Université de Montréal

Global mental health:
Building the capacity for the integration of mental health in primary care in Tunisia

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RÉSUMÉ ET MOTS CLÉS

Contexte

Dans les pays à faible et moyen revenu, s'attaquer au fardeau causé par les troubles mentaux, les troubles liés à la consommation de drogues et alcool, et l'automutilation/suicide est rendu plus difficile par le nombre limité ou la répartition inégale de professionnels formés en santé mentale. L'intégration de la santé mentale dans les soins de santé primaires par l'offre d'une formation en santé mentale pour les non-spécialistes, tels les médecins généralistes (MG), est une des solutions mises de l'avant un peu partout dans le monde pour faire face à ce problème. Afin de faciliter cette intégration, l'*Organisation mondiale de la santé* (*OMS*) a développé le *Programme d'action : Combler les lacunes en santé mentale* (*mhGAP*), et un *guide d'intervention* (*IG*) qui regroupent des interventions basées sur des données probantes visant les problèmes de santé mentale que l'*OMS* considère comme prioritaires. Cette thèse présente la mise en œuvre et l'évaluation d'une formation basée sur le programme *mhGAP,* offerte à des MG travaillant dans la région du Grand Tunis, en Tunisie, un pays à revenu intermédiaire de la tranche inférieur situé en Afrique du Nord.

Méthodes

L'évaluation du programme de formation a été faite en employant des méthodes mixtes. Premièrement, l'évaluation de l'efficacité de la formation a été réalisée à l'aide d'un essai randomisé contrôlé. Nous avons évalué l'impact de la formation sur les connaissances et les attitudes envers la santé mentale, le sentiment d'auto-efficacité pour la détection, le traitement et la gestion des troubles de santé mentale et les pratiques cliniques en santé mentale rapportées par les MG à court terme (six semaines après la formation) et à long terme (18 mois après la

formation). Deuxièmement, une étude de cas a été utilisée pour explorer comment les facteurs contextuels ont contribué à influencer les résultats obtenus.

Résultats

La formation a eu un impact significatif à court terme sur les connaissances, les attitudes et l'auto-efficacité, mais pas sur les pratiques cliniques en santé mentale rapportées. Ces changements ont été maintenus à 18 mois post-formation. De plus, les MG ont rapporté, à 18 mois, avoir réduit le nombre de références en services spécialisés comparativement à celles faites avant la formation. Toutefois, les MG ont identifié plus d'obstacles que d'éléments facilitateurs en décrivant les facteurs contextuels ayant influencé les résultats de la formation. Les méthodes qualitatives ont alors permis d'identifier des pistes de solutions que les décideurs pourraient employer pour encourager davantage la participation des MG en santé mentale.

Conclusion

L'utilisation de méthodes mixtes pour évaluer le programme de formation *mhGAP* dans la région du Grand Tunis, en Tunisie, a permis d'en arriver à une compréhension fine des enjeux liés à son implantation et de ses effets. Les résultats de cette thèse peuvent aussi s'avérer utiles dans d'autres contextes similaires où l'on vise à mieux cibler les symptômes de santé mentale non-traités en renforçant les capacités de prise en charge au niveau des soins primaires.

Mots-clés

Santé mentale, évaluation de programme, soins primaires, médecins généralistes, *mhGAP*, méthodes mixtes, Tunisie

ABSTRACT AND KEYWORDS

Background

In low- and middle-income countries (LMICs), addressing the burden caused by mental health conditions, substance use disorders, and self-harm/suicide may be challenged by the limited number and/or unequal distribution of mental health personnel. Integrating mental health into primary care settings through the training of non-specialists such as primary care physicians (PCPs) is an internationally acclaimed solution to address such challenges. To facilitate this integration, the *World Health Organization* (*WHO*) developed the *Mental Health Gap Action Programme* (*mhGAP*) *Intervention Guide* (*IG*), regrouping evidence-based interventions for what the *WHO* considers priority mental health conditions. This dissertation presents the implementation and evaluation of an *mhGAP*-based training offered to PCPs working in the Greater Tunis area of Tunisia, a lower middle-income country located in North Africa.

Methods

Evaluation of the training program employed a mixed-methods approach. First, evaluation for effectiveness was conducted using a randomized controlled trial (RCT). We assessed the short-term (six weeks post-training) and long-term (18 months post-training) impact of the training on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice. Second, a case study design was used to explore how contextual factors interacted with the implemented training program to influence its expected outcomes.

Results

The training had a statistically significant short-term impact on mental health knowledge, attitudes, and self-efficacy, but not on self-reported practice. When comparing pre-training results and results 18 months after training, these changes were maintained. In addition, PCPs reported a decrease in referrals to specialized services 18 months after training in comparison to pre-training. However, PCPs identified more barriers than facilitators when describing contextual factors influencing the training program's outcomes. Hence, qualitative methods helped identify practical challenges that decision-makers could address to further promote PCPs' involvement in mental health care in primary care settings and thus impact the health of people with mental health problems.

Conclusion

A mixed-methods approach helped create a comprehensive understanding of the implementation and evaluation of the *mhGAP*-based training in the Greater Tunis area of Tunisia. Findings may also be useful in other settings with similar profiles that aim to target untreated mental health symptoms by building individual and system-level capacity.

Keywords

Mental health, program evaluation, primary care, physicians, *mhGAP*, mixed-methods, Tunisia

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FRANÇAIS

MG	médecins généralistes
OMS	*Organisation mondiale de la santé*
mhGAP	*Programme d'action : Combler les lacunes en santé mentale*
IG	*Guide d'intervention*

ENGLISH

IRSPUM	*Institut de recherche de l'Université de Montréal*
RRSPQ	*Regroupement Stratégique en Santé Mondiale du Réseau de recherche en santé des populations du Québec*
DALYs	disability-adjusted life years
YLDs	years lived with disability
LMICs	low- and middle-income countries
HICs	high-income countries
WHO	*World Health Organization*
mhGAP	*Mental health Gap Action Programme*
IG	*Intervention Guide*
GCGMH	*Grand Challenges in Global Mental Health*
UN	*United Nations*
SDGs	Sustainable Development Goals
LICs	low-income countries
PCPs	primary care physicians
EMR	*Eastern Mediterranean Region*
PAHO	*Pan-American Health Organization*
CC	*Collaborating Center*
RCT	randomized controlled trial
WONCA	*World Organization of Family Doctors*

1…
Alla mia famiglia…
Per avermi insegnato che ogni cosa arriverà a suo tempo.

2…
To those living with mental illness…
For teaching me that there is no health without mental health.

"I only seek to call attention to aspects of global culture that seem promising and that suggest that an initial change, which is the crucial grounds for improving the moral conditions of those with chronic mental illness, may be underway. And this is what all concerned with global mental health must work to advance. The moral failure of humanity in the past does not mean we must tolerate this failure any longer."

- Arthur Kleinman (2009, p. 604)

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> “And I will raise my hand up
> Into the night time sky and count the stars
> That's shining in your eye.” – Van Morrison

CHAPTER 1: GENERAL INTRODUCTION

1.1. Background to the dissertation

1.1.1. The mental health treatment gap

Mental illness accounts for approximately 13% of disability-adjusted life years (DALYs) and 32.4% of years lived with disability (YLDs), placing it first in terms of global burden of disease for YLDs, and classifying it as equally burdensome as cardiovascular and circulatory diseases in terms of DALYs (Turner et al., 2017; Vigo et al., 2016). While mental illness exists worldwide, most of its burden lies in low- and middle-income countries (LMICs) (Jacob & Patel, 2014; Lopez et al., 2006; Lund et al., 2012; Patel et al., 2007a; Rathod et al., 2017; Thyloth et al., 2016; *WHO*, 2010). Furthermore, the treatment gap, defined as the difference between the number of people living with a mental illness in need of treatment and those who are treated (Kohn et al., 2004; Maulik et al., 2014; McBain et al., 2012), is disproportionately higher in LMICs: between 76% and 85% of people living with mental illness in such countries receive no treatment, whereas this statistic is estimated at between 35% and 50% in high-income countries (HICs) (Demyttenaere et al., 2004; Wang et al., 2007; *WHO*, 2013a).

1.1.2. *Global Mental Health:* definition and political involvement

Given evidence on untreated mental health symptoms, *Global Mental Health*, an emerging field in global health (Cohen et al., 2014), *"places a priority on improving mental health and achieving equity in mental health for all people worldwide"* (Maulik et al., 2014, p. 168; Patel & Prince, 2010). This field (and its unmet needs, disproportionality high in LMICs) has gained wide, international attention since the publication of *The Lancet Series on Global Mental Health* (*The Lancet*, 2007, 2011), which regroups landmark papers to bring to light challenges and opportunities within this often-neglected area in global health (Cohen et al., 2014; Horton, 2007;

Marquez & Saxena, 2016; Vigo et al., 2016) and set of developmental agendas (Cratsley & Mackey, 2018; Patel et al., 2018; Thornicroft & Patel, 2014; Votruba et al., 2016).

Global Mental Health's achievements since *The Lancet Series on Global Mental Health* (*The Lancet*, 2007, 2011) are numerous. First, in 2008, the *World Health Organization* (*WHO*) launched the *Mental Health Gap Action Programme (mhGAP)* (*WHO*, 2008), which aims to help countries, especially those in LMICs, increase their capacities to detect, treat, and manage priority mental, neurological, and substance use disorders. In 2010, evidence from the *mhGAP* was organized in an accompanying *Intervention Guide (IG)*, currently in its second version, in order to help non-specialists working in non-specialized settings provide care for these priority conditions (*WHO*, 2010; 2016). Second, in 2011, the *Grand Challenges in Global Mental Health* initiative (*GCGMH*), a panel of over 420 experts, was created to address implementation challenges in *Global Mental Health* (*Grand Challenges*, 2018; Patel et al., 2018), many of which were highlighted in *The Lancet Series on Global Mental Health* (*The Lancet*, 2007, 2011). Innovative projects were suggested, and funding for implementation and accompanying research was provided to those that had the highest chances of closing the mental health treatment gap in LMICs and being scaled-up in such countries (Cohen et al., 2014). Third, to ensure that an actionable plan was in place to help countries address their mental health treatment gaps, the *WHO* built upon the work of the *mhGAP* by creating the *WHO Mental Health Action Plan 2013-2020* (*WHO*, 2013a). This document, endorsed by 194 Ministers of Health at the *66th World Health Assembly* held in May 2013 (Patel et al., 2018; Saxena et al., 2013), highlights four objectives and accompanying measurable outcomes to help in the development and implementation of national mental health policies and plans. Outcomes include: stronger leadership and governance for

mental health; better integration of mental health and social care services in primary and community-based settings; an increase in mental health prevention and promotion programs; and increased information systems (*WHO*, 2013a). Last, one of *Global Mental Health*'s greatest achievements to date occurred in 2015: the formal inclusion of mental health in the *United Nations* (*UN*) Sustainable Development Goals (SDGs) (*United Nations*, 2018). Goal 3 of the SDGs, referred to as the "health goal," addresses issues related to mental health in specific targets. Target 3.4 aims to *"reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being"* (*United Nations*, 2018); and target 3.5 aims to *"strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol"* (*United Nations*, 2018). Mental health's inclusion in the SDGs suggests that the *UN* acknowledges the burden caused by mental illness and is increasingly aware of its importance in the field of global health (Cratsley & Mackey, 2018), specifically as a prerequisite to many developmental goals, such as economic growth and the elimination of poverty (Votruba et al., 2016). Of note, on October 10, 2018, *The Lancet Commission on Global Mental Health and Sustainable Development* was launched to ensure that *Global Mental Health* is not solely a field focused on reducing the mental health treatment gap, but also on reducing mental illness's contribution to the global burden of disease (Patel et al., 2018). Hence, this Commission strives to propose indicators to monitor the mental health targets put forth in the SDGs (Patel et al., 2018).

1.2. Problem statement

1.2.1. Challenges in *Global Mental Health*

Despite such international efforts surrounding *Global Mental Health*, mental health is still neglected by governments and international donors. For example, mental illness continues to receive weak funding commitments by development investors, especially in comparison to other diseases (ODI, 2016; Patel et al., 2018). For example, despite accounting for 32.4% of YLDs (Vigo et al., 2016), mental illness received 0.40% of the development assistance totalling $35.9 billion distributed in 2014 (*ODI*, 2016). However, child health, maternal health, and communicable diseases received 68% of this development assistance in 2014 despite collectively accounting for 46.9% of DALYs 25 years ago (Vigo et al., 2016).

Weak commitment to mental health is also seen within and across countries. First, mental health specialists and healthcare professionals trained in effective mental health care are limited and unevenly distributed across countries. For example, the *2017 Mental Health Atlas* (*WHO*, 2018a), an initiative that highlights mental health service gaps among high-, middle-, and low-income countries (Maulik et al., 2014; *WHO*, 2018a), found extreme variations between the availability of mental health workers in LMICs and HICs. Specifically, this variation ranges from less than one mental health worker per 100,000 people in LICs (low-income countries) to 72 per 100,000 people in HICs (*WHO*, 2018a). Moreover, mental health specialists, when available in LMICs, are unevenly distributed; they primarily practice in urban areas, leaving many regions under-serviced, if serviced at all (Kakuma et al., 2011; Kakuma et al., 2014). In addition, healthcare professionals trained in effective mental health care are lacking. Globally, in 2017, less than 2% of primary care physicians (PCPs) and nurses received at least two days of training in mental health detection, treatment, and management (*WHO*, 2015; *WHO*, 2018a). LMICs also had fewer trained personnel than HICs given that of the roughly 70% of countries with mental health

training programs, three-quarters were available only in HICs (Kakuma et al., 2014; Maulik et al., 2014). Consequently, the mental health personnel and healthcare professionals trained in effective mental health care in LMICs are not enough to meet mental health needs (Brucker et al., 2011; Kakuma et al., 2011; Kakuma et al, 2014; *WHO*, 2015; *WHO*, 2018a).

Second, a meagre amount of LMICs' health budgets are allocated to mental health (Patel, 2007; Patel et al., 2018; *WHO*, 2015; *WHO*, 2018a). For example, it is not uncommon for LMICs to allocate less than 2% of their total health budget to mental health (*WHO*, 2018a). Despite higher burden caused by mental illness in LMICs than in HICs (Jacob & Patel, 2014; Lopez et al., 2006; Lund et al., 2012; Patel et al., 2007a; Rathod et al., 2017; Thyloth et al., 2016; *WHO*, 2010), the latter's health budgets are up to 20 times bigger (*WHO*, 2018a). Arguments have been made that LMICs spend a smaller percentage of their total health budget on mental health care than HICs because of their higher rates of communicable diseases such as HIV, tuberculosis, and malaria (McBain et al., 2014; Maulik et al., 2014). However, evidence on effective and affordable mental health services is now available (Chisholm & Saxena, 2012; Chisholm et al., 2016; Levin & Chisholm, 2016; Summergrad, 2016). Therefore, advocates suggest that *"the percentage of government health expenditures dedicated to mental health is an indication of the priority given to mental health within the government's health sector"* (Maulik et al., 2014, p. 173). In addition, when a mental health budget is available in a LMIC, an average of 80% of funds are used to maintain mental health hospitals (Cohen et al., 2014; Patel et al., 2007a; Saraceno et al., 2007; *WHO*, 2013a; *WHO*, 2015; *WHO*, 2018a), whereas in HICs, this statistic is estimated at less than 43% (*WHO*, 2018a). Quality of care in psychiatric hospitals has been questioned given their often poor standards of care, frequent violations of human rights, and limited affordability (Cohen et

al., 2014; Drew et al., 2011; Levin & Chisholm, 2014; Saraceno et al., 2007; *WHO*, 2013a; *WHO Regional Office for Europe*, 2018).

Third, a key challenge in *Global Mental Health* is the development and implementation of mental health legislation, which is important in promoting the human rights of people living with mental illness (Drew et al., 2011; Maulik et al., 2014; *WHO*, 2013a; *WHO*, 2018a). Not only are these rights important for their recognition and inclusion in society, but also for their timely access to effective mental health care (Patel et al., 2018). Approximately 40% more HICs have mental health laws than LMICs (Maulik et al., 2014; *WHO*, 2018a). Of these, a greater number of HICs have updated them in the past five years than LMICs (*WHO*, 2018a). Quality of mental health legislation is also often discussed: over 65% of LMICs with mental health laws state that a human rights monitoring body does not exist within the country (*WHO*, 2018a). In contrast, this statistic is estimated at below 30% in HICs (*WHO*, 2018a). In addition, many statutory laws in LMICs use stigmatizing terms, do not include clauses that specify prosecution if not implemented, and/or do not abide international norms on human rights, such as the *UN Convention on the Rights of Persons with Disabilities* (Bhana et al., 2010; Cooper et al., 2010; Drew et al., 2011; Maulik et al., 2014; Omar et al., 2010; *United Nations*, 2006). Such deficits in promoting the rights of people living with mental illness, as advocated by pioneers of the *Global Mental Health* movement, is a moral problem in its nature (Kleinman, 2009). In other words, in many LMICs, tactics "to protect society," which are fuelled by incorrect beliefs about the dangerousness of people living with mental illness, prevail over securing the lives of people living with mental illness (Marquez & Saxena, 2016). Therefore, a system transformation to address health system disparities must inevitably also include a moral component to address the stigma and discrimination that leads to

pervasive human rights violations against people with mental illness, including limited timely access to effective mental health services (Drew et al., 2011; Kleinman, 2009; Marquez & Saxena, 2016; Patel et al., 2018; Rathod et al., 2017; *WHO*, 2013; *WHO*, 2015; *WHO*, 2018a). Until then, people living with mental illness will continue to be considered as one of the most neglected and vulnerable populations (Patel et al., 2018).

1.2.2. Potential opportunities in *Global Mental Health*

In response to this neglect, *Global Mental Health* aims to increase access to mental health care and encourage the social inclusion of people living with mental illness by promoting services *"as close as possible to people's own communities"* (*United Nations*, 2006). This view also aligns with the *Declaration of Alma-Ata*, an affirmation that primary health care, defined as the first contact with health services in the community, is essential in advancing the health of all people including those living with mental illness (*International Conference on Primary Health Care*, 1978; *The Lancet*, 2018a; *The Lancet*, 2018b; Watkins et al., 2018). In October 2018, the global community gathered at the *Global Conference on Primary Health Care*, co-hosted by the *WHO*, to renew its commitment to building strong primary health care systems by celebrating the 40th anniversary of the *Declaration of Alma-Ata* (*WHO*, 2018b) and the launch of the *Astana Declaration* (*The Lancet*, 2018b; *WHO*, 2018b; *WHO* and *UNICEF*, 2018). Global leaders present at the conference committed to strengthening health systems by further investing in primary health care's infrastructure and workforce in order to provide proximity health and mental health services (*WHO*, 2018b; *WHO* and *UNICEF*, 2018).

The *WHO* and *Global Mental Health* leaders have endorsed the integration of mental health in primary care settings (Cohen et al., 2014; Funk et al., 2008; Patel et al., 2018; Prince et al., 2014; Rathod et al., 2017; *WHO*, 2008; *WHO*, 2013a; *WHO*, 2018a; *WHO*, 2018b), for example, by further involving non-specialists in mental health care delivery (Hoeft et al., 2018; van Ginneken et al., 2013; *WHO*, 2008; *WHO*, 2010; *WHO*, 2013a; *WHO*, 2016) through an approach called *task-sharing* (Hoeft et al., 2018; Kakuma et al., 2011; Kakuma et al., 2014). Task-sharing aims to increase the implication of healthcare providers and/or lay personnel with limited training and/or experience in mental health (Hoeft et al., 2018; Kakuma et al., 2011; Kakuma et al., 2014; Murray et al. 2011). This approach responds well to realities of LMICs: given the limited number and/or unequal distribution of mental health specialists (Kakuma et al., 2014; Kohn et al., 2004; Murray et al., 2011; Patel, 2007; *WHO*, 2013a; *WHO*, 2018a), developing the capacity of available resources (i.e., primary healthcare professionals and/or the lay workforce) and relying on them for many mental health tasks will help address untreated mental health symptoms (Murray et al., 2012; Ngo et al., 2014; Whiteford et al., 2013).

This dissertation focuses primarily on task-sharing initiatives in primary care settings by primary care physicians (PCPs). Primary care is an important setting in *Global Mental Health*. First, it has been found to be a promising way to increase access to needed, timely, comprehensive, and effective mental health services that are affordable (Funk et al., 2008; Patel et al., 2018; *WHO* and *WONCA*, 2008; *WHO*, 2013a; *WHO*, 2018a). Second, integrating mental health care in primary care settings contrasts a vision of vertical (stand-alone) health programs that have traditionally been favoured in LMICs (Atun et al., 2008). Given the connection between mental illness and physical diseases (Kessler et al., 2014) (to be explored in Chapter 2, Section 2.2.2) and

therefore the need for a range of services such as provided in primary care settings (Thornicroft et al., 2018; *WHO* and *WONCA*, 2008), vertical (stand-alone) programs targeting mental illness and substance use disorders are not as effective as integrated approaches (Atun et al., 2008; Thornicroft et al., 2018). Last, with the strategic position of PCPs in many primary care settings around the globe, the *WHO* has recognized mental health care as a core component of PCPs' training (*The Lancet*, 2018b; *WHO* and *WONCA*, 2008). Therefore, since 2005, the *World Health Organization of Family Doctors* (*WONCA*) and the *WHO* have worked jointly to improve mental health training offered to PCPs (*The Lancet*, 2018b).

The importance of task-sharing by PCPs in primary care settings has also been upheld in Tunisia, a lower-middle income country (*The World Bank*, 2017) located in North Africa and part of the *WHO*'s *Eastern Mediterranean Region* (*EMR*) (Charara et al., 2017). Tunisia is the context of this dissertation's work.

1.2.3. Tunisia and *Global Mental Health*

Tunisia faces similar challenges than other LMICs with regards to the management of untreated mental health symptoms. These include: a limited mental health budget mainly used to sustain hospital settings for the treatment and management of mental illness, uneven distribution of mental health personnel, limited mental health training programs for non-specialists, and high levels of mental health stigma (Ministry of Health, 2013; Spagnolo et al., 2017a; Spagnolo et al., 2018a,b; *WHO* and Ministry of Health Tunisia, 2008). The Tunisian Ministry of Health has thus aligned its mental health objectives with those prioritized by the *WHO*. Specifically, members of the Ministry are concentrating efforts on further integrating mental health into primary care

settings to further the reach of mental health service delivery (Ministry of Health, 2013; Spagnolo et al., 2017a). Notably, the Ministry of Health's commitment to such an international trend was confirmed by the creation of the *2013 National Strategy for the Promotion of Mental Health* (Ministry of Health, 2013) and the *Committee for Mental Health Promotion* in 2015. Of note, the *2013 National Strategy for the Promotion of Mental Health* (Ministry of Health, 2013) is quite revolutionary: Tunisia is one of the few countries to have produced a mental health strategy in the *EMR*, and this region is one of the *WHO* regions with the least number of countries to have produced a mental health plan worldwide (*WHO*, 2018a).

One of the first mandates of the *Committee for Mental Health Promotion* was the focus on the mental health training of PCPs, the most relied upon non-specialists in mental health care delivery in the country (Ben Thabet et al., 2018; Ministry of Health, 2013; Spagnolo et al., 2018a). The success of PCPs' involvement in mental health care in Tunisia (Ministry of Health, 2013), similarly to other LMICs (Mendenhall et al., 2014; Padmanathan et al., 2013), is dependent upon: 1) PCPs' perceived mental health competencies; 2) the availability of effective mental health training programs targeting PCPs' mental health needs; and 3) the generation of knowledge on broader organizational and systematic factors facilitating or challenging training implementation and the involvement of PCPs in primary care settings.

1.3. Study pertinence and research questions

While mental health training programs have been offered to PCPs in Tunisia, these were few, sporadic, and not offered as part of a systematic national program (Spagnolo et al., 2017a; Spagnolo et al., 2018b). Specifically, previous mental health training programs were offered

occasionally (and haphazardly) under the leadership of individual governorate directors. Hence, PCPs continue to show deficits in mental health competencies and skills (Ben Thabet et al., 2018; Hend et al., 2012; Ministry of Health, 2013; Melki et al., 2003; Spagnolo et al., 2018a). In addition, part of the issue related to PCPs' deficits in mental health competencies may be that these previously implemented training programs were never evaluated for effectiveness, and neither were contextual factors interacting with such programs to influence its expected outcomes identified and explored either.

This dissertation aims to fill these gaps in Tunisia by piloting the implementation and evaluation of an adapted mental health training program, offered to PCPs working in the Greater Tunis area of Tunisia. The training program was based on the *mhGAP-IG* (*version 1.0*) (*WHO*, 2010) and offered under the leadership of the *Committee for Mental Health Promotion* (a national entity comprising members of the Ministry of Health in Tunisia), whose reach and governance in Tunisia are assets for potential scale-up. The *Committee for Mental Health Promotion* worked in collaboration with the *School of Public Health* at the *Université de Montréal* (Québec, Canada), the *WHO* office in Tunisia, and the *Montréal WHO-Pan American Health Organization (PAHO) Collaborating Center (CC) for Research and Training in Mental Health* (Québec, Canada).

This dissertation aims to answer the following research questions:

1) What is the impact of a mental health training program based on the *mhGAP-IG* (*version 1.0*) on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice?

2) How do contextual factors influence the implementation and expected outcomes of a mental health training based on the *mhGAP-IG* (*version 1.0*) in the Greater Tunis area of Tunisia?

Evaluation employed a mixed-methods approach, using the embedded design (Creswell & Plano Clark, 2018). Specifically, evaluation for effectiveness was conducted using an exploratory trial, which included a randomized controlled trial (RCT) (research question 1). Exploration of contextual factors that influenced the implementation and expected outcomes of the *mhGAP*-based training (research question 2) was conducted with implementation analysis using a case study design (Champagne et al., 2011).

Beyond practical and research pertinence to Tunisia, this pilot project contributes more widely to the *Global Mental Health* field. Despite its implementation in over a hundred countries (*WHO*, 2018c), the *mhGAP*-based training, to our knowledge, has rarely been implemented (and never evaluated) in a French-speaking nation (Keynejad et al., 2018; Spagnolo et al., 2017a). The implementation of the *mhGAP-IG* (*WHO*, 2010) in Tunisia would thus serve to expand the program's limited evidence in French-speaking nations and, more generally, in LMICs with similar profiles (Keynejad et al., 2018; Spagnolo et al., 2017a). In addition, the *mhGAP-IG* (*WHO*, 2010; 2016) is very rarely evaluated using an RCT design (Akol et al., 2018; Keynejad et al. 2018). Not only is this type of research design pertinent for the *mhGAP-IG* evidence-base, it also fills a gap in *Global Mental Health* research given a dearth of such methodology specifically in LMICs (Thornicroft et al., 2012; Thornicroft & Patel, 2014).

While mental health training is primary in building individual capacity, non-specialists, such as PCPs, work in a health context that may facilitate or challenge training implementation and their involvement in mental health care. Thus, identifying such contextual factors in Tunisia is also pertinent, more generally, for other LMICs facing mental health challenges related to untreated symptoms of mental illness (Cohen et al., 2014; Funk et al., 2008; Kohrt et al., 2018; Prince et al., 2014; Rathod et al., 2017; *WHO*, 2008; *WHO*, 2013a; *WHO*, 2018a). Of note, this information is of current priority in *Global Mental Health* to further aid in the implementation of training programs and to further build health system capacity to support the involvement of non-specialists in mental health care delivery (Betancourt & Chambers, 2016; Halon, 2017; Keynejad et al., 2018; Thornicroft & Patel, 2014).

1.4. Dissertation structure

This dissertation contains five chapters, enumerated and explained below.

Chapter 2 of this dissertation presents a literature review that expands on information provided in this chapter. Specifically, it expands on *Global Mental Health*'s definition by providing an overview of mental illness, its burden, and implications for public health. It then highlights task-sharing initiatives in *Global Mental Health*, with a focus on primary care settings and the role of PCPs in mental health care delivery. Finally, this chapter will conclude with an overview of challenges and opportunities for mental health care in Tunisia, notably through the involvement of PCPs.

Chapter 3 presents the study protocol published in *BMC Health Services Research* (January 2017) (Spagnolo et al., 2017a). This published protocol was preliminarily adapted from the originally conceived protocol defended in June 2015 at the *School of Public Health* at *Université de Montréal*. However, further modifications to this preliminarily adapted protocol were suggested by local partners to better meet the realities of the Greater Tunis area of Tunisia and to ensure feasibility of the study. Such adaptations, which were followed in this dissertation, will be presented, along with accompanying detailed explanations.

Dissertation results are presented in four articles in Chapter 4. The first article describes the adaptation of the *mhGAP-IG* training program (*version 1.0*) (*WHO*, 2010) to the primary care realities of the Greater Tunis area of Tunisia. It was published in the journal *Global Mental Health* (May 2018) (Spagnolo et al., 2018b). The second article describes the study's sample of PCPs' mental health knowledge, attitudes, and self-efficacy prior to the implementation of the adapted *mhGAP-IG* training (*version 1.0*) (*WHO*, 2010), as well as characteristics that may be associated with such competencies. In this article, we also provide reliability measures for the data collection tools used in the study. This article was published in the *International Journal of Mental Health Systems* (October 2018) (Spagnolo et al., 2018a). The third article assesses the impact of the adapted training program on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice, using an exploratory trial comprising several designs (i.e., a *pretest-posttest control group design* (an RCT), a *one-group pretest-posttest design*, and *a repeated measures design*). The article was accepted for publication pending minor revisions by the journal *Health Policy and Planning* (April 2019). Using a case study design with a purposeful sample of 18 trained PCPs, the last article explores contextual factors that interacted with the adapted *mhGAP-*

IG training (*version 1.0*) (*WHO*, 2010) to influence its expected effects. The article was published in the journal *BMC Public Health* in December 2018 (Spagnolo et al., 2018c).

Chapter 5 is dedicated to a synthesis of the study's main results. In addition, it discusses their contribution and pertinence to the dissertation as well as the field of *Global Mental Health*. These contributions have been outlined in the form of a "lessons learned" manuscript, supported by evidence in the field of *Global Mental Health* to highlight their international pertinence. The "lessons learned" article was published in the *Journal of Global Health Reports* (April 2019). Following this manuscript, Chapter 5 concludes with the strengths and limitations of the dissertation's practice and research aspects, as well as future practice and research recommendations.

This dissertation represents the results of five and a half years of intensive work, six months of which I spent in Tunis, Tunisia, working alongside members of the Tunisian Ministry of Health invested in further integrating mental health into primary care settings, members of the *WHO* office in Tunisia also supporting this integration, and medical personnel involved in the training of PCPs in effective mental health care. Through these invaluable experiences and collaborations, as well as my involvement in all aspects surrounding this project, including its conception, development, implementation, evaluation, analyses, and dissemination of results, I am grateful for the acquisition of new knowledge and skills. Most of all, I am humbled by the generosity of the community surrounding this dissertation, and the support that it (and I) received for its completion.

CHAPTER 2: REVIEW OF THE LITERATURE

2.1. Synopsis

The literature review presented in this section of the dissertation builds upon Chapter 1. Specifically, it expands on *Global Mental Health*'s definition by providing an overview of mental illness, its burden, and its implications for public health (2.2). This section is followed by an overview of the role of primary care settings in addressing mental illness's burden, with a focus on task-sharing initiatives facilitating and challenging PCPs' involvement in mental health care delivery (2.3). Finally, this chapter concludes with an exploration of the context of this dissertation's work: Tunisia. An overview is presented of the country's mental illness burden, as well as the challenges and opportunities it faces for effective mental health care delivery, notably by the involvement of PCPs (2.4).

2.2. Exploring mental illness

2.2.1. Defining mental illness

Mental illness, often used interchangeably with *mental disorder* or *mental health condition*, refers to *"the presence of a cluster of symptoms that marks a definite change from a previous psychological state for an individual"* (Kendall et al., 1986). Mental illness includes a broad range of conditions, such as common mental disorders (i.e., depression, anxiety disorders, somatoform disorders), severe mental disorders (i.e. schizophrenia, bipolar affective disorder, severe depression episodes with or without psychosis), neuropsychiatric disorders (i.e., developmental disorders, epilepsy, dementia), and substance use disorders (alcohol and drug use disorders) (Gureje et al., 2014).

Pertinent to this dissertation are depressive disorders, anxiety disorders, schizophrenia, substance use disorders, and suicide/self-harm, as their burden influenced the choice of training modules for PCPs in Tunisia (to be discussed in Section 2.4). Depression and anxiety disorders represent most of the 13% of DALYs caused by mental illness (Prince et al., 2014; Vigo et al., 2016; Whiteford et al., 2013). Specifically, they represent 40.5% and 14.6% of this burden, respectively (Whiteford et al., 2013). Following depression and anxiety disorders, the largest burdens are related to drug (10.9%) and alcohol use (9.6%) disorders, and schizophrenia (7.4%) (Whiteford et al., 2013). While suicide/self-harm is not considered a category of mental illness per se, it is associated with mental disorders, and therefore contributes to its share of the burden. Specifically, studies reveal that 90% of completed suicides (86% of which occur in LMICs) (Prince et al., 2007) are due to underlying mental illness (Arsenault-Lapierre et al., 2004).

Of note, *mental health* is often confused with the absence of mental illness (Galderisi et al., 2015; Manwell et al., 2015). However, mental health is defined broadly as *"a state of well being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community"* (*WHO*, 2014). Therefore, imperative to acknowledging the mental health of an individual are two aspects: addressing mental illness, which is concerned with biomedical markers of disorders (Gureje et al., 2014); and providing individuals living with mental illness opportunities for participation and inclusion in society (Boardman, 2011). Thus, the definitions of *mental illness* and *mental health* are both dire to the *Global Mental Health* field, as they promote the recognition of individuals living with mental illness through the securing of their human rights (Drew et al., 2011; Maulik et al., 2014; *WHO*, 2018a): their right to accessible and quality health care to detect, treat, and manage mental illness (Hein et al., 2018; Vigo et al., 2016) and their right to participate in and make contributions to social life, which promotes positive mental health (Boardman, 2011; Kessler et al., 2014; Kleinman, 2009). In this dissertation, a focus is placed on aspects that primarily rely on the definition of *mental illness*, that is, the right of people living with mental illness to accessible and quality health care in order to detect, treat, and manage mental disorders.

2.2.2. Mental illness's implication for public health

Mental illness is a major public health concern for several reasons. While mental disorders span all ages, findings show that 50% of mental disorders start before the age of 14 (Turner et al., 2017) and 75% before the age of 25 (Lu & Patel, 2018). These statistics are unsurprising; the proportion of disease burden attributed to mental illness is highest in adolescents and young to middle-aged

adults (i.e., 10-29 years of age) (Kessler et al., 2014; Patel et al., 2007b; Whiteford et al., 2013). This age period is important to consider from a public health perspective; more that 40% of the world population is under the age of 24, most of which live in LMICs (i.e., over 90%) (Erskine et al., 2015; Lu & Patel, 2018). For example, records show that youth represent 47% of the population in LMICs as compared with 30% in HICs, and in the former countries, it is expected to rise (Erskine et al., 2015). Specifically, infant survival rates are said to increase in LMICs due to decreasing infectious disease rates, causing more people to live at the ages where mental illness is more likely to develop (Erskine et al., 2015; Lu & Patel, 2018; Turner et al., 2017). Youth and young adulthood are also characterized by rapid biological, cognitive, social, and emotional changes, all important for identity and health development in adulthood (Patel et al., 2007b; Schulenberg et al., 2004). Therefore, untreated mental illness in the period before adulthood may cause maladaptive behaviours and pathways, thus increasing the potential severity of prognosis (Kieling et al., 2011). These negative consequences in youth have been linked with poor education performance, unemployment, and higher rates of criminality in adulthood (Erskine et al., 2015).

Mental disorders may be associated with non-communicable diseases and worse prognosis of communicable diseases. Studies show that major depression has a high chance of predicting the onset of cardiovascular diseases (Albus, 2010; Prince et al., 2014), stroke (Everson et al., 1998; Larson et al., 2001), diabetes (Sridhar, 2007), and some cancers (Kessler et al., 2014). In contrast, while schizophrenia does not necessarily predict the onset of certain non-communicable diseases, people living with schizophrenia incur higher risk of death from conditions such as heart disease, stroke, diabetes, influenza, and cancer in comparison to the general population (Crump et al., 2013). Studies also show that people living with mental illness are up to five times more

likely to develop a smoking habit than the general population (Boksa, 2017; Minichino et al., 2013; De Leon & Diaz, 2005). Higher smoking rates in people living with mental illness is problematic given its link to an increased risk of developing heart disease and lung cancer (*WHO*, 2018d). In addition, living with certain mental health problems has been shown to aggravate the course of some physical disorders (Kessler et al., 2014). For example, associations have been found between mental health problems and worse HIV prognosis (*WHO*, 2018d), especially among high-risk populations, such as people living with substance use disorders (Prince et al., 2014) and psychosis (Cournos et al., 2005). There are also associations between physical diseases and higher prevalence of certain mental health conditions. For example, diabetes may be associated with high prevalence of depression (Bădescu et al., 2016; Moussavi et al., 2007; Robinson et al., 2018) and eating disorders (Crow et al., 2001; Jones et al., 2000), while HIV may be associated with high prevalence of affective disorders (Ciesla & Roberts, 2001). Beyond communicable and non-communicable diseases, people with mental disorders have an elevated risk of suicide attempts and suicide deaths (Cavanagh et al. 2003; Nock et al., 2010; *WHO*, 2018b). Specifically, anxiety, mood, impulse-control, and substance use disorders significantly predict suicide attempts (Nock et al., 2010), and psychological autopsies conducted on people who died by suicide reveal that co-morbid mental and substance use disorders preceded suicide in most cases (Cavanagh et al., 2003).

These consequences result in elevated morbidity and mortality risk, and, thus, a decrease in life expectancy for people living with mental illness by up to 20 years, as compared to the general population (Chesney et al., 2014; WHO, 2018d). These risks have: 1) led mental health advocates to urge public health officials to consider people living with mental illness as a high-

risk population (Chesney et al., 2014); and 2) prompted the *WHO* to create the *Guidelines on the management of physical conditions in adults with severe mental disorders* to help address the risk factors contributing to the elevated morbidity and mortality risks of people living with mental illness (*WHO*, 2018d). These guidelines were launched at the *Healthier, Longer Lives Conference* in November 2018 (*Healthier, Longer Lives*, 2018).

Mental disorders are also a public health concern for what Kleinman (2009) calls a *"social death"* (p. 604). Specifically, given the stigma and discrimination attached to mental illness, in most cases, *"the individual is no longer valued as an effective node in the network of connections that form social life"* (Kleinman, 2009, p. 604). For example, studies show that mental disorders, especially if untreated, may result in: 1) premature termination of education (Esch et al., 2014), associated with poorer health, lesser functioning in civic life, and greater financial instability (Lee et al., 2009); 2) low probability of ever marrying, or early marriage, associated with less financial security and cultural stigma in certain countries (Breslau et al., 2011; Kleinman, 2009); and 3) greater chances of being unemployed (Luciano & Meara, 2014), contributing to lower household incomes than those without mental illness (Lund et al., 2010). In addition, studies show that poverty, unemployment, and its associated conditions, such as psychological and physical stress, have been linked to increased risks of mental illness (ex.: anxiety and depression) and/or the maintenance of ill-mental health (Lund et al., 2010; Lund et al., 2014).

Burden associated with mental illness has increased by 37.6% between 1990 and 2010 and is estimated to rise further. This rise is due to population growth and ageing (Murray et al., 2012; Ngo et al., 2013; Whiteford et al., 2013), encouraged by a decrease in mortality caused by

communicable diseases, especially in LMICs (Baranne & Falissard, 2018; Murray et al., 2012), as well as current instabilities faced by numerous countries (Charara et al., 2017). Therefore, it is speculated that changes in population and disease, as well as in civil unrest and instability, will cause more people to be living with mental illness and for longer periods of time (Ngo et al., 2013; Whiteford et al., 2013). Given limited international investment in mental illness in comparison to other diseases and governmental neglect causing health system challenges that prevent timely access to effective mental health care, opportunities to increase access to such care in cost-effective, feasible, and scalable ways are encouraged, especially for LMICs (Marquez & Saxena, 2016; Thornicroft & Tansella, 2002; *WHO*, 2013a). Specifically, pioneers of the *Global Mental Health* movement support and encourage integrating mental health into primary care settings (Funk et al., 2008; *WHO* and *WONCA*, 2008). This integration is urged specifically through the development and efficient use of available human resources (Hoeft et al., 2018; Kakuma et al., 2011; Kakuma et al., 2014; Saraceno et al., 2007; van Ginneken et al., 2013; Vigo et al., 2016).

The next sections of the literature review will explore the benefits of receiving mental health care in primary care settings. In addition, it will provide an overview of initiatives (especially in LMICs) to further involve non-specialist health workers (specifically PCPs) in mental health care delivery within such settings.

2.3. Building mental health capacity in primary care settings

2.3.1. Why integrate mental health into primary care settings?

At the core of the integration of mental health into primary care settings is the transition from an over-reliance on institutional settings for mental health care to a care model mostly involving

services offered close to people's homes, within their respective communities (Patel et al., 2018; Thornicroft & Tansella, 2009; Thornicroft et al., 2016; *WHO*, 2008; *WHO*, 2013a). This transition, however, is lagging, particularly in LMICs. Given continued high investment of available mental health budgets to sustain institutional-based mental health care, the involvement of primary care settings (and their healthcare professionals) in mental health care is not always prioritized by decision-makers (Cohen et al., 2014; Patel et al., 2018; Saraceno et al., 2007; Shen et al., 2017; Thornicroft & Tansella, 2009; Thornicroft et al., 2016; *WHO* and *WONCA*, 2008; *WHO*, 2013a; *WHO*, 2018a).

Primary care settings have been encouraged since the publication of the *Alma-Ata Declaration* (*Alma-Ata Declaration*, 1978) and, more recently, the *WHO's World Health Report on Primary Health Care* (*WHO*, 2008), the *WHO Mental Health Action Plan 2013-2020* (*WHO*, 2013a), and the *Astana Declaration*, a commitment renewal to primary health care forty years after the publication of the *Alma-Ata Declaration* (*WHO* and *UNICEF*, 2008). Studies show that a model of care primarily based on institutional settings is a major barrier to developing accessible mental health services for a wider population. Specifically, in LMICs, facility-based settings are often inaccessible, since they are mostly concentrated in bigger cities (Ngui et al., 2011; *WHO*, 2013a; *WHO*, 2018a). These can be many hours away from people needing mental health care, who thus require time and funds for transportation (Ali et al., 2016; Drew et al., 2011; Omi Jack-Ide et al., 2013; Tristiana et al., 2018). Geographic barriers to mental health services are important to consider because they have been associated with failure to seek and continue treatment (Drew et al., 2011; Kelly et al., 2017; Thornicroft et al., 2016; *WHO* and *WONCA*, 2008; *WHO*, 2013a). In addition, inaccessible facilities for the majority have been shown to negatively impact the lives

of people consulting them. For example, receiving treatment in hard-to-reach facilities separates people from their communities and support systems, making it difficult to maintain daily living activities such as employment, which is linked to greater financial stability and community inclusion (Drew et al., 2011; Funk et al., 2008; Ngui et al., 2011; Patel et al., 2018). In contrast, mental health services offered within primary care settings are shown to increase access to needed mental health services for the majority (*WHO* and *WONCA*, 2008). Such proximity services are important not only to ensure timely care, but also to maintain service users' connection to their communities, which is integral to recovery (Baumgartner & Susser, 2013; Funk et al., 2008; Patel et al., 2018; Piat et al., 2017; *WHO* and *WONCA*, 2008; Young & Ensing, 1999).

Mental health services offered within primary care settings are also advocated for because they have been shown to provide better quality of care than psychiatric hospitals (Funk et al, 2008). First, offering mental health services within primary care settings may reduce the stigma often attached to people with mental disorders and their carers. Since primary care settings do not explicitly target mental health care, but rather a wide range of health issues (Lund et al., 2012; Patel et al., 2013; *WHO* and *WONCA*, 2008; *WHO*, 2013a), the reason for consultation may not be overtly apparent, thus reducing stigma in comparison to psychiatric hospitals (Lund et al., 2012; Patel et al., 2013). Second, mental illness is more easily detectable in primary care settings than in facility-based settings, due to the former's proximity to the community and thus greater accessibility (*WHO* and *WONCA*, 2008; Wittchen et al., 2003). Early detection of mental illness is essential because it reduces the duration of untreated symptoms related to illness and is directly linked with better prognosis (Collins et al. 2011; Ghio et al., 2014; Sharma et al., 2009). Third, quality of mental health care is enhanced in primary care settings, given their ability to provide a

broad range of services for diverse health conditions (Kringos et al., 2010; Starfield et al., 1994; Thornicroft et al., 2016; Thornicroft et al., 2018; *WHO* and *WONCA*, 2008). Comprehensive services are necessary given the links between mental illness and communicable and non-communicable diseases (Albus et al., 2010; Bădescu et al., 2016; Ciesla & Roberts, 2001; Cournos et al., 2005; Crow et al., 2000; Everson et al., 1998; Jones et al., 2000; Kessler et al., 2014; Larson et al., 2001; Moussavi et al., 2007; Prince et al., 2014; Robinson et al., 2013; Sridhar, 2007; Thornicroft et al., 2018; *WHO*, 2018d; *WHO* and *WONCA*, 2008). The range of services offered in primary care settings thus helps create a "one-stop shop" (Schäfer et al., 2017) to focus on "the whole patient" (Patel et al., 2013), which increases satisfaction with services received (Thornicroft et al., 2016). Fourth, a holistic focus on patients through this "one-stop shop" helps enhance continuity of care, in comparison to psychiatric hospitals (Schäfer et al., 2017). For example, studies show that as the range of services offered by primary healthcare workers augments, so does the reported perception of continuity of care by mental health service users (Patel et al., 2013; Schäfer et al., 2017). Last, rapport built between patients and primary healthcare workers has been linked with long-standing clinical relationships (Schäfer et al., 2017; Thornicroft et al., 2016). This long-standing clinical relationship encourages greater adherence to treatment regimes (Funk et al., 2008), better identification of needs given healthcare workers' understanding of their patients' personal and living conditions, and increased tailored support (*WHO* and *WONCA*, 2008).

The provision of mental health services within primary care settings and closer to (and embedded within) communities is also increasingly advocated for given reports of frequent and recurrent violation of human rights in psychiatric institutions, especially in LMICs (Patel et al.,

2018). For example, reports show that people receiving care in such settings often live in unacceptable conditions. These include overcrowding, a limited number of beds, forcing people to sleep on dirty floors (or on a dirty mattress on the floor), frequent outbreaks of preventable diseases given unsanitary conditions, and inadequate food (if any at all) (Drew et al., 2011; Humans Right Watch, 2015; Mkize, 2007; Ngui et al., 2010; Poreddi et al., 2013; Shen et al., 2017; *WHO* and *WONCA*, 2008). People receiving care within psychiatric institutions in LMICs are often treated like prisoners: restrained, shackled, locked away in cells and/or cages, watched by guards (some armed with guns), and/or detained without consent (Alem, 2000; Humans Rights Watch, 2015; Poreddi et al., 2013; *WHO* and *WONCA*, 2008; Yamin & Rosenthal, 2005). Little attention in psychiatric hospitals is paid to recreational activities, such as reading, exercise, and socialization, leaving many service users completely isolated (Mkize, 2007; *WHO* and *WONCA*, 2008). Reports also indicate frequent verbal, physical, and sexual abuse by staff (Drew et al., 2011; Lucas & Stevenson, 2004, Mkize, 2007; *WHO* and *WONCA*, 2008; Yamin & Rosenthal, 2005). When this abuse is reported to other staff members and/or hospital administration, complaints rarely result in repercussion (Lucas & Stevenson, 2004). In addition, people living within psychiatric institutions are often subjected to inappropriate and violent medical care, such as medication without consent, forced sedation, and over-medication (Yamin & Rosenthal, 2005; *WHO* and *WONCA*, 2008; Humans Right Watch, 2015). Of note, human rights violations occurring within psychiatric institutions are not solely an issue of LMICs. For example, in 2018, a quality assessment of long-term institutions housing people with intellectual and psychosocial difficulties was conducted for the *WHO European Region* (*WHO Regional Office for Europe*, 2018). The report confirmed that currently, in Europe, many institutional settings for the care of people living with severe mental illness are worrisome. For example, findings show that many

service users are housed in old, overcrowded, poorly ventilated, bug-infested institutions with limited privacy, including in bathrooms. Stalls often have no doors, and showers, no curtains (*WHO Regional Office for Europe*, 2018). Abuse and maltreatment were also reported within these institutions, in the form of shaming, restraint, isolation, over-medication, sexual abuse, neglect, and favoritism (*WHO Regional Office for Europe*, 2018).

Testing the cost-effectiveness of the provision of mental health services in primary care settings is an emerging research area in *Global Mental Health* (Chisholm, 2005; Shah & Jenkins, 2000; Watson et al., 2018; *WHO*, 2013b). Cost-effectiveness in the field of mental health aims to summarize *"the efficiency with which an intervention produces health outcomes, […] a 'very cost-effective' intervention [being] one that generates an extra year of healthy life for a cost that falls below the average annual income per person"* (*WHO*, 2013b, p. 18). Such evidence is of interest in the *Global Mental Health* field; since a substantial amount of mental health funding continues to be invested in institutional-based settings in LMICs, mental health advocates are increasingly concerned about misplaced (and rising) health expenditures to target untreated mental health symptoms (Chisholm, 2005; *WHO*, 2013b; *WHO*, 2018a). To encourage decision-makers to transition mental health funding mainly from institutional settings to primary care settings, where services are more accessible, gathering evidence on resource implications for the development of these new strategies and packages is dire (Kakuma et al., 2014; Levin & Chisholm, 2016; ODI, 2016; Shah & Jenkins, 2000; Watson et al., 2018; *WHO*, 2013b; *WHO*, 2018a). However, most economic evaluations in health are conducted in HICs, making it difficult to generalize the data to LMICs (Pitt et al., 2016). While economic evaluations conducted in LMICs are still in their infancy (Horton et al., 2017; Watson et al., 2018), evidence generated on

cost-effectiveness from such countries is clear: certain mental health services offered within primary care settings may maximize health outcomes while minimizing health expenditures (Gureje et al., 2007; Levin & Chisholm, 2016; ODI, 2016; Watson et al., 2018; *WHO*, 2013b; *WHO*, 2018a). For example, trials show several cost-effective mental health initiatives in primary care settings: screening for mental illness; providing pharmacological treatments for common mental disorders (i.e., depression and/or anxiety); providing psychosocial support, such as psychotherapy for depression, psychosis, and alcohol use disorders; and using newer antipsychotics for the treatment of schizophrenia (Araya et al., 2006; Buttorff et al., 2012; Chisholm, 2005; Chisholm et al., 2012; Levin & Chisholm, 2016; Patel et al., 2003; Patel et al., 2007; Prukkanone et al., 2012; Shah & Jenkins, 2000; Watson et al., 2018; *WHO*, 2013b). Interestingly, studies also point to the cost-effectiveness of offering mental health services by leveraging existing community-based platforms designed to care for individuals with communicable and non-communicable diseases, such as HIV/AIDS, tuberculosis, maternal health, and other chronic conditions (i.e., cancer, diabetes, and cardiovascular diseases) (Das et al., 2016; Jack et al., 2014; Ngo et al., 2013; Patel et al., 2013; Peterson et al., 2014). Authors note that using these platforms for mental health care is cost-effective, seeing as many LMICs have already established effective chronic disease programmes, some of which have been scaled up, such as those for HIV/AIDS (Mall et al., 2017; Rabkin & El-Sadr, 2011).

Of note, in order to benefit from the integration of mental health into primary care settings, efficient use of available human resources becomes vital (Kakuma et al., 2011; Kakuma et al., 2014; Saraceno et al., 2007; *WHO*, 2008; van Ginneken et al., 2013; Vigo et al., 2016). *Global Mental Health* encourages the increased implication of primary healthcare workers with less

training and experience in mental health (Hoeft et al., 2018; Kakuma et al., 2011; Murray et al. 2011; Kakuma et al., 2014). Identified opportunities in and challenges to the successful involvement of PCPs (specifically) through task-sharing (especially in LMICs) will be explored in the next sections.

2.3.2. Task-sharing with primary care physicians in primary care settings

2.3.2.1. Opportunities

Human resources working in *Global Mental Health* regroup in different cadres. These include, naturally, mental health specialists, such as psychiatrists, neurologists, psychologists, psychiatric nurses, social workers, and occupational therapists (Kakuma et al., 2011; Kakuma et al., 2014; van Ginneken et al., 2013; *WHO*, 2018a). However, it is estimated that LMICs are missing 1.18 million mental health specialists to adequately address untreated mental health symptoms (Mendenhall et al., 2014). A dearth of mental health specialists has encouraged the involvement of other types of human resources to address untreated mental health symptoms. These include healthcare professionals working in primary care settings (i.e., PCPs and nurses) (Kakuma et al., 2011; Kakuma et al., 2014) and community health workers, who often take different names, such as community health aides, village health workers, community health advocates, lay health workers, and community health promoters (Huang et al., 2018; Pallas et al., 2013). Both primary healthcare professionals and community health workers are considered non-specialist health workers in *Global Mental Health* given their limited mental health training and/or experience in the field of mental health (Kakuma et al., 2011; Kakuma et al., 2014; van Ginneken et al., 2013; *WHO*, 2018a).

To further involve such non-specialists in mental health care delivery in primary care settings, task-sharing is encouraged. Task-sharing is derived from its predecessor, task-shifting, popularized by initiatives in HIV/AIDS (*WHO*, *PEPFAR* and *UNAIDS*, 2008; Callaghan et al., 2010). Task-shifting suggests that *"specific tasks are moved, where appropriate, from highly qualified health workers to health workers with shorter training and fewer qualifications in order to make more efficient use of the available human resources for health"* (*WHO*, *PEPFAR* and *UNAIDS*, 2008, p. 2). In the field of *Global Mental Health*, task-sharing has widely replaced task-shifting, based on studies showing the inadequacies of role substitution, with no collaboration, between specialist and non-specialist health workers for mental health care (Hoeft et al., 2018; Mendenhall et al. 2014). Task-sharing thus allows for the creation of a model of care where limited specialists are better utilized, not replaced. For example, instead of being solely responsible for mental health detection, treatment, and management, the role of specialist changes to that of supporting, training, and/or supervising non-specialist health workers as they deliver mental health care in primary care settings (Hoeft et al., 2018; Kakuma et al., 2011; Kakuma et al., 2014; Mendenhall et al., 2014). These new roles also foster greater, more sustainable collaboration between primary care settings and specialized settings (Hoeft et al., 2018).

For the purposes of this dissertation, a focus is placed on PCPs and their role in mental health care delivery in primary care settings. PCPs are often the first point of contact that people with mental illness have with the health care system, especially in middle- and high-income countries (Blashki et al., 2003; Fleury et al., 2012; Lum et al., 2008; Patel et al., 2010; Schäfer et al., 2017; Schultz et al., 2017; *WHO* and *WONCA*, 2008; Wittchen et al., 2003). Their mental health role within primary care settings may include: detecting and diagnosing mental health

conditions; treating such conditions, for example, with psychoeducation, prescription of medication, and brief therapy; referring more complex cases to specialized services; and providing service users and their carers with useful information about mental health services within the community and/or connecting them to such services (Araya et al., 2003; Fleury et al., 2012; Fricchione et al., 2012; Kakuma et al., 2011; Linden et al., 1999; Lum et al., 2017; Patel et al., 2008; Saxena et al., 2007; Starfield, 1998; *WHO* and *WONCA*, 2008). In addition, PCPs with mental health training have sometimes adopted the role of trainer and supervisor to community health workers in less resourced settings (Kakuma et al., 2014).

Given that PCPs are not as readily available in lower resourced settings (Celletti et al., 2011; Chen et al., 2004), the majority of mental health task-sharing initiatives involving PCPs are implemented and studied in settings with greater resources. However, highlighting opportunities in and challenges to the role of PCPs in mental health task-sharing initiatives in LMICs is timely, given the global community's increased recognition of general medical practice (or family medicine) (Mash & Reid, 2010; Kidd, 2013; Rouleau et al., 2018; *WONCA*, 2018), which has been described as *"a source of first-contact, person-centered, and community-based generalist medical care"* (Rouleau et al., 2018, p. 21). Specifically, studies show that between 1995 and 2015, countries reporting general medical practice programs went from 56 to 132, a surge also seen in LMICs (Rouleau et al., 2018).

General medical practice is being increasingly advocated for in *Global Mental Health* given evidence of its ability, through the primary healthcare team under the leadership of the PCP, to provide comprehensive and integrated services that lead to better health outcomes for the

population and fewer hospitalizations (Collins et al., 2011; Mash & Reid, 2010; Kidd, 2013; Rouleau et al., 2018; Thornicroft et al., 2018; *WHO* and *WONCA*, 2008). Hence, studies show that the benefits of developing general medical practice overlap with those of providing health services within primary care settings (Mash & Reid, 2010; Moosa et al., 2014; Rouleau et al., 2018; Thornicroft et al., 2018). *WONCA* stands at the forefront of support for quality general medical practice worldwide (*WONCA*, 2018). Specifically, the organization advocates for the establishment of an academic department of general medical practice in every medical school (*WONCA*, 2018).

2.3.2.2. Challenges

While general medical practice is developing in LMICs, studies show that PCPs still lack mental health competencies vital to the success of task-sharing initiatives (Kakuma et al., 2014; Maulik et al., 2014; *WHO*, 2005; *WHO*, 2015; *WHO*, 2018a). First, PCPs reported lacking specific knowledge about mental illness and suicide (Sun et al., 2007; Liu et al., 2008; Cowan et al., 2012; Almanzar et al., 2014). While PCPs do see people presenting with mental health problems in consultation, the majority are not able to list or recognize symptoms attributable to mental illness, affecting proper diagnosis and treatment (Afana et al., 2002; Koopman et al., 2008; Irfan et al., 2015; Salwan et al., 2014; Mutiso et al., 2017). Interestingly, this is also a reality observed with depression and anxiety (Almarzar et al., 2014; Ben Thabet et al., 2018), despite these being the most frequently reported and seen mental health problems in non-specialized settings (Patel et al., 2010). In addition, PCPs have difficulties identifying medications used in mental health care, such as antidepressants and antipsychotics (Liu et al., 2008; Hend et al., 2012; Ministry of Health, 2013; Ben Thabet et al., 2018).

Second, studies show that the healthcare system, even if non-institutional, is an environment where people living with mental health problems experience varying levels of stigma (Ungar et al., 2016). Negative experiences within the healthcare system are attributable in part to PCPs' stigma against mental illness. For example, studies show how common it is for healthcare workers to believe that people with mental illness are "violent" and "dangerous" (Adewuya et al., 2007; Liu et al., 2008; Alfredsson et al., 2017). Studies also show that this stigma encourages healthcare professionals to associate mental illness with personal, moral faults or weakness (Mbatia et al., 2009; Cowan et al., 2012; Almanzar et al., 2014) and to describe people consulting for mental health conditions with derogatory terms, such as "crazy" and "mad" (Gwaikolo et al., 2017). Thus, it is not surprising that due to negative beliefs about people living with mental illness, PCPs are less likely to personally engage with this type of clientele and show empathy (Adewuya et al., 2007; Schulze, 2007; Van Boekel et al., 2013). In addition, studies mention that stigma against mental illness even deters medical students from considering "psychiatry" as a preferred specialty (Kassam et al., 2010; Alaa El-Din et al., 2016).

Third, self-efficacy, a concept first introduced by Bandura (1977; 2006), is defined as one's beliefs in his/her capability to succeed in a specific situation or task. Bandura (1977) suggests that individuals with higher levels of self-efficacy will invest themselves more in a specific task and are generally more successful than those with lower levels of self-efficacy. In our case, this concept translates into PCPs' belief in their capability to successfully detect, treat, and manage mental health issues at the level of primary care (Spagnolo et al., 2017a). Studies show that PCPs question their involvement in the field of mental health because they are not confident in their general mental health skills (Liu et al., 2008; Angdembe et al., 2017;

Subramaniam et al., 2018). Lower levels of confidence in mental health skills are reportedly one of the main factors influencing PCPs' decisions to refer patients to specialized mental health services (Kravitz et al., 2006; Anthony et al., 2010). Hence, studies assessing the feasibility and acceptability of using such non-specialists in mental health care commonly highlight the need for ongoing mental health training in order to "boost" confidence (Jacob, 2001; Mendenhall et al., 2014; Hou et al., 2016).

2.3.2.3. Potential solutions

With the strategic position of PCPs in many primary care settings around the globe, and the further recognition of general medical practice in less resourced countries such as LMICs, the *WHO* has endorsed mental health care as a core component of PCPs' training and one that must be further developed (*WHO* and *WONCA*, 2008). Therefore, since 2005, the *WONCA* and the *WHO* have worked jointly to improve mental health training offered to PCPs to tackle known deficits in their mental health competencies and skills (*The Lancet*, 2018b). Such trainings are twofold: mental health training programs as part of continuing medical curricula (Blanco-Vieira et al., 2018; Cohen, 2001; Fricchione et al., 2012; Hodges et al., 2001) and mental health curricula offered as part of post-medical school training, under the specialty of general medical practice/family medicine (Arya et al., 2017; Fricchione et al., 2012; Rouleau et al., 2018). This dissertation will focus on mental health training programs as part of continuing medical education developed and offered to PCPs.

2.3.3. Mental health training for primary care physicians

2.3.3.1. Implementation and evaluation

Mental health training programs that are included as part of continuing medical education to improve PCPs' mental health competencies and skills are not new (Cohen, 2001; Gask & Morriss, 1999; Giel & Harding, 1976; Goldberg et al., 1980a; Goldberg et al., 1980b). Attention to mental health training programs in continuing medical education (and their evaluation) has led to heterogeneity in measurable outcomes, training content, and educational methods. For example, studies assessing the impact of mental health training programs using a comparison group have reported on a wide range of PCP and patient outcomes. First, studies assessing PCPs' behaviours pre- and post-training focus on their ability to correctly detect mental health conditions using validated diagnostic instruments (Al-Faris et al., 1997; Gask et al., 2004; Pond et al., 2018; Thompson et al., 2000), their ability to adequately treat mental illness, using role plays, case studies, videotaped sessions, or unannounced standardized patients (Blashki et al., 2008; Gask et al., 1998; Murrihy & Byrne, 2005; Murrihy et al., 2009; Shirazi et al., 2013; Wong et al., 2009), their adherence to treatment guidelines (Aakus et al., 2016), their prescribing patterns (Gask et al., 2004; Kendrick et al., 1995; Lin et al., 2001; King et al. 1998; Lin et al., 1997; Rouillon et al., 2011; Vicente et al., 2007), their rates of referrals to specialized services (Kendrick et al., 1995; Lester et al., 2009; Pond et al., 2018; Power et al., 2007; Vicente et al., 2007), and their rates of patient consultations in comparison to patients treated (Strang et al., 2007). Second, studies show the assessment of patient outcomes pre- and post-training, specifically patients' symptoms related to mental health conditions (Aakhus et al., 2016; Almeida et al., 2012; Ambresin et al., 2017; Gask et al., 2004; Haller et al., 2014; Menchetti et al., 2013; Murrihy & Byrne, 2005; Pond et al., 2018; Indu et al., 2018; Vergouwen et al., 2008), patients' suicide rates (Szanto et al., 2007), the time patients with mental health symptoms remained untreated (Power et al., 2007), and patients' beliefs about continuing treatment (Vergouwen et al., 2008). In addition to PCPs' behaviours and

their patients' outcomes pre- and post-training, studies assess the training's impact on PCPs' attitudes towards mental health conditions (using Likert scales) (Beaulieu et al., 2017; Shirazi et al., 2009; Strang et al., 2007), their knowledge about mental illness and/or treatment techniques (using Likert scales, open-ended questions, and/or True/False questions) (Murrihy et al., 2009; Shirazi et al., 2009; Strang et al., 2007), and their confidence in providing mental health care (Murrihy & Bryne, 2005; Strang et al., 2007).

Regardless of diversity in measurable outcomes, many positive changes in PCPs' mental health competencies have been reported after the implementation of mental health training programs. Specifically, in comparison to control groups, PCPs post-training have: improved their knowledge and confidence in using cognitive behaviour therapy with people presenting with symptoms related to anxiety and depression (Murrihy & Byrne, 2005); improved their knowledge and actual use of cognitive behaviour therapy in their practice (Murrihy et al., 2009); improved their knowledge about depression (Shirazi et al., 2009), as well as their performance in diagnosing and treating depression (Shirazi et al., 2011); remained more actively involved in the care of people with opioid addiction (Strang et al., 2007); acquired better active listening skills for the management of depression and generalized anxiety disorders (Wong et al., 2009); increased in confidence when managing mental illness, which translated into improvements in overall attitudes towards mental health conditions (Beaulieu et al., 2017); and increased their ability to detect mental disorders among youth (Ambresin et al., 2017). In addition, many changes in patients' outcomes have been reported after the implementation of mental health training programs targeting PCPs. Specifically, post-training, in comparison to control groups, patients' beliefs about the use of antidepressants were more favourable (Vergouwen et al., 2009), their remission

of depressive and self-harm symptoms was higher (Almeida et al., 2012; Indu et al., 2018; Menchetti et al., 2013), and their quality of life was improved (Indu et al., 2018). Of note, in certain studies that assessed training programs, no difference between intervention and control groups was found. These studies include those that aimed to: reduce substance use in youth using a brief intervention consisting of motivational interviewing (Haller et al., 2014); improve PCPs' management skills of substance use disorders using problem-solving techniques (Harris et al., 2013); increase referral rates to early-intervention services and to reduce the duration of untreated psychosis for youth with first-episode psychosis (Lester et al., 2009); decrease patients' depressive symptoms after a 10-hour course helping PCPs develop skills in managing depression (Gask et al., 2004); increase PCPs' rates of new depression diagnosis and of new prescription of antidepressants (Lin et al., 2001); increase PCPs' knowledge of and prescribing confidence for opioid addiction (Strang et al., 2007); increase positive interactions (i.e., structuring the consultation and developing clinical plans) with patients consulting for depression and generalized anxiety disorders (Wong et al., 2009); and increase the quality of life and depression scores of patients' living with dementia (Pond et al., 2018).

Studies on the evaluation of mental health training programs targeting PCPs also highlight the variance in training content and educational methods (Blaski et al., 2003; Hodgins et al., 2001; *WHO* and *WONCA*, 2008). However, certain components across mental health training programs have been argued to encourage (and sustain) positive changes in PCPs' competencies and patient outcomes measured after their implementation. These include: trainings based on "deficit-based objectives" (Hodges et al., 2001; p. 1580), that is, on mental health gaps identified by PCPs themselves; lecture-based trainings that also include active participation, such as role plays,

patient-actors, clinical case discussions, and videos on effective mental health care (Almeida et al., 2012; Blashki et al., 2003; Bloom, 2005; Cervero, 2003; Gask & Morriss, 1999; Hodges et al., 2001; Shirazi et al., 2013); trainings that have evaluative components, whether satisfaction questionnaires, knowledge tests, a measurement of attitudes, or an assessment of skills (Hodges et al., 2001); access to practica for exercises in detecting, treating, and managing mental health conditions in primary care settings (Hodges et al., 2001); and ongoing support and/or supervision (Blashki et al., 2003; Hoeft et al., 2018; Menchetti et al., 2013; Mendenhall et al., 2014; Murrihy & Byrne, 2005; Padmanathan & De Silva, 2013; Petersen et al., 2011). Some studies highlight the benefit of providing support using technological mediums such as teleconferencing; however, there are limits to such evidence (Hoeft et al., 2018).

While evaluations are conducted to assess the impact of implemented training programs on PCPs' mental health competencies and patient outcomes, studies explore issues related to their implementation and evaluation specifically in LMICs. First, these programs are not substantial in such countries. For example, of 37 LMICs included in a study, only 27% reported mental health training for PCPs in continuing medical education (Fricchione et al., 2012; Jacob et al., 2011), and worldwide, only 2.8% of training programs targeting PCPs are specifically about mental health (Liu et al., 2016). Thus, the *WHO*'s *2017 Mental Health Atlas* shows a global shortage of PCPs trained in mental health (*WHO*, 2018a). Second, research capacity is limited in LMICs (Collins et al., 2011; Collins et al., 2014; Collins et al., 2015; Rahman, 2018; Razzouk et al., 2010; Regan et al., 2015; Thornicroft & Patel, 2014; Wainberg et al., 2017). While 90% of the global population live in LMICs, only between 3% and 6% of the mental health research published in high-impact journals is from such countries (Thornicroft et al., 2012). In addition, research on the

impact of training programs in the "real world," using for example, designs such as RCTs, is severely under-represented in LMICs (Bloom, 2005; Davis et al., 1999; Fairall et al., 2014; Huibers et al., 2003; Purgato et al., 2012; Sidhaye et al., 2015; Sikorski et al., 2012; Thornicroft & Patel, 2014). Given the dearth in mental health training programs for PCPs and in their "real-world" application in LMICs, evidence of "what works" and "what does not work" (specifically "where" and "how") comes primarily from HICs (Eaton et al., 2014; Thornicroft & Patel, 2014). Findings from HICs do not always accord with the realities of many LMICs and their primary care settings, preventing the uptake of knowledge that is culturally and contextually relevant (Thornicroft & Patel, 2014).

2.3.3.2. The *mhGAP* training

To address such issues, in 2008, the *WHO* launched the *mhGAP*, an evidence-based package that joins efforts to build system capacity in LMICs by further developing and integrating mental health into primary care settings (Chisholm, et al., 2007; Yasamy et al., 2011; *WHO*, 2008; *WHO*, 2010; *WHO*, 2013a; Gureje & Stein, 2014). This programme is accompanied by standard guidelines to further build the mental health competencies and skills of non-specialists (including but not limited to PCPs) who work in non-specialized settings, such as in primary care. A variety of manuals for such training are included under the umbrella of the *mhGAP*. One such program, utilized in over a hundred countries since its launch in 2010 (Keynejad et al., 2018; *WHO*, 2018b), is the *mhGAP-IG* (*WHO*, 2010), currently in its second version (*WHO*, 2016).

The *mhGAP-IG* is a standard training program developed to encourage the delivery of evidence-based interventions for what the *WHO* deems priority mental health conditions in

LMICs. These include: depression, psychosis, epilepsy/seizures, developmental disorders, behavioural disorders, dementia, alcohol use disorders, drug use disorders, and self-harm/suicide (*WHO*, 2010; 2016). The guide is unique. First, the *mhGAP-IG* was developed through a rigorous process. A systematic review of evidence available in mental health (e.g., detection, treatment, and management) was conducted, extracting data on treatments that have been proven effective specifically in LMICs (Gureje & Stein, 2014; Thornicroft & Patel, 2014). The *mhGAP-IG* presents these interventions (i.e., "what to do") using easy-to-follow diagrams (*WHO*, 2010; 2016). Second, the *mhGAP-IG* was developed through international participatory processes (Gureje & Stein, 2014). Specifically, the guide was developed by including expert opinions from researchers, decision-makers, and healthcare professionals (Eaton et al., 2014). Participatory processes are particularly important when developing training interventions, seeing as *"the classification system for mental disorders that will be satisfactory for primary care must capture the complexity of the range of presentations of psychological problems in that setting"* (Gureje & Stein, 2014, p. 33). Third, the guide is updated every couple of years to include the latest evidence on mental health care delivery in LMICs specifically, as well as extensive feedback from experts who have used its previous versions (*WHO*, 2016). Last, one of the products of advocating for further implementation of and research on mental health training programs in LMICs is the development of the *mhGAP-IG*'s accompanied training tools to facilitate such implementation and research. These include: facilitator guides, trainee guides, PowerPoint presentations, a contextualization guide to adapt the training material and content to local healthcare realities, knowledge questionnaires, and supervision sheets (WHO, 2018e). However, while peer-reviewed literature on the *mhGAP-IG* training is increasing in LMICs, it is rarely evaluated for effectiveness using an RCT design (Akol et al., 2018; Keynejad et al., 2018).

2.3.3.3. Beyond mental health training

Authors who have engaged in developing non-specialists' mental health capacity through offering and evaluating training programs suggest that *"making it easier for generalists to acquire and practice skills in the recognition of and treatment of mental health problems […] is not sufficient, and it will not be possible to meet need by continuing to pursue the idea of simply training more people"* (Eaton et al., 2014, p 310). Therefore, health system transformation within primary care settings is essential for addressing systemic and organizational factors that might interfere with implementation and interact with the training program to challenge the involvement of PCPs in mental health care delivery (Blanco-Vieira et al., 2018; Davis et al., 2012; Dubois & Singh, 2009; Gask & Morriss, 1999; Keynejad et al., 2018; Mendenhall et al., 2014; Padmanathan & De Silva, 2013; Semrau et al., 2015; Sidharye et al., 2015). As previous studies suggest, such factors include: 1) restraining policies, such as restrictions on PCPs' ability to prescribe psychotropic medications and the criminalization of substance use and misuse; 2) lack of funding, which influences the development and sustainability of primary care settings and the implementation of continuing mental health training programs for PCPs; 3) limited mental health resources, such as deficits in the availability of medications and health workers; 4) organizational factors, such as obstacles to continuity in care, lack of time for providing mental health care, high turnover of trained employees, other professionals' limited support for the integration of mental health into primary care settings, and no mental health supervision/support; and 5) the degree of acceptability of perceived changes to mental health specialists' role (Mendenhall et al., 2014; Maulik et al., 2014; Padmanathan & De Silva, 2013; Patel, 2009; Patel et al., 2018; Rathod et al., 2017; Patel et al., 2018). Hence, implementation analysis (Champagne et al., 2011) is particularly significant when offering a mental health training program, since context affects how the intervention is

conceived and implemented within a dynamic system. In addition, such factors can impact its expected outcomes and thus the integration of mental health through the further involvement of PCPs (Gask & Morriss, 1999; Keynejad et al., 2018; Thornicroft & Patel, 2014).

While the *mhGAP*-based training, in both its versions, has been implemented in over a hundred countries (Keynejad et al., 2018; *WHO*, 2018b), little research has focused on how factors within specific contexts affected implementation and interacted with the training program to influence its expected outcomes (Ayano et al., 2016; Bruni, 2014; Jordans et al., 2016; Keynejad et al., 2018; Siriwardhana et al., 2016). Such findings highlight "real-world" challenges to the training's implementation, uptake, and potential scale-up in specific resource-limited settings (Abou-Malham et al., 2013; Champagne et al., 2011; Damschroder et al., 2009), information that might encourage decision-makers to create a system facilitating implementation of training programs and non-specialists' involvement in mental health care (Dubois & Singh, 2009; Keynejad et al., 2018; Nadkarni et al., 2014; Rathod et al., 2017; *WHO*, 2013a).

For these reasons, this dissertation:

1) assessed the impact of a mental health training program based on the *mhGAP-IG* (*version 1.0*) (*WHO*, 2010) on a sample of PCPs working in the Greater Tunis area of Tunisia (specifically, the impact on their mental health knowledge, attitudes, self-efficacy, and self-reported practice); and

2) explored contextual factors influencing the program's implementation in the Greater Tunis area of Tunisia and interacting with the training to facilitate and/or hinder the attainment of its expected outcomes.

In Tunisia, PCPs are the most relied upon non-specialists for mental health care in the country (Ben Thabet et al., 2018; Ministry of Health, 2013; Spagnolo et al., 2018a). The next section of the literature review will provide an overview of the opportunities and challenges related to including PCPs in mental health care delivery in the country.

2.4. Building mental health capacity in Tunisia

2.4.1. Mental health and illness in Tunisia

Rates of anxiety, depression, substance use disorders, and suicide are on the rise in Tunisia, especially since the 2010-2011 Revolution, a campaign of civil resistance to protest high levels of youth unemployment, political repression, government corruption, and economic hardships (Ben Khelil et al., 2016a; Ben Khelil et al., 2016b; Ben Khelil et al., 2017; Ben Khelil et al., 2018; Charara et al., 2017; Honwana, 2013; Ministry of Health, 2013; Ouanes et al., 2014). First, data suggests that consultations specifically for anxiety and depression have increased post-Tunisian Revolution (Ministry of Health, 2013; Ouanes et al., 2014). Second, records show that the number of suicide deaths rose 1.8 times and self-immolation rose three times during the four years following the Revolution (Ben Khelil et al., 2016a; Ben Khelil et al., 2017). Third, there is a recorded increase in the rates of substance use (MedSPAD Committee, 2017) and substance use disorders, in addition to an increase in the use of substances such as opioids, cannabis, ecstasy, and alcohol, especially among people under the age of 35 (MedSPAD Committee, 2017; Ministry

of Health, 2013). The rise in anxiety disorders, depressive disorders, substance use disorders, and suicide has been argued to be linked to triggering events during the 2010-2011 Tunisian Revolution (Ben Khelil et al., 2017; Ouanes et al., 2014) and with current instabilities such as difficult working and living conditions in the country (Charara et al., 2017; Ministry of Health, 2013; Ouanes et al., 2014).

While records do not show a significant increase in the rise of schizophrenia since the Revolution, there is worry about potential complications associated with this disorder, even though it is underdiagnosed. More specifically, in Tunisia, schizophrenia has been linked with suicide and suicide attempts (Ghachem et al., 2009). In addition, it is reported that annual mortality rates associated with schizophrenia have increased (Ghachem et al., 2009).

2.4.2. Mental health challenges in Tunisia

Accessing mental health care was recognized by Tunisian citizens as a key challenge during the "*societal dialogue*" (*le dialogue sociétal*), a country-wide participatory process that aimed to better understand the health concerns of Tunisian citizens and create possible health reform tracks that would aid decision-makers in improving the health of all, including those living with mental illness (Comité technique du dialogue sociétal, 2014). Like other LMICs, the Tunisian Ministry of Health has therefore endorsed its commitment to increasing access to needed mental health services, primarily through the creation of the *Committee for Mental Health Promotion* in 2015 and the adoption of the *2013 Tunisian National Strategy for the Promotion of Mental Health* (Ministry of Health, 2013). This strategy aims to further the transition from institutional to community-based mental health care, which follows international *Global Mental Health* trends

aiming to further integrate mental health into primary care settings. Interestingly, Tunisia is located within the *EMR*, one of the *WHO* regions with the least number of countries to have produced a mental health plan or strategy (*WHO*, 2018a) and with one of the highest rates of mental disorder burden compared to the global average (Rahman, 2018).

Despite this political commitment, Tunisia still faces many health system challenges that make it difficult for the country to adequately address untreated mental health symptoms. First, like other LMICs, it is estimated that roughly 1% of the country's total public sector healthcare budget is allocated to mental health, and of this, half is used to sustain hospitals treating mental illness (*WHO*, 2008). Continued investment in institutional settings to detect, treat, and manage mental illness has accentuated these services to the detriment of developing community-based mental health services (Ministry of Health, 2013; Patel et al., 2018; *WHO*, 2008, *WHO*, 2018a). Second, there is a deficit of mental healthcare professionals (Ben Thabet et al., 2018; Bruckner et al., 2011; *WHO*, 2008), who are also unevenly distributed across the country. For example, mental healthcare professionals mainly work in and around the capital or along the coastline (Ministry of Health, 2013; *WHO*, 2008), despite the strong need for services within the interior of the country (Ministry of Health, 2013). In addition, studies show that mental health nurses and psychosocial care providers in Tunisia are estimated at 3.7 per 100,000 and 2.9 per 100,000 people respectively, numbers insufficient to meet current need in Tunisia (Bruckner et al., 2011). To address this shortage, the number of needed mental health nurses and psychosocial care providers is projected at 13.4 per 100,000 and 9.8 per 100,000 people respectively (Bruckner et al., 2011). Third, there are challenges related to the integration of mental health at the primary care level, namely due to deficits in continuing mental health training (Patel et al., 2018; *WHO*, 2013a; *WHO*, 2018a). For

example, while 30-40% of consultations done by PCPs are related to mental health care, continuing mental health training programs were not offered as part of a systematic national program. Instead, they were offered under the leadership of individual governorate directors, which limited national efforts to further integrate mental health into existing primary and community-based services (Ministry of Health, 2013; *WHO*, 2008). Therefore, while PCPs are (and are encouraged to be) involved in the care of people living with mental health conditions in Tunisia, little is known about their preparedness and willingness to address mental health problems, substance use disorders, and suicide/self-harm in primary care in Tunisia. A few studies do help shed light on this topic. A study conducted in Sfax, Tunisia, a city located in the central east of the country, highlights PCPs' difficulties detecting and managing depression in primary care settings (Ben Thabet et al., 2018). In addition, a study conducted on attitudes towards schizophrenia among randomly selected PCPs in the Greater Tunis area suggests that most underestimated the prevalence of schizophrenia, while 48.5% were incapable of naming medications for use in first episode psychosis (Hend et al., 2012). These findings corroborate with those of a study conducted in central Tunisia, which suggest that 53% of PCPs did not master the prescription of antipsychotic medications (Ministry of Health, 2013; Melki et al., 2003). One of the products of this dissertation is a baseline portrait of PCPs' mental health knowledge, attitudes, and self-efficacy before the implementation of the *mhGAP-IG* training (*version 1.0*) (*WHO*, 2010). The study highlights that a sample of PCPs from the Greater Tunis area: had limited knowledge about substance use disorders and myths about suicide attempts; had unfavorable attitudes about the dangerousness of people with mental health problems, personal disclosure of mental illness, non-specialists' role in assessing mental health problems, and personal recovery; and believed the least in their capabilities related to substance use disorders, suicide/self-harm,

and psychosis (Spagnolo et al., 2018a). Interestingly, this study also corroborates the findings of Ben Thabet and colleagues (2018) that an association exists between previous participation in a mental health training and higher levels of certain mental health competencies.

2.4.3. Mental health opportunities for primary care physicians in Tunisia

The Greater Tunis area of Tunisia, the setting of this dissertation, comprises four governorates: Tunis, Ariana, Ben Arous, and Manouba. These regroup 30 health districts, 163 primary health care centers, and, in 2015, 2,709,762 of the estimated 11,154,372 people in Tunisia (Ministère de la santé, 2016). PCPs working in primary care settings are the most relied upon non-specialists for mental health care in Tunisia (Ben Thabet et al, 2018; Ministry of Health, 2013; Spagnolo et al., 2018a). PCPs' involvement in mental health care delivery is a consequence of attempts made in the 1990s to integrate mental health care within primary health centers, which provide outpatient care, including preventative and curative health services as well as health education (*WHO*, 2008). Even though this integration was done non-systematically and with limited follow-up, it was an attempt to increase access to mental health care for the majority (*WHO*, 2008).

Given the key role PCPs play in primary care settings and their current involvement in mental health care delivery, albeit with limited competencies and skills (Ben Thabet et al., 2018; Hend et al., 2012; Melki et al., 2003; Ministry of Health, 2013; Spagnolo et al., 2018a), one of the first mandates of the *Committee for Mental Health Promotion* was improving continuing mental health training for PCPs. Specifically, the Committee was interested in implementing a mental health training program under its leadership in order to meet PCPs' mental health needs and to consider its potential scalability in a systematic fashion. Hence, members of the Tunisian Ministry

of Health (more specifically, the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide*), in collaboration with the *School of Public Health* at *Université de Montréal*, the *World Health Organization* office in Tunisia, and the *Montréal World Health Organization-Pan American Health Organization Collaborating Center for Research and Training in Mental Health*, implemented a training based on the *mhGAP-IG* (*version 1.0*) (*WHO*, 2010).

Such a program aims to not only ensure continuing mental health education for PCPs, but also to train those not affected by the Ministry of Health's revamp of the family medicine university curricula. Specifically, in 2011, the Ministry of Health drafted and passed a decree for the inclusion of a mandatory two-month mental health internship in post-graduate medical school for future family physicians, previously optional (Ministère de la santé publique, 2011). The first graduating class under this new curriculum is planned for 2019.

Chapter 3 presents the study protocol published in *BMC Health Services Research* (January 2017) (Spagnolo et al., 2017a). This published protocol was preliminarily adapted from the originally conceived protocol defended in June 2015 at the *School of Public Health* at *Université de Montréal*. However, further modifications to this preliminarily adapted protocol were suggested by local partners to better meet the realities of the Greater Tunis area of Tunisia and to ensure feasibility of the study. Such adaptations, which were followed in this dissertation, will be presented, along with accompanying detailed explanations.

CHAPTER 3: METHODS

3.1. Synopsis

This methods chapter presents the study's protocol, which was preliminarily adapted from the original study protocol defended in June 2015 at the *School of Public Health* at *Université de Montréal*, a requirement of the doctoral program. A part of the preliminarily adapted protocol has since been published in *BMC Health Services Research* (January 2017) (3.3). While this protocol was a good start in conceiving and adapting the study and its methods, as well as a contribution to the field of *Global Mental Health*, the published protocol had to be further adapted to local circumstances. Changes in partners initially involved in the study and contextual realities in Tunisia when the protocol's implementation began influenced such further adaptations. These adaptations will be presented in the methods chapter (3.4). The adapted (and followed) protocol was developed in close collaboration with members of the Ministry of Health involved in this project, directors of the governorates of the Greater Tunis area, PCPs in charge of continuing medical education in the Greater Tunis area, trainer-psychiatrists, and the *WHO* office in Tunisia.

3.2. Candidate's contribution to the protocol

The first article included in this dissertation (Section 3.3) outlines the protocol, published in *BMC Health Services Research* (September 2017). For this article, the candidate: 1) was involved in the development of the protocol and the methodological aspects that it outlines; 2) was involved in choosing and/or developing the training evaluation material and interview guide; 3) was involved in designing the initial training model and schedule; 4) wrote the first draft of the manuscript; and 5) integrated suggested corrections by co-authors and reviewers into subsequent versions.

3.3. Article 1: published protocol

Building system capacity for the integration of mental health at the level of primary care in Tunisia: a study protocol in global mental health

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Abstract

Background

In low- and middle-income countries (LMICs), addressing the high prevalence of mental disorders is a challenge given the limited number and unequal distribution of specialists, as well as scarce resources allocated to mental health. The *Mental Health Gap Action Programme* (*mhGAP*) and its accompanying *Intervention Guide* (*IG*), developed by the *World Health Organization* (*WHO*), aim to address this challenge by training non-specialists such as general practitioners (GPs) in mental health care. This trial aims to implement and evaluate an adapted version of the *mhGAP-IG* (*version 1.0*) offered to GPs in 2 governorates of Tunisia (i.e., Tunis and Sousse), in order to uncover important information regarding the implementation process and the study design before considering country-wide implementation and evaluation.

Methods

First, a systematic review will be conducted to explore types and effectiveness of mental health training programs offered to GPs around the world, with a specific focus on programs implemented and evaluated in LMICs. Second, a cluster randomized controlled trial (RCT) will be conducted to evaluate the effectiveness of the implemented training based on the *mhGAP-IG* (*version 1.0*). Third, multiple case study design will be used to explore how contextual factors impact the successful implementation of the training and desired outcomes.

Discussion

In Tunisia, an important need exists to further develop proximity health services and to address the growing mental health treatment gap. One solution is to train GPs in the detection, treatment,

and management of mental health problems, given their strategic role in the healthcare system. This trial thus aims to implement and evaluate an adapted version of a training based on the *mhGAP-IG* (*version 1.0*) in Tunis and Sousse before considering country-wide implementation and evaluation. Several contributions are envisioned: adding to the growing evidence on the mhGAP and its accompanying guide, especially in French-speaking nations; building research capacity in Tunisia and more generally in LMICs by employing rigorous designs; evaluating an adapted version of the *mhGAP-IG* (*version 1.0*) on a sample of GPs; generating important information regarding the implementation process and the study design before considering country-wide implementation; and complementing the trial results with implementation analysis, a priority in global mental health.

Keywords

mhGAP, mental health, primary care, treatment gap, integration, capacity-building, general practitioners, Tunisia, effectiveness, RCT

Background

Health systems around the globe are facing enormous challenges, and these are particularly apparent in LMICs [1–4]. High prevalence of mental disorders, a reliance on limited and unevenly distributed specialists, and neglect of adequate investment in resources allocated to mental health have prevented between 76-85% of people living with mental health problems in LMICs from receiving any treatment [4–9]. This treatment gap, which is on the rise in LMICs, points to the dire need of developing proximity mental health services for a population "now among the most neglected and vulnerable throughout the world" [10].

International efforts are currently invested in reforms that build system capacity in primary and community-based settings for a number of reasons [8, 11–13]. First, there are proven user and system benefits of receiving care in such settings. These include: increased user and family satisfaction with services; reduced service costs; increased access to services for a wider population; and decreased stigmatized care [9, 14–17]. Second, current reforms target primary and community-based care because improvements in mental health system capacity do not require highly specialized professionals [7, 12, 18]. Contrary to widespread belief on delivering mental health services, most mental health problems can be effectively managed in non-specialized health settings by non-specialists through an approach called task-sharing [2, 19–27]. Task-sharing is defined as "moving the primary provision of the mental health intervention from mental health specialists (e.g., psychiatrists, psychologists, Master level providers) to lay counselors (i.e., limited to no mental health training or experience)" [25]. International efforts are assuming this approach because of its concordance with the realities of LMICs: it emphasizes the need to involve

primary healthcare professionals and/or the lay workforce given the limited number and unequal distribution of mental health specialists [5, 18, 24, 25, 28].

GPs have been targets of many task-sharing initiatives worldwide because they are ideally placed in the health care system [29–31]. However, they often lack appropriate knowledge and skills to adequately detect, treat, and manage mental health problems. To respond to this gap in knowledge, a number of mental health training programs targeting GPs have been developed and implemented worldwide. Such trainings contribute to health system reform in that "there is evidence that adequate training can reduce variations in provider behavior, improve fidelity, and ultimately increase the quality of service delivery" [32]. Developing and implementing mental health trainings that seek to build capacity and further integrate mental health into routine general practice has also been identified as a priority in global mental health [33].

It is important to note that questions regarding evidence on building mental health system capacity by offering training programs to non-specialized healthcare professionals, including GPs, often arise. First, findings are mainly from high-income countries (HICs) [7, 26, 34] and do not concord with the realities of LMICs due to differing culture and context, preventing the uptake of relevant and useful knowledge in these settings [34]. Therefore, generating appropriate and usable knowledge is an increasingly important research priority in global mental health [7, 26, 34, 35]. Second, most mental health training programs are focused solely on evaluating effectiveness or efficacy using experimental trials such as RCTs, which are known to disregard contextual factors that might influence the uptake and use of knowledge, practice-level changes, system-level changes, and sustainability of an implemented program [34, 36]. Therefore, implementation

analysis is needed because it highlights how culture and context affect the successful implementation of an intervention within a dynamic environment, which can have a significant impact on desired training outcomes [36]. Last, most mental health training programs are not designed in the form of a "package," where training is complemented with guidelines that seek to develop mental health policies and systems [17, 26]. These guidelines are important because they can help decision- makers orchestrate and sustain reforms [7, 26, 37].

In 2008, the *World Health Organization* (*WHO*) launched the *mhGAP* in response to these gaps in evidence on building mental health system capacity. The programme aims to train non-specialists in mental health detection, treatment, and management, all the while complementing training with discussions around implementation, as well as system and policy development [26, 38]. In 2010, the *mhGAP Intervention Guide* (*IG*), currently in its second edition, was developed to encourage delivery of evidence-based interventions for what the *WHO* deems priority mental disorders [2, 39, 40]. The guide was developed by systematically searching the literature on ways to effectively treat and manage mental disorders in non-specialized settings by non-specialists [2]. Interventions included in the guide were also subject to international expert consultation [2].

The *mhGAP-IG* is the current mental health training of choice around the world for a number of reasons. Unlike previous mental health trainings, the evidence is based on findings specifically from LMICs, as well as expert opinion from researchers, decision-makers, and healthcare professionals working within these countries [26, 34, 39]. In addition, the *mhGAP-IG* was developed through international participatory consensus-based processes [39]. Participatory processes are particularly important when developing training interventions for mental health

seeing as "the classification system for mental disorders that will be satisfactory for primary care must capture the complexity of the range of presentations of psychological problems in that setting" [39]. For the above-mentioned reasons, the *mhGAP-IG* was chosen as the intervention for this trial.

The Tunisian Ministry of Health, in collaboration with the *School of Public Health* at *Université de Montréal*, the *WHO* office Tunisia, and the *Montreal WHO-PAHO Collaborating Center for Research and Training in Mental Health* (*Douglas Mental Health University Institute*), is interested in implementing an adapted version the *mhGAP-IG* in 2 governorates (i.e., Tunis and Sousse), in response to discussions of a country-wide health services reform that began in 2013. One of the main targets of this suggested reform is to strengthen health system capacity by creating proximity health services [41, 42]. This reorganization aims to: 1) promote the use of multidisciplinary teams in primary care settings; 2) valorize general medical practice; and 3) equip primary care practitioners in effective patient management [42]. This reform is also discussed extensively to meet the needs of people living with mental health problems in Tunisia [41].

Implementing a mental health training based on the *mhGAP-IG* (*version 1.0*) thus comes at an opportune time during discussions of health system reform in Tunisia. Although Tunisia is equipped with mental health services, they are mainly provided in the capital (through the only standing and overcrowded mental health hospital in the country) and along the coastline (through psychiatric units within regional hospitals), making the distribution of resources uneven and impeding on equal access to services [43, 44]. In addition, Tunisia suffers from a shortage of mental health professionals, such as psychiatrists, psychologists, psychiatric nurses, and mental

health social workers [41, 43] also echoed in many other LMICs. Shortages of mental health specialists in Tunisia force non-specialists such as GPs to receive between 30-40% of mental health consultations, despite their limited ability to adequately detect, treat, and manage mental health problems in primary care [41, 45].

Objectives

This trial aims to implement and evaluate an adapted version of the *mhGAP-IG* (*version 1.0*) offered to GPs in 2 governorates of Tunisia (i.e., Tunis and Sousse), in order to uncover important information regarding the implementation process and the study design, before considering country-wide implementation and evaluation. The main objective of the trial is divided into 3 phases:

Phase 1 aims to answer the following research question by conducting a systematic review: what types of mental health training programs offered to GPs have been implemented and evaluated, and are they effective? This review, which to our knowledge has not yet been previously conducted, will: 1) help us gain a broader perspective on tested training outcomes, in order to inform this trial; 2) complement already available findings on the *mhGAP-IG*; and 3) compare the effectiveness of a mental health training based on the *mhGAP-IG* (this trial) with previously implementing training programs in LMICs.

Phase 2 aims to answer the following research question by conducting a cluster RCT: what is the potential value of building capacity in primary or community-based settings by training GPs in Tunis and Sousse (Tunisia) using the *mhGAP-IG*? Five specific modules from the *mhGAP-IG*

(*version 1.0*) have been chosen by members of the Ministry of Health in Tunisia to reflect current and pressing needs: depression; psychosis; suicide/self-harm; alcohol use disorders; and drug use disorders. The main hypothesis of this cluster RCT is that the mental health training based on the *mhGAP-IG* will: be clinically useful; improve/increase GPs' knowledge about disorders selected for training, attitudes towards mental illness, and perceived clinical self-efficacy; and improve/increase rates of detection, treatment, and management of mental illness. In addition, the cluster RCT will allow us to obtain crucial information on the design, namely the acceptability of delivering the mental health training as planned for the trial, as well as the estimated effect size and intra-cluster correlation (ICC) of a mental health training based on the *mhGAP-IG*. At the time this protocol was written and defended (June 2015), this information was not available.

Phase 3 aims to answer the following research question by multiple case study design: how do contextual factors influence the successful implementation and expected outcomes of a mental health training based on the *mhGAP-IG* (*version 1.0*) offered to GPs in Tunis and Sousse (Tunisia)? This type of evaluation is referred to as implementation analysis [36] and is currently a priority in global mental health [34].

Methods/Design

Phase 1: Conducting a Systematic Review Search

Strategy and data collection

A systematic review will be conducted to explore the types and effectiveness of mental health training programs offered to GPs worldwide, with a specific focus on primary care in LMICs. To our knowledge, this is the first systematic review on the topic, and will be used to improve the

training intervention offered to GPs in Tunis and Sousse. It will also complement findings on the *mhGAP-IG*.

JS met with a librarian at the *Université de Montréal* to generate a search strategy for this review, which is currently underway. To answer the research question, the following databases are currently being searched: MEDLINE, PubMed, Embase, CINAHL, PsycINFO, and Web of Science. The main search terms used to generate the search strategy include: general practitioners; primary care; mental health; mental disorders; psychiatry; training programs; and education. Google will be used as a means to find grey literature. Once articles have been selected, reference lists will be searched for additional eligible articles. After identifying the articles to be included in this review, key individuals in the field of capacity building by training GPs in mental health detection, treatment, and management will be contacted to validate findings and/or to obtain information on additional publications.

Study selection

Study eligibility criteria has been developed. These include: 1) academic and grey literature published from 1978 onwards; 2) articles written in English, French, and Spanish; and 3) study designs including RCTs, cluster RCTs, and quasi-experimental designs, to match our trial design. Studies will be excluded if they do not have a control/comparison group, and if they are descriptive or qualitative only.

Data analysis

Titles and abstracts of articles found using the search strategy will be reviewed. If they meet eligibility criteria, full texts will be obtained. Full texts will be included only if they meet eligibility criteria after review. Included texts will be reviewed for quality to deem if the training programs are effective.

Quality will be assessed using the *Quality Assessment Tool for Quantitative Studies* (1998) (http://www.ephpp.ca/tools.html) [46]. It was developed by *Effective Public Health Practice Project* (*EPHPP*) and specifically designed for use in public health. According to Jackson & Waters (2005) [47], this tool is considered adequate for analyzing articles that target interventions. Six content areas are included: allocation bias; confounders; blinding; data collection; as well as withdrawal and drop-outs. Each of the content areas are rated as such: strong (3 points), moderate (2 points), and weak (1 point), for a maximum of 18 points per study analyzed. Content area scores are then averaged to provide the overall quality score [48].

Studies show that this quality tool has acceptable internal consistency and test-retest properties [47]. The *Quality Assessment Tool for Quantitative Studies* [46] is accompanied by a reviewer's dictionary to ensure standardized use.

Phase 2: Building mental health capacity by training GPs in Tunisia

The method section below follows the SPIRIT Guidelines.

Participants, interventions and outcomes

Study setting

To assess the potential value of capacity building by training GPs in Tunis and Sousse using an adaptation of the *mhGAP-IG* (*version 1.0*), a cluster randomized controlled trial (RCT) with two arms (i.e., intervention and control) will be conducted. Tunis and Sousse have been chosen as they regroup a large portion of the Tunisian population; they have access to the only standing mental health hospital in the country, as well as psychiatric units located in general hospitals; and in this area, there are substantially more resources allocated to mental healthcare (i.e., doctors, clinics, medication) than in other areas of Tunisia. Delegations (i.e., designated areas within the governorates) have been chosen as the clusters for this trial, seeing as health services are organized accordingly in Tunisia. There are 22 delegations in Tunis and 16 in Sousse, for a total of 38 delegations.

Eligibility criteria

The group of participants who will be recruited for this trial are GPs working within private or public institutions at the level of primary care in Tunis or Sousse. GPs will be recruited by identified clinicians working to promote continuing medical education in Tunis and Sousse. These clinicians, who work within private or public institutions at the level of primary care, have been selected by members of the Ministry of Health in Tunisia to be a part of this trial, as they have advanced knowledge and skills in the field of mental health, and they are mandated to encourage continuing medical education within their respective delegations. GPs will also be approached by 1 psychiatrist-trainer, as she works closely with GPs within the community.

To be included in the trial, GPs must meet the following eligibility criteria: 1) working within public or private institutions at the level of primary care in Tunis or Sousse; 2) having 5 or more years of clinical experience; 3) dedicating a minimum of 1 h per week to mental health; 4) being part of the *Conseil national de l'ordre des médecins de Tunisie* (*CNOM*), which is the GP order in Tunisia; and 5) being available when the training is scheduled. GPs will be excluded from the trial if they are retired or on sick leave; work in any other setting than in primary or community-based institutions; or do not dedicate any time to mental health or illness within their given work-week.

Interventions

The training intervention is based on an adapted version of the *mhGAP-IG* (*version 1.0*) developed by the *WHO* [2]. Instead of implementing all the suggested modules of the *mhGAP-IG* (*version 1.0*), 5 modules have been chosen for the purposes of this trial by members of the Ministry of Health in Tunisia: depression; psychosis; suicide/self-harm; alcohol use disorders; and drug use disorders. In addition to these modules, general principles of care and an introduction to the *mhGAP* will be presented.

Using the *mhGAP Adaptation Guide* developed by the *WHO*, the training modules and the accompanying training material (PowerPoints, trainer, and participant guides) will be adapted to the local primary care context of the 2 governorates.

The training will be conducted by 3 Tunisian psychiatrists, trained in the proper use of the *mhGAP-IG*. The *mhGAP* training for participating GPs will take place one afternoon a week, over

5 weeks. A total of 17.5 h (3.5 h a week) is envisioned for the training modules, followed by a 2-h supervision session. During the supervision session, participating GPs will be invited to present mental health cases to the trainer-psychiatrists, engage in additional role plays, and review some of the material presented during the training sessions.

To improve adherence, participating GPs will be given an attestation signed by the President of the *Committee for Mental Health Promotion in Tunisia*, certifying that they completed the training program.

Outcomes

Outcomes include GPs' knowledge about disorders selected for training, attitudes towards mental health and illness, perceived clinical self-efficacy for detecting, treating, and managing patients with the selected disorders, and mental health practice.

Sample size

This trial will answer several important questions regarding study design, namely: what is the estimated effect size and ICC of a mental health training based on the *mhGAP-IG*? These parameters, to our knowledge, were not available at the time this protocol was written and defended (June 2015), and will thus make significant contribution to knowledge on the *mhGAP-IG*.

Following consultation with members of the Ministry of Health in Tunisia, the recommended average number of GPs to be recruited in the cluster (i.e., the delegation, many of

which comprise the governorate) was suggested to be 15. While some studies using a cluster RCT to evaluate the effectiveness of a mental health training program offered to GPs in HICs do not report attrition [49–51], we are concerned that the evidence does not reflect the sampling realities in LMICs. For this reason, we aim to recruit 19 GPs per delegation, to be sure we account for a maximum of 20% attrition rate per cluster [52, 53]. Table 1 highlights the estimated sample size and number of clusters for the trial.

Table 1:
The sample size and number of clusters in the trial

PARAMETERS	#
n (total number of GPs)	722
# clusters (delegation)	38
n cluster (GPs on average per cluster)	19

Using the statistical software G*Power 3.1, the effect size can be calculated after data collection. Parameters will be set at: 1) test family: t test; 2) statistical test: difference between two independent means; 3) tail(s): two-tailed test; 4) type of power analysis: sensitivity; 5) alpha: 0.05; 6) power: 0.80; and 7) sample size (i.e., the total number of GPs) for control and intervention groups used in this trial. Once the effect size is found, the estimated ICC can be generated using the following formula, designed for cluster RCTs: N = Nsg (1 + (m-1) ICC), where:

N = number of participants in the trial (i.e., the total number of GPs);

Nsg = number of participants in the trial, without considering clusters;

m = number of participants in the cluster (i.e., the average number of GPs in the cluster);

ICC = intra-cluster correlation (i.e., the correlation among GPs in the cluster).

Recruitment

GPs will be recruited in part by identified clinicians working to promote continuing medical education in Tunis and Sousse. A training on the description of the study and participant requirements will be given to the identified clinicians before the recruitment phase. Identified clinicians will then collect the names and contact information of the interested participants, who will be contacted by JS to obtain consent before randomization.

Assignment of interventions

Allocation sequence generation

A randomization scheme must be generated to randomize the delegations either to the intervention or control group. Using SAS software version 9.3, a random seed (blockrand function) will be used to produce simple randomization by fixed blocks of 3. A list of these simple blocks will be used to determine the delegation assignment.

Allocation concealment mechanism

GPs working in the delegations included in this trial will be offered the training, but at varying times. Therefore, it will be impossible to determine which delegation (and thus participating GPs) is assigned to either the intervention or control group. Psychiatrist-trainers, clinicians responsible for GP recruitment, members of the Ministry of Health in Tunisia, and directors of the delegations included in this trial will not be informed of the allocation.

Implementation

JS will be responsible for the overall management of the trial, including the generation of the allocation sequence, and assignation of delegations to either the intervention or control group. While in Tunisia, JS will be working under the auspices of members of the Ministry of Health and the *WHO* office. They will help ensure the successful implementation of the training program in Tunis and Sousse.

Blinding

To protect against result contamination, delegations and not individuals will be randomized. Given the geographic distance between each delegation included in this trial, it is very unlikely that GPs from different delegations will share information during and after the training sessions. Selection bias will be avoided by randomization.

Members of the Ministry of Health and *WHO* office in Tunisia working to ensure the successful implementation of this training program in Tunis and Sousse will be blinded to the allocation of delegations.

Data collection, management, and analysis

Data collection and methods

Questionnaires will be administered to the intervention and control groups at different times. These include questionnaires on socio-demographics, mental health knowledge, attitudes, self-efficacy, and mental health practice. The socio-demographic questionnaire will include information on GPs' gender, age, number of years working in primary care, percentage of time

dedicated to mental health in primary care, education, previous mental health training, and work location.

The knowledge questionnaire has been developed by the *WHO* to accompany the *mhGAP-IG* and training package. However, it has been adapted to conform to the modules that have been chosen for the purposes of this trial.

The *Mental Illness Clinicians' Attitudes* (*MICA*) *Scale* (*version 4*) [54, 55] was chosen to assess GPs' attitudes in this trial. This scale is a modified version of the *Mental Illness Clinicians' Attitudes* (*MICA*) *Scale* (*version 2*), which aims to assess attitudes of medical students towards mental illness and the mental health field. Kassam et al. (2010) [54], by modifying this scale, developed a version that can be used with students and health care professionals of any health discipline. It is of interest for this trial because most of the other scales that aim to assess health professionals' attitudes towards mental illness have questionable psychometric properties [55]. The *MICA Scale* (*version 4*) has 16-items, and answers range from 'strongly agree' to 'strongly disagree'. It was shown to have adequate internal consistency and test-retest properties [55].

A self-efficacy questionnaire was developed for the purposes of this trial. Self-efficacy is a concept first introduced by Bandura [56] and is part of his social cognitive theory as a "key psychological construct with regards to how people adapt to their environments where new skills are developed" [57]. More specifically, self-efficacy refers to people's beliefs in their capabilities, which influence performance attainment, achievement of outcomes, and behavioural change [56–58]. For these reasons, assessment of perceived clinical self-efficacy is of interest when evaluating

training programs because positive effects on self-efficacy scales should translate into practice change [59]. Bandura (2006) [58] suggests that the best way to measure self-efficacy in a study is to develop specific scales per tasks to be explored. In this case, the explored task is the perceived clinical self-efficacy in mental health detection, treatment, and management at the level of primary care, particularly for the selected training modules. The developed self-efficacy questionnaire is thus comprised of questions aiming to understand GPs' judgement of capabilities in detecting and diagnosing depression; psychosis; suicide/self-harm; alcohol use disorders; and drug use disorders; as well as treating and managing patients who present symptoms related to these disorders. An overall assessment that reflects self-efficacy will then be generated by averaging all the constructed domains of the scale.

A mental health practice questionnaire based on the *Mental Neurological and Substance Use Patient Visit Summary* developed by the *WHO* for the *mhGAP Support and Supervision Guide* will be administered. The purpose of administering this questionnaire is to collect the number of total cases (i.e., new, follow-up, or referred cases) before and after the training intervention, as well as patient socio-demographics.

Data will be collected at 4 times. At baseline (T-1, or before the training offered to the intervention group), GPs in both groups will be administered the 5 questionnaires (i.e., socio-demographic, knowledge, attitudes, self-efficacy and mental health practice). Post-intervention group training (T-2), both the intervention and control group will be administered the same questionnaires, minus the socio-demographic questionnaire. The reason for the administration of the same questionnaires to the control group at T-2 is to account for contamination between groups

during the intervention group training and they will serve as the pre-training measure for this group. T-2 therefore is also known as the pretest control group training measure. Post-test control group training (T-3), the control group will be administered the same knowledge, attitude, self-efficacy and mental health practice questionnaires. One year after the completion of the intervention group training (T-4), the groups will be administered the knowledge, attitude, self-efficacy and mental health practice questionnaires to assess whether the results of the training program were maintained over time.

Data management

JS, who is under the supervision of FC, NL, and MP, will be responsible for data collection, entry, analysis, and management.

Statistical methods

All participants will be included in the analysis. This type of analysis is called intention-to-treat and is considered the best way to preserve the effects of randomization [53, 60]. Answers generated by questionnaires and surveys will be analyzed using SPSS Statistical Software (version 24).

T-tests on the difference in cluster means between the intervention and control groups [53] will be assessed for the questionnaires administered to the GPs. Two-tailed p-values of less than 0.05 will be considered statistically significant. While the t-tests take into account cluster level analysis, individual level analysis is discarded, which can underestimate the power of the analysis and generate misleading conclusions about the intervention [53, 61]. Adjustments can be made to

the t-tests in order to account for individual level analysis. Campbell et al. (2000) [61] suggest that the t-test values (i.e., the differences between groups) should be divided by the square root of the design effect (i.e., 1 + (m-1) ICC). Two-tailed p-values of less than 0.05 will be considered statistically significant. Individual level analysis will result in a higher significance level, compared with cluster level analysis [61].

Phase 3: Exploring factors that influence implementation

Design

Multiple case study design will be used to explore how contextual factors within and across delegations (i.e., the cases) influence the successful implementation and expected outcomes of a mental health training based on the *mhGAP-IG* (*version 1.0*). According to Yin (2014) [62], case studies are most often used to answer 'how' questions, generally about situations that the researcher cannot control. Delegations are thus boundaries subject to a wider, uncontrollable context. They have been clearly established and have specific particularities that we wish to uncover [63].

According to Yin (2014) [62], multiple case study design is based on a mix of qualitative and quantitative evidence. For this reason, multiple sources of data will be used to answer the research question, including focus groups with GPs, as well as quantitative data generated from the cluster RCT. These findings will be triangulated to develop what Yin (2014) [62] calls "converging lines of inquiry."

Conceptual framework

An implementation model is necessary to guide the multiple case study design. There are a number of implementation models currently in use [64–69]. However, it is important to note that there is currently no consensus on constructs that make up implementation models and outcome measures [65, 69, 70]. Lack of agreement is caused because implementing interventions is a multifaceted process that "involves attention to a wide array of multi-level variables related to the innovation itself, the local implementation context, and the behavioral strategies used to implement the innovation" [69].

While consensus on constructs and outcome measures to be included in implementation models has not been established, Champagne (2016) [64] regroups pre-existing implementation models to create a model for which complex and multifaceted factors and processes are taken into account. For this reason, Champagne (2016)'s [64] model will be used to develop focus group questions, as well as analyze or sort the collected data.

Data collection

Focus groups with the trained GPs working in delegations assigned to the intervention group will be conducted to explore how contextual factors influence the successful implementation of the mental health training based on the *mhGAP-IG* (*version 1.0*) and impact desired outcomes. Seven to 10 trained GPs from the intervention group will be interviewed at a time, a number that has been said to facilitate discussion by all participants [63]. Therefore, 2 focus groups will be conducted, with a total of 14 to 20 trained GPs. Focus groups will be conducted in French by JS

and audio recorded. Data will be collected at T-2 (post-intervention group training).

Data analysis

Focus group audio recordings will be transcribed by JS and analyzed using thematic analysis [72]. This type of analysis focuses on developing common themes that are represented in the data. Important to note is that multiple case study design allows for the development of themes within cases and cross-cases [62]. More specifically, themes developed within delegations that receive the training will be reported, and they will be compared cross-delegations.

According to Padgett et al. (2008) [71], there are varied approaches to thematic analysis. The preferred method for this trial is to generate themes from the data that reflect initial interview questions, consistent with practices in evaluation research [71, 72]. In other words, the interview guide developed from Champagne et al., (2016)'s [64] implementation model will serve as a thematic template for coding and will be used to develop a code book before the coding process begins [71]. Coding will be done in *QDA* miner software (version 4.1.27).

To ensure rigor in the data analysis process, the code book will be devolved by JS, and validated by FC, NL, and MP. Independent coding will be done in *QDA* miner software (version 4.1.27), using the developed code book. Coding from two independent reviewers will be merged, generating a percentage score for inter-rater reliability.

Discussion

The purpose of this trial is to implement and evaluate a training based on the *mhGAP-IG* (*version 1.0*) offered to GPs in 2 Tunisian governorates (i.e., Tunis and Sousse), in order to uncover important information regarding the implementation process and the study design. Generated information will aid in country-wide implementation and evaluation. This training comes at an opportune time, given that Tunisia is currently undergoing discussions about a health services reform, one of its main objectives being to further develop proximity health services to address the mental health treatment gap in the country [41, 42]. In addition, given the political unrest and economic hardships currently experienced in Tunisia, mental health issues are of great national concern. While Tunisia has a mental health system, the uneven distribution of services and deficits in training for staff cause significant barriers to accessible care [41, 43].

This trial makes several practical contributions. First, its main focus is to train GPs in the detection, treatment, and management of patients consulting for specific mental health problems in Tunis or Sousse, given their often-limited capacity to address mental illness. Involvement of members of the Tunisian Ministry of Health in the implementation of this training program has prompted its inclusion under the national mandate of the *Committee for Mental Health Promotion* in Tunisia. In addition, this training aims to help further integrate mental health into primary care by training non-specialists in mental health. With GPs playing an important role in the healthcare system, this training will help better utilize available resources in the country in order to target the mental health treatment gap.

This trial makes several contributions to the literature. To our knowledge, this is the first attempt to evaluate a mental health training program using an RCT design in Tunisia; implement a training based on the *mhGAP-IG* in Tunisia; and one of the first attempts to implement and evaluate a training based on the *mhGAP-IG* in a French-speaking nation. The trial will thus help build research capacity in Tunisia and more generally in LMICs, currently under-represented in the mental health literature [7, 34]. This trial also complements the effectiveness results with implementation analysis, a current priority in global mental health [7, 26, 34]. Acknowledging factors that influence the successful implementation of a training program generates understanding about how context, especially within preparations for health services reform such as those currently underway in Tunisia, influences desired outcomes [36].

Lessons learned from this trial (i.e., successes and challenges regarding implementation of the training and acceptability of the trial design) can also be of use to other LMICs interested in implementing and evaluating a mental health training program based on the *mhGAP-IG*; designing a cluster RCT to evaluate the *mhGAP-IG*; or exploring contextual factors that can influence the success of a training intervention and expected results in a low-resource setting.

Abbreviations

EPHPP: effective public health practice project
GPs: general practitioners
HICs: high-income countries
ICC: intra-cluster correlation
IG: intervention guide
LMICs: low- and middle-income countries
mhGAP: Mental Health Gap Action Programme
mhGAP-IG: Mental Health Gap Action Programme Intervention Guide
RCT: randomized controlled trial
PAHO: Pan-American Health Organization
WHO: World Health Organization

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Availability of data and materials
Not applicable.

Authors' contributions
JS, FC, NL, and MP were involved in the development of the protocol. JS wrote the protocol and manuscript. FC, NL, and MP provided critical input regarding the trial conception and design. JS, FC, NL, and MP chose and/or developed the training evaluation material, as well as the interview guide. JS, ML, WM, and FC were involved in designing the initial training model and schedule, as well as its write-up. WM and FC recruited the trainer-psychiatrists and clinicians involved in continuing medical education. ML trained the trainer- psychiatrists in the proper use of the *mhGAP-IG*. All authors read, reviewed and approved the final version of the protocol and manuscript.

Competing interests
The authors declare that they have no competing interests.

Consent for publications
Not application.

Ethics approval and consent to participate
Ethics approval has been obtained from l'Université de Montréal (Quebec, Canada) and Razi Hospital (Tunisia). From the moment consent has been obtained, participants will be assigned codes by JS, and data will be entered using the developed coding system to ensure anonymity.

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3.4. Adaptations to the published protocol

While the published protocol was a good start in conceiving and adapting the study, this section of the methods chapter will highlight the changes made in order to better adapt it to local realities. These adaptations were made in collaboration with local partners such as members of the Ministry of Health involved in the project, directors of the governorates of the Greater Tunis area of Tunsia, PCPs in charge of continuing medical education in the Greater Tunis area, trainer-psychiatrists, and the *WHO* office in Tunisia. The modifications (and reasons behind these modifications) brought to the published protocol are detailed below. This dissertation follows these adaptations.

3.4.1. Research questions and objectives

As stated in the published protocol, the study aimed to answer three distinct research questions:

1) What types of mental health training programs offered to PCPs have been implemented and evaluated, and are they effective?

2) What is the potential value of building capacity in primary or community-based settings by training PCPs in Tunis and Sousse (Tunisia) using the *mhGAP-IG* (*version 1.0*)?

3) How do contextual factors influence the successful implementation and expected outcomes of a mental health training based on the *mhGAP-IG* (*version 1.0*) offered to PCPs in Tunis and Sousse (Tunisia)?

A systematic review is currently underway in order to answer research question 1 outlined in the original protocol. It is not included in this dissertation due to time constraints and other research priorities suggested by members of the Ministry of Health involved in the project (outlined

below). The review, tentatively entitled *Effectiveness of mental health training programs offered to general practitioners working in primary or community-based settings: a review of the evidence*, was registered with PROSPERO in 2017 (CRD42017075135) (PROSPERO, 2017), an international database of prospectively registered systematic reviews in health and social care (PROSPERO, 2018).

The followed protocol and thus this dissertation answer research question 2, but with some modifications discussed in the next sections of this chapter. These modifications were suggested by members of the Ministry of Health collaborating on this project, in order to meet a research gap in the Greater Tunis area: a description of the baseline portrait of the mental health knowledge, attitudes, self-efficacy, and self-reported practice of our sample of PCPs. In addition, the article aimed to identify what characteristics are associated with these competencies (Article 3, Section 4.3) (Spagnolo et al., 2018a). Given the *Committee for Mental Health Promotion*'s commitment to furthering mental health training programs as part of continuing medical education (Ministry of Health, 2013) and the Ministry's vested interest in mental health in family medical education training (Ministère de la santé publique, 2011), they thought that uncovering such information would be useful for the purpose of mental health training materials that target non-specialists, as well as for formulating aspects of health policy. Including this research objective under the umbrella of research question 2 was thought also to contribute to building research capacity in Tunisia (Ministry of Health, 2013), the *EMR* (Alwan & Saeed, 2015; Regan et al., 2015; Rahman, 2018), and LMICs more generally (Collins et al., 2014; Rahman, 2018; Razzouk et al., 2010; Regan et al., 2015; Thornicroft & Patel, 2014; Wainberg et al., 2017).

To answer research question 3 of the published protocol, Type I and Type III implementation analyses were planned (Champagne et al., 2011). Type I implementation analysis aims to identify and explore contextual factors that: 1) promote the implementation (and evaluation) of an intervention; 2) encourage the tailoring of an intervention to meet local realities; and 3) affect its planned implementation (Champagne et al., 2011). Type III implementation analysis aims to identify and explore contextual factors that interact with the implemented intervention to influence its expected outcomes or effects (Champagne et al., 2011). This dissertation primarily relied on Type III implementation analysis to answer research question 3 (Article 5, Section 4.6), but does include some elements related to Type I implementation analysis. Specifically, the discussion, especially Article 6 (Section 5.3.2), highlights the contextual factors that encouraged the implementation and evaluation of the *mhGAP*-based training. These include: clinical needs, as identified by local collaborations; a favourable political context; support from the Ministry of Health, governorate directors, and the *WHO* office in Tunisia; and the willingness of PCPs to engage in mental health training. In addition, prior to its implementation, the *mhGAP-IG* (*version 1.0*) training was tailored to meet the primary care realities of the study's setting. Hence, the second article included in this dissertation (Section 4.3) describes the adaptation process of the *mhGAP-IG* (*version 1.0*) and reports on its content and program structure, tailored to meet the primary care realities of the study's setting (Spagnolo et al., 2018b). This paper was included in this dissertation for several reasons. First, the *mhGAP-IG* in both its versions (*WHO*, 2010; 2016) and its accompanying training material were developed by the *WHO* as standardized tools for use in a wide range of LMICs to address the alarming treatment gap. However, within these countries lie differences in the conception of mental health conditions and mental healthcare organization, factors that result in varying socio-cultural contexts (Abdulmalik et al., 2013;

Keynejad et al., 2018; Thornicroft & Patel, 2014). Therefore, given the heterogeneity of LMICs, the *WHO* suggests that the standard *mhGAP-IG*, its accompanying training material, and the structure of its standard program be adapted before local implementation (*WHO*, 2010; 2016).

Second, the publication of the adaptation process, including relevant adaptations to the primary care realities of the study's setting, fills a gap in the literature. Specifically, while the *mhGAP*-based training has been implemented in over a hundred countries (*WHO*, 2018b), to our knowledge, only a handful of peer-reviewed articles highlight the training program's contextualization process and relevant adaptations. Countries that report on adaptations include Kenya (Mituso et al., 2018), Nepal (Jha & Sapkota, 2013), Nigeria (Abdulmalik et al., 2013), and Uganda (Akol et al., 2018). These teams employed different contextualization techniques and involved diverse stakeholder groups. For example, Mutiso and colleagues (2018) included a discussion with a multidisciplinary team comprising of a psychiatrist, psychologists, psychiatric nurses, clinical officers, and a public health physician. They also offered a translation and back translation of the guide into the local dialect. Similarly, Abdulmalik and colleagues (2013) describe the involvement of a multidisciplinary team (i.e., nurses, community health officers, and community health extension workers) in the adaptation process, but with the addition of the following: a national consultation to validate modifications to the training manual, a pilot implementation and evaluation of the adapted training, and a workshop regrouping trainers and trainees to finalize the adaptations and relevant modifications (Abdulmalik et al., 2013). In contrast, Akol and colleagues (2017) consulted solely with mental health specialists (psychiatrists and psychologists) to adapt the training material. Specifically, they added and shared information about the Ugandan mental health system and the common mental health issues. In addition,

standard training content was replaced with examples and group discussion topics based on the Ugandan setting (Akol et al., 2017). Last, diagnostic procedures to diagnose dementia by physicians and treatment protocols were adapted to the Nepalese context by Jha & Sapkota (2013). Given this heterogeneity, publishing on the adaptation of the *mhGAP*-based training (*version 1.0*) to the local primary care realities of our study's setting was thought pertinent in order to: 1) develop literature on the *mhGAP-IG*, a priority in *Global Mental Health* (Keynejad et al., 2018); 2) complement existing adaptation processes of the *mhGAP-IG* by providing another example of the ways in which the contextualization in a LMIC was conducted; and 3) encourage other LMICs to publish such a process, including relevant adaptations made to the standardized material.

Of note, while the dissertation identifies contextual factors that encouraged the implementation and evaluation of the *mhGAP*-based training (Article 6, Section 5.3.2) and factors that lead to its tailoring to local primary care realities (Article 2, Section 4.3) (Spagnolo et al., 2018b), it was challenging to explore whether it, in its tailored form, was implemented as planned (i.e., a fidelity evaluation). Contextual (i.e., linguistic and logistical) barriers prevented such an exploration. First, while French is the language in which medical school is taught and in which all medical staff is fluent, many aspects of the training were planned and conducted in Tunisian Arabic. For example, it was thought best by members of the Ministry of Health, trainer-psychiatrists, and PCPs in charge of continuing medical education ("tutors") to translate instructions for standard role plays into Tunisian Arabic and implement them in that language, in order to mirror "real-world" consultation in primary healthcare clinics (Spagnolo et al., 2018b). Role plays in the support session following the training were also translated into Tunisian Arabic and offered in that language (Spagnolo et al., 2018b). In addition, the general group lecture often

encouraged larger group discussions in the form of True/False questions and/or reflections. Tunisian Arabic was often used by trainer-psychiatrists when describing clinical scenarios related to these questions and/or reflections, as well as by PCPs when they provided examples from their practice. Therefore, it was difficult to evaluate if the role plays and elements of group discussions where implemented as planned given language barriers. Second, due to high demand for mental health training, it proved useful to randomly assign participating PCPs to one of three work groups in order to facilitate role plays and discussion following the general lecture (Spagnolo et al., 2018b). It was therefore difficult to evaluate if role plays were offered to trainees as planned in all three work groups, given logistic barriers preventing the candidate's access to all three rooms at once. Third, due to logistic demands during the training sessions (i.e., room organization, questions from trainers and "tutors"), it was challenging to conduct observations during the training sessions. Last, when tailoring the training program to local context, members of the Ministry of Health suggested that, during and after training, a team of "tutors" (PCPs in charge of continuing medical education) would aid trainees with challenging mental health cases and/or queries instead of specialists, given their unavailability (Spagnolo et al., 2018b). However, understanding if this part of the training program was implemented as planned was challenging given limited contact with trainees and "tutors" post-training.

3.4.2. Design and analyses

The published protocol outlines the assessment of the training's impact using a cluster RCT, the cluster consisting of delegations, designated areas within the governorates that aid in the organization of health services (Spagnolo et al., 2017a). Logistical issues affected the feasibility of conducting a cluster RCT using delegations, so this detail was modified to ensure feasibility of

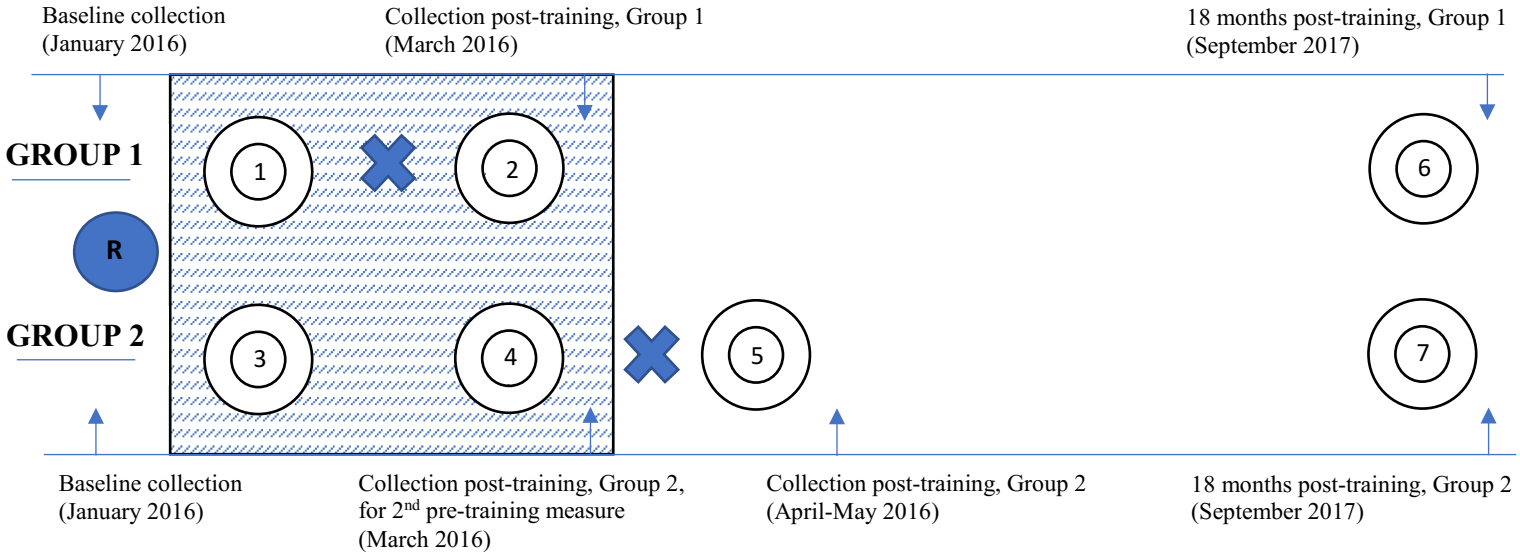
the study. First, it was conceived originally by members of the Ministry of Health involved in the study that governorate directors would help PCPs in charge of continuing medical education in the Greater Tunis area of Tunisia with recruitment, given their knowledge of delegations within their governorates. However, circumstances during the recruitment phase severely limited governorate directors from being involved with recruitment. Therefore, members of the Ministry of Health delegated the task of recruiting primarily to PCPs in charge of continuing medical education in the Greater Tunis area and one trainer-psychiatrist who works within the community. Second, the PCPs assigned as recruiters faced unexpected logistical challenges, including difficulty contacting and engaging with administrators within the delegations, transportation barriers, and time constraints. These logistical challenges, according to members of the Ministry of Health, could jeopardize recruitment. They suggested randomization by individual to facilitate the recruitment process given the limited involvement of delegation administrators and governorate directors during the recruitment phase.

An RCT to assess the impact of the training program, where randomization would occur by individual (i.e., PCPs) and not by cluster (i.e., the delegation), as suggested by local partners, was envisioned. However, members of the Ministry of Health and the directors of the governorates insisted on also offering the training program to PCPs who would be randomly assigned to the control group in order to increase accessibility to mental health training (given how limited it is in the country). Participating PCPs would receive the training, but at different times depending on their allocated group. Beyond meeting accessibility issues, discussions with members of the Tunisian Ministry of Health involved in the study and the governorates' directors suggested that offering the training to both groups at different times could help reduce trial

attrition. This contextual reality allowed for the conception of different types of designs to assess the impact of the training program, which were followed in this dissertation.

This dissertation employed an exploratory trial, conducted between January 2016 and September 2017 using a combination of designs. First, a *pretest-posttest control group design* (an RCT) (Campbell & Stanley, 1963) was used to assess the training's short-term impact (*Figure 1*). For this design, PCPs were randomly assigned to two groups: the intervention group (Group 1) or the control group (Group 2). Group 1 received the training from 9 February to 15 March 2016. Second, a delayed-intervention strategy was envisioned through a *one-group pretest-posttest design* (Campbell & Stanley, 1963) to assess the impact of the training program offered to Group 2 (*Figure 2*). Group 2 received the training from 29 March to 27 April 2016. Third, a *repeated measures design* was used to assess the training's long-term impact (*Figure 3*). This design relied on the pooling of Groups 1 and 2 over three time periods to assess the training program's long-term impact, all while benefitting from the robustness of randomization ensured by the *pretest-posttest control group design* (Campbell & Stanley, 1963). Pooling also would allow for an increase in statistical power when assessing the evolution of the training's impact over time.

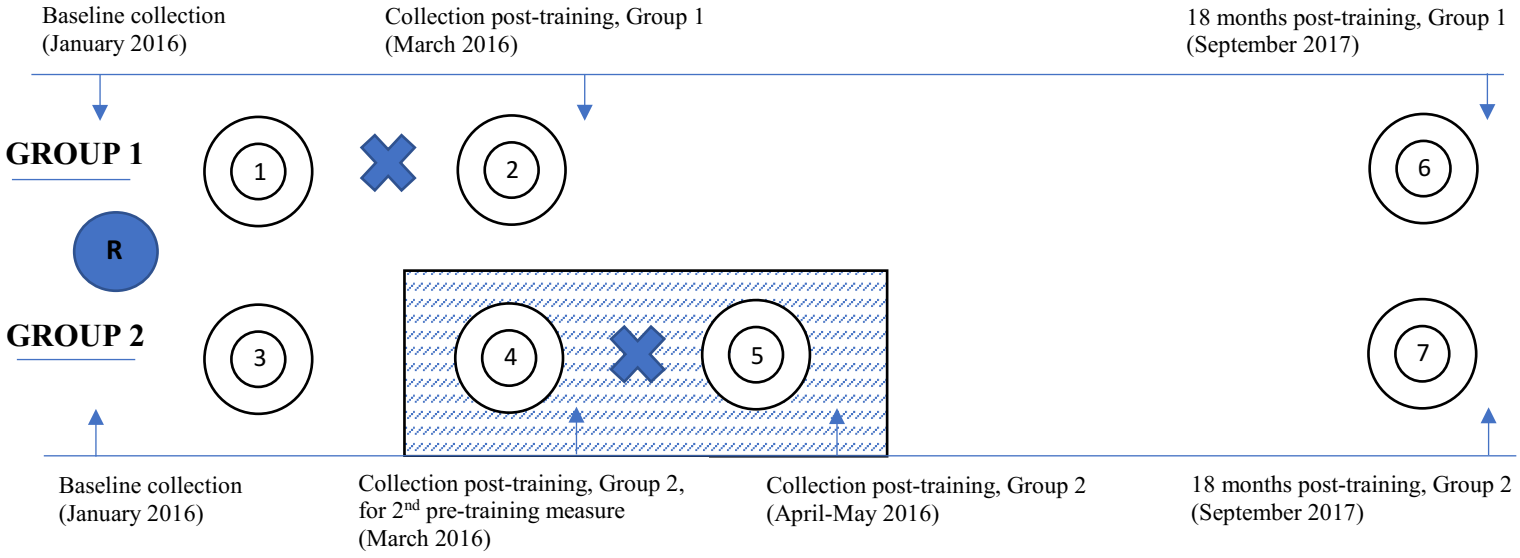
Figure 1: Pretest-posttest control group design (short-term impact)



R = Randomization; X = Training

The shaded area depicts the *pretest-posttest control group design* and the timing of the intervention. Participants were randomized to either Group 1 (the intervention group) or Group 2 (the control group). Group 1 received the training from 9 February to 15 March 2016 (circles 1 and 2). Group 2 did not receive the intervention during this time (circles 3 and 4). Data was collected through self-administered questionnaires prior to the randomization of both groups (baseline collection: January 2016) and following Group 1's training (March 2016).

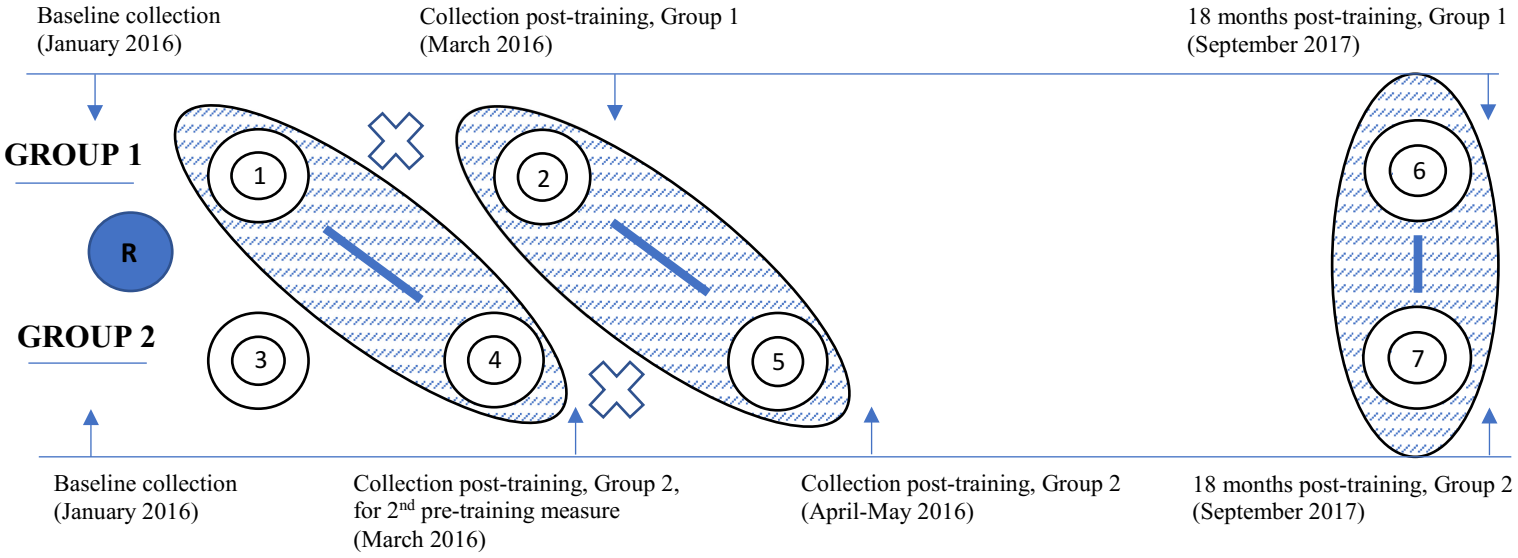
Figure 2: One-group pretest-posttest design (short-term impact)



R = Randomization; X = Training

The shaded area depicts the *one-group pretest-posttest design*, which relied on a delayed-intervention strategy. Following Group 1's training, Group 2 received the training from 29 March to 27 April 2016 (circles 4 and 5). Data was collected through self-administered questionnaires prior to Group 2's participation in the training program (March 2016) and following Group 2's training (Arpil-May 2016).

Figure 3: Repeated measures design (long-term impact)



R= Randomization; X = Training
In this repeated measures design, the shaded area depicts the pooling of Groups 1 and 2 for analysis of the evolution of the training's impact over three time periods: pre-training (circles 1 and 4), post-training (circles 2 and 5), and 18 months post-training (circles 6 and 7). Pooling at these three times was justified given the similarity of characteristics between groups, and the short amount of time elapsed between circles 1 and 4 and circles 2 and 5. Of note, circles 1, 3, and 4 were comparable on all characteristics, therefore we pooled circles 1 and 4.

The use of a combination of designs is referred to by Campbell and Stanley (1963) as a "*patched up design*" (p. 57), and one of its key features significant to this dissertation is the ability to demonstrate in several manners the effect of an intervention (i.e., the training based on the *mhGAP-IG*). Replicating the effects of an intervention using assorted designs is said to increase the robustness of a study (Campbell & Stanley, 1963). Specifically, following the Theory of Experimentation, *"the more numerous and independent the ways in which the experimental effect is demonstrated, the less numerous and less plausible any singular rival invalidating hypothesis becomes"* (Campbell & Stanley, 1963, p. 36), increasing the study's internal validity. In this dissertation, the effects of the training based on the *mhGAP-IG* shown in Group 1 by the *pretest-posttest control group design* (Campbell & Stanley, 1963) were replicated in Group 2 by the *one-group pretest-posttest design* (Cambell & Stanley, 1963); findings show that the effects of the

training program on both groups were similar (Spagnolo et al., 2017b). *Table 1* shows that for the following variables, there were statistical differences pre- and post-training, and that these differences were similar between groups: mental health knowledge, mental health attitudes, mental health self efficacy, and PCPs' referral habits. While no difference between pre- and post-training was found for the variable mental health's importance in clinical practice, this status quo was also mirrored between groups.

Table 1: Comparison of training effects between Group 1 and Group 2 (short-term impact)

PCPs' competencies (i.e., outcome variables)	**Group 1 (intervention)**		**Group 2 (intervention)**		**Time**		**Group x time interaction**	
	Pre	**Post**	**Pre**	**Post**	**P value**	**Effect[a]**	**P value**	**Effect[a]**
	Mean (SD), n	Mean (SD), n	Mean (SD), n	Mean (SD), n				
Knowledge	6.36 (1.28), 45	7.42 (1.24), 45	6.56 (1.32), 43	7.70 (1.36), 43	<0.001	0.411	0.745	0.001
Attitudes[b]	29.38 (6.56), 45	24.91 (6.45), 45	27.94 (6.94), 43	23.99 (6.52), 43	<0.001	0.326	0.687	0.002
Self-efficacy	5.25 (1.36), 45	7.17 (1.35), 45	5.05 (1.45), 43	7.18 (1.30), 43	<0.001	0.684	0.477	0.006
MH's importance in clinical practice[c]	0.94 (0.34), 44	0.92 (0.35), 44	1.05 (0.32), 41	1.01 (0.36), 41	0.373	0.010	0.736	0.001
PCPs' referral habits	59.27 (31.17), 37	44.92 (32.20), 37	53.76 (36.00), 38	32.76 (33.06), 38	<0.001	0.175	0.462	0.007

[a] Eta partial squared (η^2) is the effect size reported.
[b] Higher scores indicate more negative attitudes about mental illness and the field of mental health.
[c] Analyses and results are reported in log form.
Tests conducted: Mixed ANOVA (reporting means and standard deviations (SD)).

As stated in the published protocol, randomization by cluster was envisioned in the attempt to minimize contamination. Contamination is of concern in randomized controlled trials because it may cause *"people who were not intended to receive an intervention inadvertently [to] do so"* (Keogh-Brown, 2007, p. ix). After the randomization by individuals (and suggested by local

partners) contamination was tested in two ways. First, we assessed contamination in the *pretest-posttest control group design* (Campbell & Stanley, 1963) (Article 4, Section 4.5) by evaluating whether PCPs in the control group might have gained mental health competencies despite not participating in the training program (Torgerson, 2001). *Table 2* highlights that both pre- and post-training, there are no differential effects for the control condition on outcome measures.

Table 2: Assessing contamination in the control condition (n=60)

PCPs' competencies (i.e., outcome variables)	**Control group**		**p-value**
	Pre-training (n = 60)	**Post-training** (n = 47)	
Knowledge about mental health, median (Q1, Q3)	6.3 (5.63, 7.50)	6.3 (5.63, 7.50)	.670[c]
Attitudes towards mental illness and the field of mental health, mean (SD)	28.2 (6.73)	27.6 (6.83)	.544[d]
Self-efficacy in detecting, treating, and managing mental health problems, median (Q1, Q3)	4.8 (3.64, 6.20)	5.4 (4.29, 6.14)	.315[c]
Self-reported practice:			
Importance of mental health in clinical practice, median (Q1,Q3) [a,e]	3.2 (2.40, 3.97)	3.2 (2.50, 3.97)	.588[c]
PCPs' referral habits, mean (SD) [b]	52.3 (28.64)	51.39 (35.68)	.866[d]

[a] Missing values were less than 5%. [b] Missing values were greater than 5% but less than 10%.
Tests conducted: [c] Wilcoxon signed-rank test (reporting medians and quartiles 1 and 3)), [d] Paired t-test (reporting means and standard deviations (SD)),
[e] This test was conducted on the log transformation of the variable.

Second, participating PCPs working at the same clinic might have been assigned to differing groups due to individual randomization. Therefore, some PCPs in the control measure, working and thus in contact with PCPs participating in the training, might have been at risk of contamination. While one outcome measure (i.e., the importance PCPs allocate to mental health practice per week) differs among PCPs at risk of contamination pre-training, *Table 3* highlights that for post-training measures, the contrary holds true. Specifically, for all post-training outcome

measures, PCPs in the control group at potential risk of contamination do not differ from PCPs not at such a risk.

Table 3: Assessing contamination among PCPs working in the same clinics but assigned to different groups (n=60)

PCPs' competencies (i.e., outcome variables)	**Control group Pre-training**		**p-value**	**Control group Post-training**		**p-value**
	Risk of contamination (n=28)	**Not at risk of contamination** (n=32)		**Risk of contamination** (n=21)	**Not at risk of contamination** (n=26)	
Knowledge about mental health, mean (SD)	6.9 (1.31)	6.3 (1.49)	.080[b]	6.7 (1.25)	6.3 (1.36)	.271[b]
Attitudes towards mental illness and the field of mental health, mean (SD)	28.5 (6.64)	27.5 (6.14)	.542[b]	28.6 (6.94)	26.7 (6.76)	.349[b]
Self-efficacy in detecting, treating, and managing mental health problems, mean (SD)	4.9 (1.77)	4.8 (1.57)	.759[b]	5.1 (1.32)	5.0 (1.66)	.766[b]
Self-reported practice: Importance of mental health in clinical practice, median (Q1, Q3) [a,d]	3.5 (2.74, 4.47)	3.2 (2.24, 3.66)	.035[c]	3.2 (2.55, 4.47)	2.7 (2.29, 3.64)	.096[c]
PCPs' referral habits, mean (SD) [a]	53.6 (32.32)	57.2 (31.45)	.669[b]	51.5 (33.18)	53.4 (38.95)	.863[b]

[a] Missing values were greater than 5% but less than 10%.
Tests conducted: [b] ANOVA with one factor (reporting means and standard deviations (SD)), [c] Kruskal–Wallis H test (reporting medians and quartiles 1 and 3)).
[d] This test was conducted on the log transformation of the variable.

3.4.3. Trial location

The published protocol states that the governorates of Tunis and Sousse were the study's planned setting. Security issues in the country during the implementation of the preliminarily adapted protocol, such as on and off nation-wide curfews, challenged transportation to and from Sousse. In addition, there is a great deal of geographical distance between Tunis and Sousse. With a limited budget for transportation, it would have been difficult to access both Tunis and Sousse. Such challenges resulted in a change to the study's setting suggested by members of the Ministry of Health involved in the study and approved by the governorate directors; the study would be

conducted in the governorates of the Greater Tunis area of Tunisia, namely in Manouba, Tunis, Ben Arous, and Ariana. This change, followed in the adapted protocol and thus this dissertation, was encouraged by members of the Ministry of Health for feasibility and because the diversity of the Greater Tunis area is representative of other areas of Tunisia.

The population of the governorates of the Greater Tunis area of Tunisia is as follows: Tunis, 1073644 people; Ariana, 599815 people; Ben Arous, 648721 people; and Manouba, 387582 people. These governorates regroup one quarter of the Tunsian population (i.e., 2709762 on a total of 11154372 people, or 24.29% of the total country population) (Ministère de la santé, 2016). The population of the Greater Tunis area live in diverse settings consisting of rural, urban, semi-rural, and semi-urban regions, like other areas of Tunisia. The socio-economic context of the governorates of the Greater Tunis area is comparable to that of other Tunisian governorates. First, the activity rate (i.e., the ratio of the total labor force to the working-age population) in the Greater Tunis area varies between 38% and 40.5%. This rate in the other governorates of Tunisia varies between 29% and 40.3%, with an average of 46.9% for the entirety of Tunisia (Ministère de la santé, 2016). Second, the dependence rate (i.e., the ratio of the number of individuals who depend on others and the number of individuals able to assume this charge) of the governorates of Greater Tunis area varies between 60% and 61%. For the other governorates of Tunisia, these statistics vary between 62% and 78%, with an average of 66% for the entirety of Tunisia (Ministère de la santé, 2016). Thirdly, the rate of graduates from primary education for the governorates of the Greater Tunis area is 27%, and this rate is between 33% and 35% for the other governorates of Tunisia, with an average of 33% for the entirety of Tunisia (Ministère de la santé, 2016). Fourth, the rate of graduates from secondary education for the governorates of the Greater

Tunis area is 40%, and this rate is between 28% and 36% for the other governorates of Tunisia, with an average of 35% for the entirety of Tunisia (Ministère de la santé, 2016).

Not only do PCPs working in the Greater Tunis area see people in their clinical practice facing similar socio-economic realities than those of other governorates in Tunisia, they are also faced with similar realities related to the provision of care. For example, the density of general practitioners working in the public sector in the governorates of the Greater Tunis area varies between 17.6 per 100 000 inhabitants (Ben Arous: rural and semi-urban) to 29.2 per 100 000 inhabitants (Tunis: urban). This density mirrors the average density of general practitioners working in the public sector in Tunisia: 30.2 per 100 000 inhabitants (Ministère de la santé, 2016). In addition, accessing psychiatrists working in the public sector of the Greater Tunis area is difficult. In the Greater Tunis area, psychiatrists working in the public sector are located primarily at *Razi Hospital*, the only operating mental health hospital in the country. This hospital is in the governorate of Ben Arous. Not only is Razi Hospital difficult to access given the distance between governorates of the area, its access is also challenged by stigmatization (Ministry of Health, 2013; Spagnolo et al., 2018c). Access to psychiatrists is comparably difficult in other areas of Tunisia. For example, the limited number of psychiatrists working within the public sector are grouped only in certain areas, specifically the psychiatric units of regional hospitals. Transport to these areas is challenging for most, hence the importance of building the mental health capacity of PCPs across Tunisia.

The aim of this dissertation was to see if the training program had an impact on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice. However, given the

representativity of the governorates comprising the Greater Tunis area, findings might help shed light on the possible outcomes of this training should it be implemented in other areas of Tunisia.

3.4.4. Participants

3.4.4.1. Sample size

Since the randomized controlled trial was without clusters, sample size was further adapted and thus adjusted, as presented in Article 4, Section 4.5.

3.4.4.2. Participant inclusion criteria

The published protocol states that to be included in the study, PCPs must meet the following eligibility criteria: 1) work within public or private institutions at the level of primary care in Tunis or Sousse; 2) have five or more years of clinical experience; 3) dedicate a minimum of one hour per week to mental health; 4) be part of the *Conseil national de l'ordre des médecins de Tunisie* (*CNOM*), which is the PCP order in Tunisia; and 5) be available when the training is scheduled. PCPs would be excluded from the trial if they were retired or on sick leave, worked in any other setting than in primary or community-based institutions, or did not dedicate any time to mental health or illness within their given work-week. Of note, such eligibility criteria were determined by local partners.

Some eligibility criteria for the study changed prior to the recruitment phase, and these were encouraged by members of the Ministry of Health and approved by governorate directors of the Greater Tunis area. Thus, the adapted protocol's eligibility criteria and procedures, listed in Article 3 (Section 4.4), were followed in this dissertation to recruit PCPs. In brief, in Tunisia,

there is a need for mental health training in the public sector, especially for PCPs, because they are the most relied-upon non-specialists for mental health detection, treatment, and management in the country (Ben Thabet et al., 2018; Ministry of Health, 2013; Spagnolo et al., 2018a). Targeting the public sector and such non-specialists specifically (as suggested by members of the Ministry of Health involved in this study and the governorate directors of the Greater Tunis area) would also help increase access to mental health services for a wider population in an affordable way. Since the PCPs were all public sector physicians, they were inevitably part of the primary care physicians' professional order in Tunisia. Hence, these two characteristics no longer served as eligibility criteria for the study. Dedicating a minimum of one hour per week to mental health was excluded as an eligibility criterion as well; members of the Ministry of Health involved in the project and the governorate directors of the Greater Tunis area hoped that even PCPs who did not engage in mental health practices prior to training would be encouraged to do so post-training. In sum, eligibility criteria followed by this dissertation for recrutement included PCPs working at the level of primary care in the Greater Tunis area and having five or more years of clinical experience. In the Greater Tunis area, if PCPs work in hospital settings, they are generally considered emergency physicians (i.e., *des urgentistes*). These PCPs were not targeted for the *mhGAP-IG* training, because they are considered specialists. Five or more years of clinical experience was considered important as an eligibility criterion by members of the Ministry of Health involved in the project and governorate directors. In the Greater Tunis area, PCPs who recently completed medical school are required to often work in remote regions of the area. This reality is not ideal for most, so it is not uncommon for these newly graduated doctors to consider alternative realms of work, such as the private sector, moving abroad, or becoming a pharmaceutical representative. Members of the Ministry of Health involved in this study and

governorate directors wanted to offer the *mhGAP* training to PCPs who were invested in family medicine in primary care settings. This reality is also reflected in the fact that most PCPs working in the Greater Tunis area of Tunisia are generally more experienced PCPs.

3.4.5. Evaluation

3.4.5.1. Data collection

The published protocol describes questionnaires to be administered to participating PCPs. These include: questionnaires on socio-demographics (which include a brief overview of PCPs' practice characteristics), mental health knowledge, attitudes, self-efficacy, and mental health practice. The mental health practice questionnaire to be administered was based on the *Mental, Neurological and Substance Use Patient Visit Summary* developed by the *WHO*. With this questionnaire, we aimed to collect in-depth information on participating PCPs' mental health cases before and after the training program. All these questionnaires were administered for the purposes of this dissertation.

One of the most surprising discoveries made during the administration of the questionnaire based on the *Mental, Neurological and Substance Use Patient Visit Summary* was a series of record-keeping issues in the study's setting. These were not only highlighted by PCPs while the questionnaire was being administered but were also recorded as a study finding. Trainees acknowledged that while the Tunisian Ministry of Health has been encouraging PCPs to record mental health statistics per primary healthcare clinic, there has been limited follow-up by administrators, which consequently jeopardizes the institutionalization of proper record-keeping (Article 5, Section 4.6) (Spagnolo et al., 2018c). Hence, practice characteristics included in the

socio-demographic questionnaire (albeit collected by self-report) were used to describe participating PCPs' mental health practice in this dissertation (Articles 3 and 4, Sections 4.4 and 4.5). While findings from the practice questionnaire were not included as part of this dissertation, information from trainees on such a challenging part of the evaluation process helped us gain a clear understanding of why it proved problematic.

The published protocol highlights that a long-term evaluation of the training program's impact was scheduled for one year after its completion. To facilitate this long-term evaluation for the purposes of this dissertation, discussions with local partners encouraged data collection during the planned dissemination session. Given logistical issues around the planning of this session (i.e., availability of local partners, religious holidays), it was organized 18 months after the completion of the training program. Hence, data to evaluate the training's long-term impact was also collected at that time (Article 4, Section 4.5).

3.4.5.2. Psychometric properties

Psychometric properties were not originally conceived in the published protocol. However, upon a reviewer's request during revision of Article 3 (Section 4.4) by the *International Journal of Mental Health Systems*, this methodological component was approved by local partners and added to the study in the adapted protocol. Specifically, we report on the scales' test-retest reliability and Cronbach's alphas (Spagnolo et al., 2018a).

3.4.5.3. Data presentation

Articles included in the results section of this dissertation (Chapter 4), present quantitative (Articles 3 and 4, Sections 4.4 and 4.5) and qualitative data (Article 5, Section 4.6) separately, as stated by the published protocol. This separation was done to ensure the feasibility of the dissertation; as data was collected, it was analysed, written, validated by co-authors, and submitted to journals. To acknowledge the "mixed methods" used in this study, and thus the different ways of understanding our research questions (Creswell & Plano Clark, 2018), we aim to integrate the two forms of data (quantitative and qualitative) in the discussion chapter of this dissertation (Chapter 5). Specifically, in this dissertation, the embedded "mixed methods" design was employed; a purposeful sample of PCPs who were randomly assigned to Group 1 (i.e., the first group to receive the training) were interviewed after their participation in the program to explore factors that would facilitate or hinder the attainment of its expected results. Thus, the qualitative data (implementation analysis) played a supportive role to the quantitative data (Creswell & Plano Clark, 2018).

3.5. Summary

Table 4, below, summarizes the mentioned modifications to the published study protocol. Changes to the protocol were suggested (except tests to assess psychometric properties) and approved by members of the Ministry of Health involved in the study and governorate directors of the Greater Tunis area to better adapt it to local realities and to further ensure the study's feasibility.

Table 4: Summary of the adaptations between the published and adapted protocols

Component	Published protocol	Adapted (and followed) protocol
Research questions and objectives	Research question 1: What types of mental health training programs offered to PCPs have been implemented and evaluated, and are they effective? Research question 2: What is the potential value of building capacity in primary or community-based settings by training PCPs in Tunis and Sousse (Tunisia) using the mhGAP-IG (version 1.0)? Research question 3: How do contextual factors influence the successful implementation and expected outcomes of a mental health training based on the *mhGAP-IG* (version 1.0) offered to PCPs in Tunis and Sousse (Tunisia)?	Research question 1: Systematic review in progress, but not presented in this dissertation. Research question 2: Addition of one research objective to complement research question 2, as suggested by local partners: to paint a baseline portrait of the mental health knowledge, attitudes, self-efficacy, and self-reported practice of our sample of PCPs. Research question 3: Type I implementation analysis: a) to explore contextual factors that facilitated the implementation and evaluation of the *mhGAP-IG* training; and b) to describe the adaptation process of the *mhGAP-IG* (*version 1.0*) to meet the primary care realities of Tunisia. Type III implementation analysis: to explore how contextual factors interact with the training program to influence its expected outcomes.
Design and analyses	A cluster randomized controlled trial (RCT) was outlined.	An exploratory trial with different designs (including an RCT) was conducted and group allocation was done on an individual basis.
Trial location	The trial was to be conducted in Tunis and Sousse.	The trial was conducted in the governorates of the Greater Tunis area of Tunisia, as suggested by local partners to ensure feasibility of the study and because the area is considered representative of Tunisia at large.
Participants	Sample size: Expected sample size: 722 PCPs, with an average of 19 PCPs per cluster. Inclusion criteria: PCPs must work in private or public institutions at the level of primary care in Tunis or Sousse; have five or more years of clinical experience; dedicate a minimum of one hour per week to mental health practice; be a part of the PCP order; and be available for training.	Sample size: A total of 112 PCPs was randomized to either Group 1 or Group 2. Inclusion criteria: PCPs must work at the level of primary care in the Greater Tunis area and have five or more years of clinical experience, as suggested by local partners.
Evaluation	Data collection: 1) Questionnaires on socio-demographic data, as well as mental health knowledge, attitudes, self-efficacy, and self-reported practice based on the *Mental, Neurological and Substance Use Patient Visit Summary* to be collected. 2) Questionnaires were to be administered one-year post-training. Psychometric properties: No mention in the protocol. Data presentation: The protocol (and consequently, the results section) present quantitative and qualitative data separately.	Data collection: All listed questionnaires in the published protocol were administered. However, there were issues with the reporting of statistics in the *Mental, Neurological and Substance Use Patient Visit Summary.* Questionnaires were administered 18 months post-training; local partners suggested they be administrated during the planned dissemination session. Psychometric properties: Added to the study based on a reviewer comment, but with approval from local partners. Data presentation: Same as in the published protocol, but this dissertation aims to integrate the study's "mixed methods" in the discussion chapter.

CHAPTER 4: RESULTS

4.1. Synopsis

This section of the thesis highlights four articles. The first article (Article 2, Section 4.3) describes the adaptation process of the *mhGAP-IG* (*version 1.0*) training program to the Greater Tunis area of Tunisia. This article was published in *Global Mental Health* (May 2018). The second article (Article 3, Section 4.4) provides a detailed portrait of the mental health knowledge, attitudes, and self-efficacy of our sample of PCPs, prior to their participation in the *mhGAP*-based training (*version 1.0*). In addition, it aims to identify what characteristics are associated with these competencies. This article was published in the *International Journal of Mental Health Systems* (October 2018). The third article (Article 4, Section 4.5) assesses the effectiveness of the tailored *mhGAP*-based training (*version 1.0*) on our sample of PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice. The article was accepted for publication pending minor revisions by the journal *Health Policy and Planning* (April 2019). The fourth article (Article 5, Section 4.6) explores contextual factors, from the perspective of 18 trained PCPs, that might have interacted with the tailored *mhGAP*-based training (*version 1.0*) to influence its expected outcomes. This article was published in the journal *BMC Public Health* (December 2018). Prior to the presentation of these articles, a brief overview of the candidate's contribution will be outline (Section 4.2).

4.2. Candidate's contribution

4.2.1. Overall study

Under the supervision of Dr. François Champagne and Dr. Nicole Leduc, the doctoral candidate: 1) was involved in the conception of the study; 2) was involved in choosing and/or developing research tools (i.e., questionnaires and interview guide); 3) developed the initial research ethics application (and annual renewals) in support of this study; 4) orchestrated the adaptation of the *mhGAP-IG* (*version 1.0*) and accompanying training material, in consultation with members of the Ministry of Health, trainer-psychiatrists, and "tutors" (i.e., PCPs in charge of continuing medical education in the Greater Tunis area of Tunisia), as well as made the suggested modifications to training material and content; 5) organized a *Training of Trainers* on the use of the *mhGAP-IG* (*version 1.0*) for trainer-psychiatrists and "tutors"; 6) was involved in the recruitment of study participants, along with one trainer-psychiatrist and "tutors"; 7) organized the weekly training sessions; 8) assisted trainer-psychiatrists and "tutors" before and during training; 9) collected data (quantitative and qualitative); 10) analysed and was involved in the interpretation of data (quantitative and qualitative); 11) reported data in articles and incorporated suggested corrections by co-authors and reviewers; and 12) helped organize and presented at a dissemination session in Tunis, Tunisia in September 2017, to validate findings before the publication of research articles. During this time, data to assess the long-term impact of the training program was collected by the candidate. This dissemination session was supported by *RRSPQ*'s *Regroupement Stratégique en Santé Mondial*e. The candidate spent 6 months in Tunisia to accomplish contributions 4 to 9. Data collection during that time was supported by *MITACS Globalink* (research fellowship, #IT06835).

4.2.2. Article 2

The first article presented in this results chapter (Article 2, Section 4.3) describes the adaptation process of the *mhGAP-IG* (*version 1.0*) training program, content, and structure to the Greater Tunis area of Tunisia. For this article, the candidate: 1) was involved in the conception of the study in which this article is inscribed and the design/organization of the paper; 2) consulted with members of the Tunisian Ministry of Health, trainer-psychiatrists, and "tutors" in order to adapt the *mhGAP-IG* and its accompanying training material; 3) wrote the first draft of the manuscript; and 4) integrated suggested corrections by co-authors and journal reviewers into subsequent versions.

4.2.3. Article 3

The second article presented in this results chapter (Article 3, Section 4.4) provides a detailed portrait of the mental health knowledge, attitudes, and self-efficacy of our sample of PCPs, prior to their participation in the *mhGAP*-based training (*version 1.0*). In addition, it aims to identify what characteristics are associated with these competencies. For this article, the candidate: 1) was involved in the conception of the study in which this article is inscribed and the design of the paper; 2) administered questionnaires for data collection; 3) performed statistical analyses using SPSS; 4) was involved in the interpretation of the results; 5) wrote the first draft of the manuscript; and 6) integrated suggested corrections by co-authors and reviewers into subsequent versions.

4.2.4. Article 4

The third article presented in this results chapter (Article 4, Section 4.5) assesses the impact of the *mhGAP*-based training (*version 1.0*) on our sample of PCPs' mental health knowledge,

attitudes, self-efficacy, and self-reported practice. Impact was assessed over the short- and long-term. For this article, the candidate: 1) was involved in the conception of the study in which this article is inscribed and the design of the paper; 2) helped recruit participants; 3) collected data (i.e., by the administration of questionnaires); 4) performed statistical analyses using SPSS; 5) was involved in the interpretation of the data; 6) wrote the first draft of manuscript; and 7) integrated suggested corrections by co-authors into subsequent versions.

4.2.5. Article 5

The fourth article presented in this results chapter (Article 5, Section 4.6) explores contextual factors, from the perspective of 18 trained PCPs, that might have interacted with the *mhGAP*-based training (*version 1.0*) to influence its expected effects. For this article, the candidate: 1) was involved in the conception of the study in which this article is inscribed and the design of the paper; 2) developed the interview guide; 3) recruited participants for interviews; 4) conducted individual and group interviews with participants; 5) analysed the data using thematic analysis; 6) was involved in the interpretation of the data; 7) wrote the first draft of the manuscript; and 8) integrated suggested corrections by co-authors and journal reviewers into subsequent versions.

4.3. Article 2: Adaptation of the *mhGAP-IG* (*version 1.0*)

Tailoring a training based on the Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG) to Tunisia: process and relevant adaptations

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Abstract

Background

In order to make mental health services more accessible, the Tunisian Ministry of Health, in collaboration with the *School of Public Health* at *Université de Montréal*, the *World Health Organization* office in Tunisia and the *Montréal World Health Organization-Pan American Health Organization Collaborating Center for Research and Training in Mental Health*, implemented a training programme based on the *Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG) (version 1.0)*, developed by the *World Health Organization*. This article describes the phase prior to the implementation of the training, which was offered to general practitioners working in primary care settings in the Greater Tunis area of Tunisia.

Methods

The phase prior to implementation consisted of adapting the standard *mhGAP-IG (version 1.0)* to the local primary healthcare context. This adaptation process, an essential step before piloting the training, involved discussions with stakeholder groups, as well as field observations.

Results

Through the adaptation process, we were able to make changes to the standard training format and material. In addition, the process helped uncover systemic barriers to effective mental health care.

Conclusions

Targeting these barriers in addition to implementing a training programme may help reduce the mental health treatment gap and promote implementation that is successful and sustainable.

Keywords

Adaptation, mhGAP training, mental health, teaching and learning, Tunisia.

Introduction

Tunisia faces many challenges related to mental health care. First, it is estimated that roughly 1% of the country's total public-sector healthcare budget is allocated to mental health, an area affecting a substantial portion of the population [1,2]. It is important to note, however, that this amount is lower than the estimated average of 1.9% allocated to mental health in other lower and middle-income countries [3,4]. Moreover, of this 1% budget, half is used to sustain hospital settings treating mental illness, to the detriment of developing community-based mental health services [1]. Second, there is a deficit of mental healthcare professionals [5] and they are unevenly distributed across the country. For example, mental healthcare professionals mainly work in and around the capital, or along the coastline [1,2], despite much-needed services within the interior of the country [2]. Third, there are challenges related to the integration of mental health at the primary care level namely due to deficits in mental health training and remaining echoes of stigma against mental illness [3]. Lack of integration and effects of stigmatization encourage the use of the only standing and already overly crowded mental health hospital, as well as the limited psychiatric units located within general hospitals [2]. With the burden caused by mental disorders, substance use disorders and suicide anticipated to increase given economic unrest in the country [2,6], barriers to effective and accessible mental health care are generating concern.

To address these challenges in the country, general practitioners (GPs) working at the primary care level are targets of health system reform given their strategic position in the healthcare system [2,7]. However, despite an estimated one-third of their consultations being related to mental health [2,8,9], GPs continue to lack specific knowledge and skills to adequately address mental health-related issues [2]. For example, it has been reported that most GPs have

insufficient mental health training, a lack of mastery over the prescription of psychotropic medications, and a fear of treating mental illness [2,8]. For these reasons, the Tunisian Ministry of Health (more specifically, the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide*), in collaboration with the *School of Public Health* at *Université de Montréal*, the *World Health Organization* office in Tunisia and the *Montréal World Health Organization-Pan American Health Organization Collaborating Center for Research and Training in Mental Health*, implemented a training based on the *Mental Health Gap Action Programme* (*mhGAP*) *Intervention Guide* (*IG*) (*version 1.0*) [10], developed by the *World Health Organization*. The goal of the training is to assist in the delivery of effective mental health services by non-specialists, for conditions considered of high priority in low- and middle-income countries [10,11].

It is important to note that the *mhGAP-IG* and accompanying training content are standardized tools developed for use in a wide range of low- and middle-income countries to address the alarming mental health treatment gap [10,12]. Within these countries, however, lie differences in the conception of mental health conditions and mental healthcare organization, factors that encourage varying socio-cultural contexts [13,14]. Therefore, given the heterogeneity of low- and middle-income countries, the standard *mhGAP-IG*, training material and programme require adaptation before implementation [10].

Since 2010, trainings based on the *mhGAP-IG* have been implemented in over 90 countries [15]. Evidence has emerged over the past years of the programme's effectiveness at improving non-specialists' detection, treatment, and management of mental health conditions within primary

and community-based settings [15]. However, what is currently scarcer is knowledge on 'how' this complex intervention is adapted to specific settings as to make it culturally appropriate, and therefore useful. Generating such evidence is a current priority in global mental health, as it can aid in the sustainability and scale-up of the programme [11,14], as well as empower local stakeholders to take ownership of the implementation process.

The purpose of this article is to describe the phase prior to the implementation of a mental health training programme based on the *mhGAP-IG* (*version 1.0*) in the Greater Tunis area of Tunisia, and report on adaptations made to the standard training material and programme, essential before piloting. This project is part of a larger trial, seeking to evaluate the training programme implemented in the Greater Tunis area using a randomized controlled trial and implementation analysis. Competencies evaluated pre- and post-training include mental health knowledge, attitudes towards mental illness and the field of mental health, self- efficacy in detecting, treating and managing mental illness in primary care, as well as clinical practice in mental health [7].

Methods

Preparing for the implementation of a mental health training programme based on the *mhGAP-IG* (*version 1.0*) began in September 2015 and necessitated multiple steps. The first step consisted of identifying mental health needs or gaps in the Greater Tunis area by: (1) using the *Adaptation Guide*, a tool developed by the *World Health Organization* to accompany the *mhGAP-IG*; (2) discussing with members of the Ministry of Health; and (3) consulting epidemiological studies on mental health trends, post-Tunisian Revolution of 2010–2011. The second step in preparing for

implementation consisted of developing a preliminary training programme and schedule, tailored to the Greater Tunis area. The last step prior to implementation consisted of conducting field observations in primary healthcare clinics.

Step 1: Identifying mental health needs

Three Tunisian psychiatrists were appointed by members of the Tunisian Ministry of Health as trainers given their expertise in mental health organization, and familiarity with the functioning of both institutional- and community-based mental health services in the Greater Tunis area. Using the *Adaptation Guide* as a road-map for dialogue, three group discussions were conducted with the trainer-psychiatrists on language used in training material, context's impact on training content (including conditions' specificities and the use of psychotherapy), availability of medication at the level of primary care, and availability of community-based mental health services. These discussions were important not only to aid in the adaptation of standard training material, but also to understand the types of resources (i.e. pharmacological, human and/or organizational) missing in the Greater Tunis area, as compared with the suggested, standard resources listed in the *mhGAP-IG* (*version 1.0*).

Discussions with members of the Ministry of Health validated the findings uncovered using the *Adaptation Guide* and allowed us to further understand the current trends in mental disorders, substance use disorders, and suicide. These trends were also confirmed by consulting the limited epidemiological studies on mental disorders, substance use disorders and suicide, especially post-Revolution in Tunisia. In addition, discussions with members of the Ministry of

Health highlighted GPs' available referral network for mental disorders, substance use disorders and suicide, and how it may be adapted for the purposes of the training.

Step 2: Developing a preliminary training programme and schedule

The next step in preparing for the implementation of the *mhGAP-IG* (*version 1.0*) consisted of developing a preliminary training programme and schedule, tailored to the Greater Tunis area. This preliminary programme and schedule were developed as a collaborative effort between members of the Ministry of Health in Tunisia (WM, FC), the *School of Public Health* at *Université de Montréal* (JS, FC, NL), the *Montreal World Health Organization-Pan American Health Organization Collaborating Centre for Research and Training in Mental Health* (ML) and the *World Health Organization* office in Tunisia (ALG). This training programme and schedule was presented to the three trainer-psychiatrists and seven GPs in charge of continuing medical education in the Greater Tunis area, for comments and suggestions. Members of the Tunisian Ministry of Health enlisted GPs responsible for continuing medical education because they are well-versed in mental health knowledge and skills and would be able to assist trainer-psychiatrists during and after training. Both trainer-psychiatrists and the seven GPs in charge of continuing medical education in the Greater Tunis area participated in a *Training of Trainers*, as an orientation to the proper use of the *mhGAP-IG* (*version 1.0*).

Step 3: Conducting field observations

The last step in preparing for the implementation of the *mhGAP-IG* (*version 1.0*) consisted of conducting field observations, between November and December 2015. Field observations included visits to primary healthcare clinics in the Greater Tunis area.

Results

Required adaptation 1: Selecting training modules

Rates of anxiety, depressive and substance use disorders, as well as suicide, are on the rise in Tunisia [2,6,9,16-19]. First, data suggests that consultations specifically for anxiety and depression have increased post-Tunisian Revolution [2,16]. Second, records show that the number of suicide deaths rose 1.8 times and self-immolation, three times during the 4 years following the Revolution [17,19]. Third, there is a recorded increase in the rates of substance use [20] and substance use disorders, specifically of opioids, cannabis, ecstasy and alcohol, and especially among people under the age of 35 [2,20]. The rise in anxiety, depressive, and substance use disorders, as well as suicide is argued to be associated with triggering events during the Revolution [16,19] and current instabilities such as difficult working and living conditions [2,16].

While records do not show a significant increase in the rise of schizophrenia since the Revolution, there is worry about potential complications associated with this disorder, even if underdiagnosed. More specifically, in Tunisia, schizophrenia has been linked with suicide and suicide attempts [21]. In addition, it is reported that annual mortality rates associated with schizophrenia have increased [21].

Given this contextual knowledge, members of the Ministry of Health selected specific modules from the *mhGAP-IG* (*version 1.0*) to address pressing and growing needs in the country. The selected modules include depression, psychosis, self-harm/suicide and alcohol/drug use disorders. In addition, a general introduction to the *mhGAP-IG* and the module 'General Principles of Care' were included in the training. These modules provide an overview of the programme's

goal, how to use the guide in consultation and appropriate clinical practices in the field of mental health.

It is important to note that the inclusion of the 'General Principles of Care' module was reinforced by field observations. More specifically, during visits to primary healthcare clinics, JS observed that some GPs shared offices to provide care, were interrupted during consultations by waiting patients and/or answered phone calls during consultations. Thus, discussions on confidentiality and clinical practices for effective communication and for the effective interactions of healthcare professionals with people seeking mental health care needed to be had. In addition, trainer-psychiatrists thought it appropriate to share with trainees some effective ways to engage in active listening, and ways to respectfully and effectively probe for information about mental health problems.

While rates of anxiety disorders have increased post-Revolution and remain concerning, at the time of adaptation, the accompanying training material (i.e. PowerPoints) for the module on conditions specifically related to stress [3] was not available in the country's working languages: French and Tunisian Arabic. This unavailability was a major implementation barrier to a much-needed module in the country. However, anxiety disorders were covered indirectly by the depression module of the standard *mhGAP-IG* (*version 1.0*) [10].

Required adaptation 2: Developing a training format

The training based on the *mhGAP-IG* was designed to accommodate the work schedule of participants. Given that GPs conduct clinical work between 8h and 14h, Monday through

Saturday, and continuing medical education occurs outside of these hours, the implementation of one afternoon training session per week was thus envisioned.

Training sessions would be conducted in French, the language in which medical school is taught, and all medical staff is well-versed. The sessions, as suggested by standard material, would consist of a general lecture, learning videos, and group discussions. Due to high demand for training, GPs were randomly assigned to one of three work groups prior to the implementation of the training as to facilitate role plays and discussion following the general lecture. Each group would be animated by a trainer-psychiatrist and GPs responsible for continuing medical education in the Greater Tunis area. Groups would remain the same for the entirety of the training, allowing GPs from different governorates to become acquainted and share experiences with regards to mental health care. It is important to note that it was thought best by members of the Ministry of Health, trainer-psychiatrists and GPs in charge of continuing medical education in the Greater Tunis area to translate instructions for standard role plays into Tunisian Arabic and implement them in that language as to mirror 'real-world' consultation in primary healthcare clinics. Translation was facilitated by the three Tunisian trainer-psychiatrists, and trainees engaged in simulation of consultations in Tunisian Arabic.

While the *World Health Organization* encourages ongoing supervision after the implementation of a training based on the *mhGAP-IG*, this task would not be feasible in the Greater Tunis area given the heavy time constraints of specialists. However, a 2-h support session, in respective work groups, was envisioned 1-week post-training to encourage GPs to discuss mental health cases, under the supervision of specialists. In addition, role plays were selected from

the standard introduction module by trainer-psychiatrists to help further integrate knowledge, and to answer any remaining questions on the general content of the training. These role plays were also translated into Tunisian Arabic by trainer-psychiatrists and conducted by trainees in that language, as well.

As ongoing supervision by trainer-psychiatrists would not be feasible, the goal of the members of the Ministry of Health was therefore to create a realistic support network for trainees, during and after training. This support network was created by appointing GPs in charge of continuing medical education in the Greater Tunis area as 'tutors'. This initiative seemed appropriate for several reasons. First, seeing as tutors are already well-versed in mental health care and had participated in the *Training of Trainers* along with the trainer-psychiatrists, they would be equipped to answer participants' mental health questions between and post-training sessions. Second, being a peer to GP trainees, tutors thoroughly understand the clinical reality in primary care and can address questions or concerns using non-specialized language. Third, given that the module on conditions specifically related to stress [22] could not be implemented, tutors would be able to play an instrumental role in filling this knowledge gap. Lastly, given that tutors are already involved in continuing medical education, it was feasible for them to attempt to organize, every month following training and in collaboration with their directors, mental health support sessions regrouping trainees from each governorate. These scheduled sessions would thus provide trainees with the opportunity to present and gain insight on challenging clinical cases. It is important to note that trainer-psychiatrists agreed that tutors could contact them directly should more in-depth consultation or a referral be necessary.

Discussions with members of the Ministry of Health during the adaptation process highlighted available referral networks for mental disorders, substance use disorders, and suicide, as well as challenges with these networks. This information is important given that the standard *mhGAP-IG* often specifies to "consult a specialist." In these cases, specialists are psychiatrists, and they may be consulted primarily by referral. Referrals to specialized care are done by letter. To facilitate and accelerate referrals (if needed during the implementation of the training programme), trainer-psychiatrists provided trainees with their telephone numbers.

The training content and format for the Greater Tunis area are presented in Table 1.

Table 1:
Outline of the Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG) training as tailored for the Greater Tunis area (Tunisia)

Schedule	Module	Learning objectives	Training components
Week 1 (13h30-17h)	*Introduction* & *"General Principles of Care"*	To learn: 1) about the mental health treatment gap in low- and middle-income countries (and thus the need to develop the *mhGAP*); 2) how to use the *mhGAP-IG*; 3) about effective clinical practices in mental health.	13h30-16h: Welcome and general lecture using *mhGAP-IG* PowerPoint: 1) introduction to the programme; 2) general principles of care (including large group discussion on stigmatization in care and confidentiality, and misinformation about mental illness); 3) overview of the guide and accompanying Master Chart. 16h-17h: Small work groups: Role plays on building trust and proper communication with patients.
Week 2 (14h-17h30)	*Depression*	To learn: 1) how to detect signs and symptoms related to depression, as well as current psychosocial stressors; 2) about pharmacological and non-pharmacological interventions for depression; 3) about managing people presenting with signs and symptoms of depression (e.g. to	14h-15h: General lecture using *mhGAP-IG* PowerPoint: 1) overview of depression; 2) evaluating signs and symptoms of depression and working with this population (including accompanying video and discussion). 15h-15h50: Small work groups: Role play on evaluation of signs and symptoms of depression, and diagnosing using the guide.

		establish a proper follow-up, to engage with family members if appropriate, and when/where to refer).	15h50-16h50: Treatment, management and follow-up (including large group discussion on myths about types of treatment for depression). 16h50-17h30: Small work groups: Role play on pharmacological and non-pharmacological treatments.
Week 3 (14h-17h30)	*Psychosis*	To learn: 1) how to detect signs and symptoms related to psychosis and schizophrenia; 2) about pharmacological and non-pharmacological interventions for psychosis and schizophrenia; 3) about managing people presenting with signs and symptoms of psychosis or schizophrenia (e.g. to establish a proper follow-up, to engage with family members if appropriate, and when/where to refer).	14h-15h30: General lecture using *mhGAP-IG* PowerPoint: 1) overview of psychosis (and schizophrenia) (including large group discussion on causes and current perceptions of these disorders); 2) evaluating signs and symptoms of psychosis/ schizophrenia and working with this population (including accompanying video and discussion). 15h30-16h: Small work groups: Role play on evaluation of signs and symptoms of psychosis/schizophrenia, and diagnosing using the guide. 16h-17h: Treatment, management, and follow-up (including large group discussion pharmacological/non-pharmacological treatment). 16h50-17h30: Small work groups: Role play on follow-up with patients with psychosis/ schizophrenia (including addressing secondary effects of pharmacological treatment).
Week 4 (14h-17h30)	*Suicide/Self-harm*	To learn: 1) how to evaluate thoughts, plans and acts of self-harm by asking appropriate questions; 2) about specific interventions for suicide/self-harm; 3) about managing people presenting with signs and symptoms of self-harm/suicide (e.g. to establish a proper follow-up, to engage with family members if appropriate, and when/where to refer).	14h-16h30: General lecture using *mhGAP-IG* PowerPoint: 1) overview of suicide self-harm (including large group discussion on myths and importance of addressing suicide/self-harm in practice); 2) evaluating thoughts of self-harm and working with this population (including accompanying video and discussion). 16h30-17h: Small work groups: Role play on evaluation of thoughts of self-harm/suicide and diagnosing using the guide. 17-17h30: Treatment, management, and follow-up.
Week 5 (14h-17h)	*Drug/alcohol use disorders*	To learn: 1) how to detect signs and symptoms related to substance use disorders; 2) about pharmacological and non-pharmacological interventions for substance use disorders; 3) about managing people presenting with signs and	14h-15h15: General lecture using *mhGAP-IG* PowerPoint: 1) overview of alcohol/drug use disorders (including large group discussion on causes and local substances); 2) evaluating signs and symptoms of alcohol/drug use disorders and working with this population. 15h15-16h: Small work groups:

		symptoms of substance use disorders (e.g. how to establish a proper follow-up, to engage with family members if appropriate, recognize use patterns, and when/where to refer).	Role play on evaluation of signs and symptoms of alcohol/drug use disorders, and diagnosing using the guide. 16h-16h50: Treatment, management, and follow-up. 16h50-17h30: Small work groups: Role play on management using non-pharmacological treatment (i.e., brief psychoeducation intervention).
Week 6 (14h-16h)	*Support session*	1) To gain insight/direction on specific mental health cases seen in clinical practice. 2) To learn from colleagues about challenges to appropriate mental health care in clinical practice. 3) To further role plays.	14h-15h: Small work groups: Presentation of mental health cases. 15h-16h: Small work groups: Role plays on evaluation of signs and symptoms of all disorders covered during the training, and diagnosing using the guide.

Required adaptation 3: Adapting content to context

Context's influence on conditions' specificities

Important observations were made regarding context's influence on conditions' specificities, thus encouraging changes to standard training material, such as PowerPoints. Discussions and modifications were needed in three principal areas of the standard training: (1) self-harm/suicide; (2) substance use disorders; and (3) the development and use of psychotherapeutic skills, as suggested by certain standard training modules. Changes to standard PowerPoints were made by JS. Adapted PowerPoints were then sent to members of the Ministry of Health and trainer-psychiatrists for final review before training implementation.

The standard training specifies that the most common means of suicide in low- and middle-income countries are the use of firearms and ingestion of pesticides [10]. However, in Tunisia, the rate of suicide by firearm is 0.27% given that privately owned guns are rare [23]. For example, Tunisia ranked 173rd out of an examined 178 countries regarding the number of

privately-owned guns, and 178th based on the rate of owning a gun [24]. In addition, the rate of suicide associated with the ingestion of pesticides in Tunisia is relatively low, at 2.74% [23]. Changes to the training material thus required the addition of the two most prominent means of completed suicide in Tunisia: hanging (58.63%) and immolation (15.89%) [17, 23]. Hanging is widespread given the accessible and affordability of the means, and immolation has been used especially after the public immolation of Mohamed Bouazizi, sparking the Revolution [16-19]. However, it is important to note that while the rate of completed suicide by ingestion of pesticides is quite low in comparison with hanging and immolation, it was not removed from the training material because it is a prominent means of attempted suicide. Readily available and easily purchased (i.e. often costing <1 Tunisian dinar) pesticides cause concern given rising consultations at emergencies and suicidal tendencies in the country.

In Tunisia, the rise of substance use disorders is worrisome, especially given that these disorders are heavily stigmatized [2]. Stigmatization encourages healthcare professionals to often dismiss substance use disorders as moral faults. Therefore, it was imperative to add the following information to the standard PowerPoints related to substance use disorders: (1) biological facts about the impact of alcohol and drugs on the brain and how they may cause dependency, especially among those living with certain preconditions; and (2) specific details on substance use disorders in Tunisia. More specifically, given no national epidemiological study on the prevalence of substance use disorders in the country, estimated statistics provided by the Ministry of Health were added to the standard PowerPoints. Such statistics show that of the estimated 350,000 people living with substance use disorders in the country, 70% of them are under the age of 35 [2]. In addition, current drugs in circulation and their local names were shared. These include: opioids

(local names: Buprenorphine and Subutex), cannabis (local name: Zatla) and ecstasy (local name: Fliss).

Many standard modules of the *mhGAP-IG* selected for training include therapeutic interventions (i.e. behavioural activation, interpersonal therapy, cognitive–behavioural therapy, contingency management therapy, family counselling/therapy, interpersonal psychotherapy or motivational enhancement therapy) as part of the management skills to be developed by trainees. It is important to note, however, that limited trainings on such therapies have only recently been introduced in Tunisia, consequently reserving many of these types of therapeutic interventions to psychosocial care providers, such as psychologists or psychiatrists. Thus, psychotherapy is very rarely conducted by GPs. These therapies were removed from the standard training content but were mentioned orally to highlight other types of treatment than pharmacological.

GPs in the Greater Tunis area do, however, engage in psychoeducation with people consulting for mental health problems, substance use disorders, and suicidal ideation. Thus, during training, appropriate information to be shared with people consulting with mental illness or suicidal ideation, as listed in the standard guide, would be taught and reinforced.

Context's impact on the availability of medication

Context plays a significant role on the availability of psychotropic medications in healthcare clinics in the Greater Tunis area. First, while many psychotropic medications listed in the *mhGAP-IG* and the *World Health Organization* Model List of Essential Medicines are available in primary care settings, differing internal procedures on the inclusion of medication in clinics cause uneven

distribution and difficulty in prescribing. For example, certain non-standardized procedures were established to counter the stealing of Trihexyphenidyl mainly in areas where crime rates were high post-Revolution. In addition, Benzodiazepines, despite their availability in certain primary healthcare settings, are very rarely used by GPs. Conditional to their use are the following: a suggested minimal level of mental health training and knowledge of the drugs (which very few GPs attain given limited medical education on pharmacology in Tunisia), or prescription renewal by these trained GPs. Thus, unavailability of needed treatment in primary healthcare settings and unattainable conditions for GPs to be able to prescribe force often unnecessary referrals to specialized or private settings. Information on uneven distribution of medication across healthcare clinics and barriers to prescription if medication is available was included in the training as to highlight health inequity in practice.

Second, stigmatization of substance use disorders has greatly limited the availability of medication for these disorders in primary healthcare clinics, their prescription mainly reserved for emergency settings [2]. For example, Naltrexone is a medication listed in the *mhGAP-IG* for treatment of alcohol dependence. While it is available in Tunisia, it only exists in injectable form, and is mainly utilized by resuscitators in emergency settings. Acamprosate and Disulfiram, also listed as medications in the *mhGAP-IG* to treat alcohol use disorders, are currently not available in Tunisia. In addition, Methadone, used to reduce withdrawal symptoms caused by heroin, is unobtainable in Tunisia. Bringing these deficits to light would be an attempt to show GPs that many cases of substance use disorders may be treated in primary care, given treatment availability and proper support.

Context's impact on the availability of community-based mental health services

Community-based mental health resources, ones that promote recovery and reintegration into economic and social activities through supported employment, housing and education opportunities, are important components of the *mhGAP-IG* (*version 1.0*) [10]. However, in Tunisia, while the Ministry of Health aims to support the transition from institutional- to community-based care, most of the mental health budget continues to be used to sustain hospital settings treating mental illness, to the detriment of developing and sustaining community-based mental health resources [1,2]. More specifically, little investment in subsidized housing makes affordable housing scarce and difficult to obtain, while supported housing, assisted living facilities and supported employment initiatives are currently not available in the public sector. Only very limited sheltered homes (i.e. a maximum of approximately 200 beds for the entire country, and long ago filled) are available in the public sector for people living with mental illness but without any family support [1].

In addition, there is a deficit of psychosocial care providers in the country, whose mandate is to help people living with mental illness further develop skills and connect with needed resources in the community. In Tunisia, there are approximately 2.9 psychosocial care providers for 100,000 people [5], and they mainly work in institutional/specialized settings or the private sector [1]. To meet current need in Tunisia, however, an estimated minimum of 9.8 psychosocial care providers per 100,000 people are encouraged [5], specifically working within the community.

Tunisia's mental health programme at the level of the Ministry of Health was created to point out these deficits in needed community-based mental health resources. The importance of

missing community-based mental health resources was therefore highlighted in the adapted training, with the hope of encouraging GPs to also advocate for such services in the Greater Tunis area.

Of note, stigmatization of drug and alcohol use disorders in Tunisia has prevented the development and implementation of a standardized structure of care, beginning in the community, for people living with these conditions [2]. For example, the *mhGAP-IG* suggests referrals to residential rehabilitation programmes. However, people needing such services in Tunisia are inevitably referred to psychiatric units, emergency medical centres or the private sector. These services are very rarely specialized in the treatment of substance use disorders, as they merely engage in general psychiatric treatments, preventing care from being adequately adapted to those consulting for needed services. In addition, the *mhGAP-IG* suggests referrals to formal support/self-help groups for people living with substance use disorders, useful for peer contact, sharing, support and networking. However, formally, support groups for this population do not exist and are not recognized in Tunisia.

Given the emphasis put on 'emergency' care for substance use disorders, and thus short-term follow-up, trainer-psychiatrists sought to help trainees better understand the benefits of developing longer term treatment plans for people presenting with these disorders in primary care, with the support of specialists. The training thus included teachings on scheduling future appointments and building therapeutic alliances. In addition, trainer-psychiatrists insisted that adapted training material include referrals to support/self-help groups even though they do not

formally exist in the Greater Tunis area, with the hope that this information would encourage GPs to recognize their importance and advocate for their creation.

Required adaptations: Summary

Required adaptations to the training content and standard programme, as well as the realities that fuelled them, are summarized in Table 2.

Table 2:
Adaptations made to the standard Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG) to meet realities of the Greater Tunis area (Tunisia)

Required adaptation	Local realities	Implications	Suggested adaptation
Selecting training modules	Context's influence on choice of modules. The need to address: -the rise in anxiety, depressive and substance use disorders, as well as suicide since the 2010-2011 Revolution. -the association between schizophrenia, suicide, and suicide attempts and reported increase in annual mortality rates associated with schizophrenia. -field observations highlight that general practitioners may share offices to provide care, were interrupted during consultations by waiting patients, and/or answered phone calls during consultations.	-All needed modules were available, except the training material on conditions specifically related to stress. -Discussions with trainees on confidentiality and good clinical practices for effective communication and interactions of healthcare professionals with people seeking mental health care were encouraged.	-General practitioners in charge of continuing medical education in the Greater Tunis area were assigned the role of "tutors" and given access to trainer-psychiatrists for support in filling this knowledge gap during and after training. -Anxiety disorders were covered indirectly in the depression module. -These local realities observed through field observation reinforced the need for the *"General Principles of Care"* module.
Developing a training format	Context's influence on training model and schedule. -General practitioners have a restrained work schedule.	-General practitioners conduct clinical practice from 8h-14h, Monday to Saturday.	-The training was designed to include only 1 session per week.

	-Deficits in continuing mental health training programs in the Greater Tunis area. -Psychiatrists in Tunisia have time constraints and a heavy workload. -Letter written by general practitioners to refer patients to more specialized care. -Consultations with patients in Tunisia are conducted in Tunisian Arabic.	-These deficits create a high demand for training. -Ongoing supervision post-training, as suggested by standard programme, is not feasible. -Challenges for trainees given short training programme, and often long referral procedure by letter. -Role plays would thus be more realistic if conducted in Tunisian Arabic.	-The general lecture was conducted with all trainees, but small groups for role plays and more in-depth discussion were created. -A 2-hour support session post-training was offered. In addition, the role of tutors was extended: they would provide guidance to trainees during and after training; if needed, they had access to trainer-psychiatrists during and after training for more in-depth questioning; and they would be able to organize support sessions with trainees post-training given their active role in continuing medical education. -Trainer-psychiatrists provided their numbers to trainees, to facilitate referrals (if needed) during the training. -Tunisian trainers translated role plays into Tunisian Arabic, and simulation of consultations were conducted in this language by general practitioners during role plays.
Altering content based on context.	<u>Context's impact on conditions' specificities.</u> *Suicide* -Means of suicide are affected by availability and affordability of the means, and political context. *Substance use disorders* -Substance use disorders are heavily stigmatized in the country. -Rise of substance use and substance use disorders in Tunisia. *Psychotherapies* -Psychotherapies are usually considered the responsibility of psychosocial care providers, not general practitioners.	 -Main means of suicide in Tunisia are hanging and immolation, not by use of firearms or ingestion of pesticides (ingestion of pesticides is a common way of attempted suicide). -General practitioners do not always acknowledge substance use disorders as an 'illness.' -No national prevalence of substance use disorders in Tunisia is available, only estimated statistics. -Rise of substance use disorders caused by specific substances, which have local names. -General practitioners usually engage in active listening and psychoeducation.	 -Training included local means of suicide/suicide attempts, but also highlighted the possibility of suicide by ingestion of pesticides given their availability and affordability. -Information on the effect of drugs and alcohol on the brain and what may cause dependency was added to the training. -Estimated statistics by the Ministry of Health were included in the training on substance use disorders to familiarize trainees with the realities associated with these disorders in Tunisia. -General practitioners were informed of the local names of substances. -Suggested therapies were removed from the standard training content but were mentioned orally to highlight other types of treatment than pharmacological.

			-General practitioners do engage in psychoeducation. Therefore, appropriate information to be shared with people consulting for mental illness or suicidal ideation, as listed in the standard guide, was taught and reinforced.
	<u>Context's impact on availability of medication.</u>		
	-Listed medication in the *standard training* and *World Health Organization Model List of Essential Medicines* are available in Tunisia, but there are different internal procedures for the availability and prescription of these medications within healthcare clinics.	-There is an uneven distribution of needed medication across healthcare clinics and the ability to prescribe it is sometimes challenging.	-To highlight this inequity, the uneven distribution of essential medicines and the conditions to prescribe them for people living with mental health problems in primary care settings was included in the training.
	-Substance use disorders are heavily stigmatized in Tunisia.	-Medications to treat these disorders, if available, are mainly for emergency settings, hospital settings, or the private sector.	-The monopoly of these medicines in emergency, hospital, or private settings were highlighted, but general practitioners' role in treatment, if resources and support were available, was emphasized.
	<u>Context's impact on availability of community-based mental health resources.</u>		
	-While there is a budget for mental health prevention activities, most mental health funding is allocated to sustain institutionally-based resources.	-There are deficits in community-based resources that promote recovery and reintegration.	-Missing community-based services were included in the training to highlight their importance and encourage general practitioners to advocate for them.
	-Substance use disorders are heavily stigmatized in Tunisia.	-For people living with substance use disorders, there are no standardized structures of care rooted in the community or formal support/self-help groups available. This encourages greater short-term follow-up.	-Training included ways in which general practitioners can manage this population over the longer term, and the need for formal support/self-help groups and residential rehabilitation services.

Discussion

To our knowledge, this is the first attempt to adapt a training based on the *mhGAP-IG* in Tunisia, and one of the first in a French-speaking nation [7,15]. The decision to implement and adapt a

mental health training programme in Tunisia was in direct response to the discussions of health system reform seeking to further develop proximity health services [1,2,25] and facilitate the integration of mental health into primary care, an international effort [10,26,27].

The training's adaptation to the Greater Tunis area, which involved multiple stakeholders and processes, such as validation of materials, discussions, and field observations, is one example of the ways in which the standard *mhGAP-IG* training material and programme can be adapted to meet local needs. The process highlighted that context has a direct impact on modules selected for training, ways in which the programme is to be designed and offered, conditions' specificities, availability of psychotropic medications in healthcare clinics, and availability of community-based mental health services that aim to promote recovery and reintegration. Without the involvement of local decision-makers, psychiatrists and GPs, the production of location-specific training material and the creation of a realistic programme that can be sustained or reproduced would not have been possible.

Uncovering systemic gaps in primary mental health care was, in our opinion, one of the most important outcomes of the adaptation process. These include lack and uneven distribution of psychotropic medications across healthcare clinics in the Greater Tunis area, as well as deficits in community-based mental health services for people living with mental illness. The adaptation process was tailored by members of the Ministry of Health in part to make clearer where there are gaps in service delivery.

All stakeholders aimed to address systemic barriers to effective mental health care in the adapted training programme for the Greater Tunis area by: (1) emphasizing primary care as a plausible setting in which mental illness may be detected, treated and managed; (2) developing a practical and feasible structure to support trainees during and after training; and (3) highlighting the needed but unavailable public resources explicitly listed in the standard *mhGAP-IG*. We hoped that highlighting unavailable resources would help improve trainees' attitudes towards mental illness and mental health integration within primary care, empower trainees to advocate for the uniform availability of psychotropic medications, and encourage trainees to campaign for the funding, development and implementation of non-existent community-based mental health services in the public sector.

We acknowledge that encouraging GPs to advocate for mental health services within primary or community-based settings all the while building their mental health capacity with an adapted training is not enough to foster the programme's success and sustainability in the Greater Tunis area. First, adapting a training programme before implementation becomes redundant if decision-makers outside of the realm of mental health do not acknowledge the importance of funding non-specialized mental health resources [28]. In other words, "policy makers need to be convinced about the reality of unmet needs and the fact that simple and affordable interventions are available" [29]. In Tunisia, the *Committee for Mental Health Promotion* was created to ensure that mental health is a priority in Ministry. The development of the *National Strategy for the Promotion of Mental Health* in Tunisia, a response of this Committee, also confirms that mental health is being recognized in policy [2]. However, while political recognition is important, it is essential to ensure that adequate funding continues to be invested as to facilitate the transition

from institution to community-based care in the country. More specifically, appropriate funding, reflecting the country's burden caused explicitly by mental disorders, substance use disorders, and suicide, should be invested as to develop and sustain the needed but unavailable public resources, examples of which are listed in the standard *mhGAP-IG*. Without adequate and continued funding allocated to non-specialized mental health resources within the community, this adapted training, and future ones under the auspices of the Ministry of Health, will most likely be unsuccessful and unsustainable.

Secondly, adapted mental health training programmes may become unsuccessful if people living with mental health problems or substance use disorders do not access developed services, resources or GPs who have been trained in effective mental health care. Therefore, anti-stigma interventions targeting the public have been declared a priority in global mental health [30]. In Tunisia, this role has been traditionally left to individual, non-governmental organizations, without clear implementation guidelines or follow-up [2]. However, the recent publication of the *National Strategy for the Promotion of Mental Health* in Tunisia includes anti-stigma initiatives under the mandate of the *Committee for Mental Health Promotion*, thus ensuring more standardized implementation and follow-up [2].

In recent years, the *Committee for Mental Health Promotion* has attempted to target the echoes of stigma attached to mental illness by actively speaking about mental health through mass media. More specifically, members of the Committee regularly organize interviews with popular Tunisian channels and national television chains to discuss important topics, such as depression and suicide. In addition, in 2017, World Mental Health Day was celebrated, in collaboration with

the *World Health Organization* office in Tunisia and members of the Ministry of Health, by encouraging directors of governorates to organize events on depression for primary healthcare professionals across the country. Other initiatives to decrease mental health stigma and encourage prevention include the development of national suicide prevention and substance use strategies. The development of these important documents is a collaboration between multiple stakeholder groups, to reflect the intersectionality of these issues. In addition, equipped with lessons learned from this adaptation and implementation, trainings based on the *mhGAP-IG* in other areas of Tunisia are envisioned.

Limitations

Limitations of the training programme are worthy of note. First, due to financial and human constraints, it was not possible to create a new guide for trainees, comprising the adaptations made to standard content. To compensate, adaptations were made to material used in training sessions, such as PowerPoints. A second limitation to the training is the little emphasis placed on psychotherapies, given that these are considered the responsibility of psychosocial care providers in Tunisia. Lastly, in our opinion, it would have been beneficial to involve, during discussion about mental health needs and gaps, personnel beyond psychiatrists and GPs. Diverse types of personnel could help highlight the mental health realities in the Greater Tunis area from complementary lenses.

Conclusion

The adaptation of a training based on the *mhGAP-IG* to the Greater Tunis area of Tunisia was needed for location-specific use. The adaptation process highlighted required changes to the

standard training and programme, influenced by contextual realities. However, it is important to note that systemic issues, such as the lack and uneven distribution of medication, echoes of stigmatization towards mental illness and the field of mental health, and the unavailability of community-based mental health services that promote recovery and reintegration, may hinder the success and sustainability of the adapted programme. These barriers are important to consider as they may perpetuate the growing mental health treatment gap. Therefore, systemic barriers must inevitably be addressed by initiatives beyond the adapted training programme.

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Declaration of Interest
Ann-Lise Guisset is a staff member of the *World Health Organization* (*WHO*) and Marc Laporta, a staff member of the *Montreal WHO-PAHO Collaborating Center for Research and Training in Mental Health.* The other authors declare that there is no conflict of interest.

Ethical Standards
The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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4.4. Article 3: Baseline portrait of the mental health competencies of PCPs in our sample

Mental health knowledge, attitudes, and self-efficacy among primary care physicians working in the Greater Tunis area of Tunisia

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Abstract

Background

Non-specialists' involvement in mental health care is encouraged in the field of global mental health to address the treatment gap caused by mental illness, especially in low- and middle-income countries. While primary care physicians (PCPs) are involved in mental health care in Tunisia, a lower-middle-income country in North Africa, it is unclear to what extent they are prepared and willing to address mental health problems, substance use disorders, and suicide/self-harm. In this context, we aim 1) to report on mental health knowledge, attitudes, and self-efficacy among a sample of PCPs working in the Greater Tunis area, prior to the implementation of a mental health training program developed by the *World Health Organization*; and 2) to identify what characteristics are associated with these competencies.

Methods

In total, 112 PCPs completed questionnaires related to their socio-demographic and practice characteristics, as well as their mental health knowledge, attitudes, and self-efficacy. Descriptive analyses and regression models were performed.

Findings

PCPs had more knowledge about depression, symptoms related to psychosis, and best practices after a suicide attempt; had favourable attitudes about distinctions between physical and mental health, learning about mental health, and the acceptance of colleagues with mental health issues; and believed most in their capabilities related to depression and anxiety. However, most PCPs had less knowledge about substance use disorders and myths about suicide attempts; had unfavorable attitudes about the dangerousness of people with mental health problems, personal

disclosure of mental illness, non-specialists' role in assessing mental health problems, and personal recovery; and believed the least in their capabilities related to substance use disorders, suicide/self-harm, and psychosis. Participation in previous mental health training, weekly hours (and weekly hours dedicated to mental health), weekly provision of psychoeducation, and certain work locations were associated with better mental health competencies, whereas mental health knowledge was negatively associated with weekly referrals to specialized services.

Conclusions

Findings suggest that PCPs in our sample engage in mental health care, but with some gaps in competencies. Mental health training and increased interactions/involvement with people consulting for mental health issues may help further develop non-specialists' mental health competencies, and integrate mental health into primary care settings.

Keywords

Mental health; physicians; primary care; knowledge; attitudes; self-efficacy; Tunisia

Background

Non-specialists' involvement in mental health care is a vision upheld in the field of global mental health to address the alarming treatment gap caused by mental, neurological, and substance use (MNS) disorders, which are especially elevated in low- and middle-income countries (LMICs) [1-4]. A non-specialist is defined as "any type of health worker (like a doctor, nurse, or lay health worker) who is not a specialist in mental health or neurology but who may have had some training in these fields" [5]. International efforts currently encourage and reinforce the use of non-specialists in mental health care because it is common for them to already be involved in mental health detection, treatment, and management, especially in LMICs where mental health providers are limited and/or unevenly distributed within countries [5-8]. Also, the involvement of non-specialists in mental health care has been shown to benefit people's health outcomes, especially for general and perinatal depression, anxiety, post-traumatic stress disorder, and alcohol-use disorders [5,7,9].

While the use of non-specialists in mental health care in resource-limited settings shows promise [5,7,9], studies highlight important gaps in their mental health literacy (i.e., knowledge, attitudes, and perceived self-efficacy [10]) that cannot be overlooked. First, non-specialists reported lacking specific knowledge about mental illness and suicide [11-15]. While non-specialists do see people presenting with mental health problems in consultation, the majority are not able to list or recognize symptoms attributable to mental illness [16-19]. Interestingly, this is also a reality observed with depression and anxiety [14,20], despite these being the most frequently reported and seen mental health problems in non-specialized settings [21,22]. In

addition, non-specialists have difficulties identifying medications used in mental health care, such as antidepressants and antipsychotics [12,20,23-25].

Second, studies show that the healthcare system, even if non-institutional, is an environment where people living with mental health problems experience stigma [26]. These negative experiences within the healthcare system are attributable in part to healthcare professionals' stigma against mental illness. For example, studies show how common it is for healthcare workers to believe that people with mental illness are "violent" and "dangerous" [12,27-30]. Studies also show that stigmatizing views against mental illness encourage healthcare professionals to associate mental illness with personal, moral faults or weakness [13,14,31] and describe people consulting for mental health conditions with derogatory terms, such as "crazy" and "mad" [32]. Thus, it is not surprising that due to negative beliefs about people living with mental illness, healthcare professionals are less likely to personally engage with this type of clientele and show empathy [33,34]. In addition, studies mention that stigma against mental illness even deters medical students from considering "psychiatry" as a preferred specialty [35,36].

Finally, self-efficacy, a concept first introduced by Bandura [37,38], is defined as one's beliefs in his/her capability to succeed in a specific situation or task. Bandura [37] suggests that individuals with higher levels of self-efficacy will invest themselves more in a specific task and are generally more successful than those with lower levels of self-efficacy. In our case, this concept translates into non-specialists' belief in their capability to successfully detect, treat, and manage mental health issues at the level of primary care [39]. Studies show that non-specialists question their involvement in the field of mental health because they are not confident in their

general mental health skills [12,40,41]. Lower levels of confidence in mental health skills is reportedly one of the main factors influencing non-specialists' decisions to refer patients to specialized mental health services [42,43]. Hence, studies assessing the feasibility and acceptability of using non-specialists in mental health care commonly highlight the need for ongoing mental health training in order to "boost" confidence [44,45].

Gaps in knowledge, attitudes, and self-efficacy have important clinical implications. Specifically, they may discourage patients from seeking mental health care [46,47] and limit access to quality interventions [3,48-50]. Interestingly, if uncovered, these gaps may be used to tailor the content of training programs in order to make them more clinically useful, which is also a way to encourage the further integration of mental health into primary and community-based settings [3,44,51,52].

Tunisia, a lower-middle-income country located in North Africa [53], is among the many countries concerned with the provision of effective mental health care to target the growing mental health treatment gap [23]. This gap is on the rise given widespread untreated mental health symptoms, especially since the 2010-2011 Revolution [23,54-57]. Lack of treatment is caused, in part, by human resource challenges [23,39,58]. First, it is worth highlighting deficits in the availability of trained mental health providers. Psychiatrists are unevenly distributed across the country, creating disparities in care [23,58]. More specifically, they are mainly located in and around the capital, or along the coastline, despite suicide rates being reported as highest in the interior of the country [23]. In addition, mental health nurses and psychosocial care providers are estimated at 3.7 per 100,000 and 2.9 per 100,000 people respectively, numbers insufficient to

meet current need in Tunisia [6]. To address this shortage, the number of needed mental health nurses and psychosocial care providers is projected at 13.7 per 100,000 and 9.8 per 100,000 people respectively [6].

Second, 30-40% of consultations done by PCPs are related to mental health care, making them the most relied upon non-specialist for this type of care in Tunisia [39]. The reason PCPs receive many mental health consultations is a consequence of attempts made in the 1990s to integrate mental health care within primary health centers, which provide outpatient care, including preventative and curative health services, as well as health education [58]. Even though this integration was done non-systematically and with limited follow-up, it was a way to ensure access to mental health care for the majority [58]. However, these attempts to integrate mental health care within primary health centers were (and still are) challenged, in part, by issues with continuing mental health training in Tunisia. While mental health training programs have been offered to primary care physicians in Tunisia, these were not offered as part of a systematic national program. Thus, previous mental health training programs were offered under the leadership of individual governorate directors, which limited national efforts to further integrate mental health into existing primary and community-based services [23,39,58]. Therefore, while PCPs are (and are encouraged to be) involved in the care of people living with MNS disorders in Tunisia [23,39], little is known about their preparedness and willingness to address mental health problems, substance use disorders, and suicide/self-harm in primary care in Tunisia. We identified a few studies that did help shed light on this topic. For example, a study conducted on attitudes towards schizophrenia among randomly selected PCPs in the Greater Tunis area suggests that most underestimated the prevalence of schizophrenia, and 48.5% were incapable of naming

medications for use in first episode psychosis [24]. These findings corroborate with those of a study conducted in central Tunisia, which suggest that 53% of PCPs did not master the prescription of antipsychotic medications [23,25].

This paper is part of a pilot trial that seeks to contextualize, implement, and evaluate a mental health training program based on the *Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG)* [2] developed by the *World Health Organization (WHO)*. More specifically, the pilot trial aims to implement and evaluate the tailored training program offered to PCPs working in the Greater Tunis area to further the development of proximity mental health services [23,39,59]. The training includes the following modules, chosen by members of the Tunisian Ministry of Health to meet the most pressing mental health needs in the country: general principles of care, depression, psychosis, suicide/self-harm, and alcohol and drug use disorders.

The two aims of this paper are 1) to report on mental health knowledge, attitudes, and self-efficacy among a sample of PCPs working in the Greater Tunis area of Tunisia prior to their involvement in the training program; and 2) to identify what characteristics are associated with these competencies. Uncovering such information is useful for informing mental health training material that targets non-specialists working in the area and for formulating aspects of health policy.

Methods

Sample and setting

The sample consisted of PCPs working in primary care in the Greater Tunis area, a setting divided into four governorates: Tunis, Manouba, Ben Arous, and Ariana. Manouba, Ben Arous, and Ariana are also referred to as the "suburbs" of Tunis. The Greater Tunis area was chosen for the pilot trial because its setting diversity is representative of other areas in Tunisia. For example, Tunis is considered urban, Ben Arous, rural and semi-urban, and Ariana, rural and urban. Manouba, where the only operating mental health hospital is located, is considered rural and semi-urban.

Recruitment was facilitated by physicians working in the Greater Tunis area who were involved in organizing continuing medical education in this area. They compiled a list including 345 PCPs, all of whom were part of the primary care physicians' professional order in Tunisia, worked in the public sector, and previously attended continuing medical education training in the Greater Tunis area. Continuing medical education is highly recommended and encouraged in Tunisia, specifically for the advancement of PCPs' careers. Therefore, we believe that this list regroups all PCPs working in the public sector in the Greater Tunis area. Of these, 315 met the following study eligibility criteria: 1) working at the level of primary care in the Greater Tunis area; and 2) having five or more years of clinical experience.

Physicians, a psychiatrist involved in the recruitment of participants given her ties to community mental health, and JS proceeded to contact the 315 PCPs. One hundred thirty-two PCPs (41.90%) accepted to participate in the trial. The others (n=183) were not included in the

trial for the following reasons: unavailability or not being reached for recruitment. To obtain consent, JS contacted the 132 PCPs who accepted to participate in the trial at the beginning of January 2016. Once consent was obtained, they were asked to complete a baseline questionnaire by the end of January 2016, a date prior to the implementation of the training. From the time consent was obtained until this deadline, JS sent reminder emails and made calls to PCPs who did not complete the questionnaire. These reminders were done once a week, for two weeks. One hundred and twelve (n=112) PCPs met the deadline to submit the questionnaire and were thus included in the pilot trial.

Data collection

Before the training, PCPs were invited to complete self-administered questionnaires on socio-demographic and practice characteristics, mental health knowledge, attitudes, and perceived self-efficacy. All questionnaires were administered in French but were verified prior to distribution by two French-speaking people who had knowledge of general and medical terms used in Tunisia. The questionnaires were then pilot tested on a sample of ten Tunisian healthcare professionals (three trainer-psychiatrists and seven PCPs in charge of continuing medical education in the Greater Tunis area) to identify unclear or confusing items. Questionnaires took twenty minutes on average to complete.

Participant socio-demographic and practice characteristics

We collected demographic information for each PCP, including data on age, gender, country of origin, mother tongue, and medical school location. Practice characteristics included work location (i.e., governorate), number of years working as a PCP, number of work hours per week,

and mental health training in the past twelve months (i.e., January 2015-January 2016). We also asked PCPs to report on their total number of patients seen per week, including those presenting with mental health problems; total number of consultations for mental health problems made with and without appointment each week; total number of hours per week allocated to mental health practice; consultations with patients for specific mental health conditions per week; types of treatment provided to patients presenting with mental health problems per week; and frequency of follow-up provided to patients presenting with mental health problems.

Knowledge

The knowledge questionnaire was developed by the WHO to accompany the training package [2]. Given its unavailability to the research team in French prior to data collection, the English version was translated into French, and was verified by two members of the WHO office in Tunisia. The questionnaire we used contained sixteen questions, nine being multiple choice and seven True/False. The questions related to material in the training program, and included questions on general principles of care, depression, psychosis, suicide/self-harm, and drug/alcohol use disorders. Questions were grouped into sub-themes to capture information about knowledge on specific training modules, pharmacological and non-pharmacological treatments, manifestation of various mental illnesses, and the management of these mental illnesses. Correct answers were scored as 1 and incorrect answers as 0. A participant's score is therefore the sum of correct answers for individual items. The authors converted the overall and sub-theme scores to a score ranging from 0 to 10. A higher score indicates more knowledge on topics related to mental health and illness, while a lower score indicates more gaps in knowledge.

Test-retest reliability considers the temporal stability of a measure at two different time points [60]. The Intraclass Correlation Coefficient (ICC) [60,61] was assessed among 47 individuals. They were randomly assigned to the control group of our trial and thus completed two pre-test measures, six weeks apart. According to suggested cut-off [61], a good degree of reliability was found between the two pre-test measures: the average measure ICC was .708, with a 95% confidence interval (CI) [.478 to .837].

Attitudes

To measure attitudes towards mental illness and the field of mental health, the *Mental Illness: Clinicians' Attitudes (MICA) Scale* (version 4.0) was used [62,63]. The scale has sixteen items, with answers ranging on a six-point Likert scale. For statements 3, 9, 10, 11, 12, and 16, items were scored as follows: 'strongly agree' = 1; 'agree' = 2; 'somewhat agree' = 3; 'somewhat disagree' = 4; 'disagree' = 5; and 'strongly disagree' = 6. All other items were reverse-scored. Scores on individual items were summed to obtain the overall score for each participant within a range of 16 to 96 points. A higher global score indicates a more negative perception of mental illness and the field of mental health.

We chose the *MICA-4* because it was found to be reliable in a sample of nursing students [62]. Analysis revealed that the overall scale had good internal consistency (Cronbach's alpha = .720) and item-total correlations (at least .2), representing an acceptable fit. To complement these psychometric properties, the scale's authors suggest considering the applicability of the *MICA-4* across other samples by verifying the Cronbach's alpha and assessing the scale's test-retest reliability [62]. We were able to assess both of these psychometric properties in our sample.

The Cronbach's alpha for all sixteen items of the *MICA-4*, when applied to our sample, was .521, which is considered poor [64,65]. To increase the scale's internal consistency, we sequentially removed items with an item-total correlation of less than .2 [66] and reassessed the scale's Cronbach's alpha. The complete results of this procedure are illustrated in the supplementary material accompanying this paper. We assessed the item-total correlations of the original sixteen-item scale. At first, question 6 was removed because it was uncorrelated to other items (i.e., showing a negative result), unsurprising given that participants expressed difficulties with this question during the diffusion of preliminary results. However, the healthcare professionals on whom the questionnaire was pilot tested did not mention any issues with this question. The removal of questions 6 increased the scale's Cronbach's alpha to .552 (Test 1) and allowed us to consider the removal of question 11, as it yielded the lowest value for item-total correlations and would increase the scale's Cronbach's alpha to .563 (Test 2). With question 11 removed, question 3 yielded the lowest value for item-total correlations. Its removal increased Cronbach's alpha to .573 (Test 3). With question 3 removed, question 8 yielded the lowest value for item-total correlations. Its removal increased Cronbach's alpha to .598 (Test 4). The removal of question 8 caused questions 9 and 12 to have the lowest values for item-total correlations. We decided to keep question 12 (i.e., "the public does not need to be protected from people with a severe mental illness") because its content focuses on one of the most commonly measured components of public stigma: belief in the dangerousness of people with a mental disorder [67]. In addition, Table 3 shows that question 12 yielded the least favorable answers among our sample; thus, it has the greatest potential for change post-training. We therefore removed question 9. Not only did it yield one of the lowest values for item-total correlations, but it also increased the scale's Cronbach's alpha to .608 (Test 5).

In sum, we report on eleven questions of the *MICA-4* (i.e., 1, 2, 4, 5, 7, 10, 12, 13, 14, 15, and 16), which yielded a Cronbach's alpha of .608 (Test 5). We deemed this value appropriate; even though Cronbach's alpha is a function of scale length [65], it increased in our case by removing items from the original scale. To compute the overall score for the eleven questions we used for the purposes of this paper, scores on individual items were summed for each participant, yielding a value between 11 to 66. A higher global score indicates a more negative perception of mental illness and the field of mental health.

The ICC [60,61] for the eleven questions of the *MICA-4* was assessed among 47 individuals randomly assigned to the control group of our trial. They completed two pre-test measures, six weeks apart. According to the suggested cut-off [61], a good degree of reliability was found between the two measures: the average measure of the ICC was .704 with a 95% CI [.468 to .835].

Self-efficacy

The self-efficacy questionnaire was developed in French for the purposes of the pilot trial because Bandura (2006) [38] suggests that the best way to measure self-efficacy is by constructing specific scales per tasks to be explored. Hence, we developed a questionnaire through which we aimed to understand PCPs' judgement of their capabilities related to detecting depression, psychosis, suicide/self-harm, and alcohol/drug use disorders, using detection techniques (scale 1, range 0-40), and treating and managing patients who present with these disorders (scale 2, range 0-100).

Scale 1 has ten items and scale 2, twenty-five items (for a total of thirty-five questions on the overall questionnaire), with answers ranging on a five-point Likert scale. Each statement was scored as follows: 'strongly agree' = 0; 'somewhat agree' = 1; 'neutral' = 2; 'somewhat disagree' = 3; and 'strongly disagree' = 4. For scale 1, items were regrouped into two themes: capabilities to detect mental health problems (six questions) and capabilities to use techniques related to detecting mental health problems (four questions). For scale 2, items were regrouped into the following themes: capabilities to provide treatment by pharmacology (five questions), treatment by support (i.e., active listening or psychosocial support) (seven questions), and treatment by psychoeducation (five questions), as well as confidence in capabilities to manage mental health problems in primary care, mainly by developing clinical plans (eight questions). Participants' overall and sub-theme scores were the sum of correct answers for individual items. Overall and sub-theme scores were converted to a score ranging from 0 to 10. A higher score indicates more confidence in capabilities to detect, treat, and manage mental health problems in primary care, while a lower score indicates more gaps in self-efficacy.

Regarding sub-themes for scale 1, the value of Cronbach's alpha was .831 for the theme on detecting mental health problems and .791 for the theme of using techniques related to detecting mental health problems. Regarding scale 2, the value of Cronbach's alpha was .770 for the theme of pharmacological treatment, .868 for the theme of treatment by support (i.e., active listening or psychosocial support), .870 for the theme of treatment by psychoeducation, and .882 for the theme of management of mental health conditions. The Cronbach's alphas for these themes were satisfactory [64,65].

The ICC [60,61] for the self-efficacy scale was assessed among 47 individuals randomly assigned to the control group of our trial. They completed two pre-test measures, six weeks apart. According to the suggested cut-off [61], a good degree of reliability was found between the two measures: the average measure ICC was .781 with a 95% CI [.606 to .878].

Data analyses

All analyses were conducted using SPSS version 25.0 [68]. Incorrect answers on the knowledge questionnaire were reported per question and sub-theme. For reporting answers of the *MICA-4*, suggested answers were reported as a single category of "favorable answers." More specifically, for reverse-scored items, suggested answers tend toward the negative (i.e., 'strongly disagree' and 'disagree'). These negative categories were thus collapsed into the single category of "favorable answers." Contrarily, for items not reversed, suggested answers tend toward the positive (i.e., 'strongly agree' and 'agree'). These positive categories were thus collapsed into the single category of "favorable answers." For reporting answers of the self-efficacy questionnaire, categories of "agree" (i.e., 'strongly agree' and 'somewhat agree') were collapsed and reported. If participants were missing more than 20% of the data on the mental health knowledge, attitudes, or self-efficacy questionnaires, their individual scores were excluded from the overall respective scale score. This resulted in excluding two participants' scores from the self-efficacy questionnaire's baseline overall score.

For descriptive analyses, group frequencies and percentages were reported for categorical variables. Means (M), standard deviations (SD), as well as quartiles 1 (Q1), 2 (Q2 – the median), and 3 (Q3) were reported for continuous variables.

To assess the association between socio-demographic/practice characteristics and mental health knowledge, attitudes, and self-efficacy, simple linear regression models were performed. Several steps were involved in undertaking such analyses. First, categorical variables were coded using dummy coding to include them in regression models [69]. Second, to respect the assumption of normality, we applied square root, logarithmic, or reciprocal (inverse) transformations [69] to highly skewed practice characteristics not normally distributed prior to conducting these models. Competency variables (i.e., knowledge, attitudes, and self-efficacy) were normally distributed. Third, once non-normally distributed data was transformed, correlation analyses were used to examine the correlation structure between socio-demographic/practice variables. Strong associations between variables may suggest that they provide the same type of information. Two variables were omitted from the regression models, given their high association: the variable "average number of years working as a PCP," which had a high association with PCPs' age ($r = .780$), and the variable "average number of consultations for mental health without appointment," which had a high association with "average number of consultations for mental health per week" ($r = .869$). Last, simple linear regression models were run to assess the association between each socio-demographic/practice characteristic and levels of mental health knowledge, attitudes, and self-efficacy. Unstandardized beta coefficients (B), p-values, and coefficients of determination (r^2) were reported for statistically significant associations. Two-tailed p-values of less than .05 were considered statistically significant.

Results

Data was collected by self-administered questionnaires in January 2016, prior to implementation of the training.

Participant socio-demographic and practice characteristics

As shown in Table 1, most PCPs included in the sample were born in Tunisia, spoke Arabic as a mother tongue, were women, attended medical school in Tunisia, and worked full-time. Mean average age of participants was 49 years of age, and they had worked on average 17.8 years as a PCP. Few PCPs reported having any mental health training in the last twelve months (i.e., January 2015-January 2016).

PCPs estimated that they saw on average 145 patients per week, approximately 17 of which consulted for mental health issues. The PCPs in our sample reported seeing very few patients consulting for mental health issues by appointment. Per week, they primarily provided consultation for anxiety and depression and mostly referred patients to specialized mental health services or provided support, such as active listening. PCPs followed up with their patients consulting for mental health issues on average roughly seven times a year.

Table 1: Primary care physicians' socio-demographic and practice characteristics (n=112)

Characteristics	**Continuous variables**	**Categorical variables**
Socio-demographic characteristics	**M (SD)** **(Q1, Q2, Q3)**	**n (%)**
Age (in years)	49.0 (5.5) (46.0, 49.0, 53.0)	-
Women	-	90 (80.4)
Born in Tunisia [b]	-	109 (97.3)
Mother tongue, Arabic [b]	-	111 (99.1)
Medical school in Tunisia [b]	-	104 (92.9)
Practice characteristics	**M (SD)** **(Q1, Q2, Q3)**	**n (%)**
Governorate – n (%)		
Tunis	-	43 (38.4)
Ariana	-	28 (25.0)
Manouba	-	21 (18.8)
Ben Arous	-	20 (17.9)
Average number of years working as a PCP [c]	17.8 (6.0) (15.0, 18.0, 21.8)	-
Hours work / week	34.1 (5.1) (30.0, 36.0, 36.0)	-
Mental health training in the last twelve months (yes)	-	14 (12.5)
Average number of patient consultations / week	145.3 (57.8) (103.8, 138.5, 180.0)	-
Average number of consultations for mental health / week	17.7 (19.8) (5.0, 12.0, 21.1)	-
Average number of consultations for mental health / week:		-
By appointment [a]	3.3 (8.1) (0.0, 0.5, 3.0)	
Without appointment [a,d]	14.8 (18.7) (3.5, 9.8, 18.0)	
Average number of hours dedicated to mental health care / week [a]	4.5 (3.8) (2.1, 3.6, 6.0)	-
% of mental health consultations per week according to diagnosis:		
Types of mental health consultation per week:		
Anxiety	49.5 (25.5) (30.0, 50.0, 70.0)	-
Depression	33.0 (22.3) (20.0, 30.0, 45.0)	-
Alcohol use disorders	8.8 (14.5) (0.0, 3.0, 10.0)	-
Drug use disorders	6.6 (13.5) (0.0, 2.0, 10.0)	-
Psychosis (including schizophrenia)	5.1 (7.9) (0.0, 2.0, 9.0)	-
Suicide/self-harm	3.7 (7.9) (0.0, 1.0, 5.0)	-
% of mental health clientele:		
Referred to specialized care [a]	55.6 (30.8) (30.0, 50.0, 80.0)	-
Receiving support (ex.: active listening)	51.8 (36.9) (20.0, 50.0, 90.0)	-
Receiving psychoeducation	40.7 (38.4) (0.0, 35.0, 80.0)	-
Receiving pharmacology	39.6 (36.3) (5.0, 30.0, 80.0)	-
Receiving psychotherapy	18.7 (29.0) (0.0, 1.0, 23.8)	-

Average number of follow-up visits / patients with mental health issues [a]	7.1 (8.8) (4.0, 4.0, 6.0)	-

[a] Missing values were greater than 5%, but less than 10%.
[b] The variable is not considered in further analyses given the small number of participants in some groups.
[c] This variable is not considered in further analyses given the high correlation with the variable 'age.'
[d] This variable is not considered in further analyses given the high correlation with the variable 'average number of consultations for mental health per week.'

Knowledge of mental illness

Prior to the implementation of the mental health training in the Greater Tunis area, PCPs obtained an average overall score of 6.5/10 (SD=1.4; Q1=5.6, Q2=6.3, Q3=7.5) on the knowledge questionnaire. Average scores were highest for sub-themes on general knowledge of depression (7.9/10, SD=1.8; Q1=6.0, Q2=8.0, Q3=10.0) and psychosis (7.5/10, SD=2.7; Q1=5.0, Q2=10.0, Q3=10.0), in comparison with sub-themes on knowledge of pharmacological treatment (6.7/10, SD=3.0; Q1=3.3, Q2=6.7, Q3=10.0), management of mental illness (6.6/10, SD=2.3; Q1=4.0, Q2=6.7, Q3=8.3), manifestation of mental illness (6.5/10, SD=1.8; Q1=5.0, Q2=6.7, Q3=8.3), self-harm/suicide (6.1/10, SD=2.6; Q1=5.0, Q2=5.0, Q3=10.0), non-pharmacological treatment (5.5/10, SD=2.1; Q1=3.3, Q2=6.7, Q3=6.7), and substance use disorders (3.7/10, SD=2.8; Q1=3.3, Q2=3.3, Q3=6.7). These results suggest gaps in knowledge about mental health.

Gaps are also made apparent when looking at incorrectly answered questions on the knowledge questionnaire. As shown in Table 2, most physicians responded incorrectly to questions pertaining to the following concepts: identifying symptoms related to alcohol use disorders; acknowledging myths about suicide attempts; effectiveness of brief advice to people with alcohol use disorders; and managing people with drug use disorders.

Table 2: Incorrect responses to knowledge statements about mental health and illness (n=112)

Knowledge of specific mental health conditions and illness manifestation	**Incorrect responses : n (%)**
Depression	
Administering antidepressants.	52 (46.4)
Depression is always treated with antidepressants.	39 (34.8)
Severe chronic depression in a mother and repercussions on children.	20 (17.9)
Symptoms of depression.	5 (4.5)
Advice for people living with depression.	4 (3.6)
Substance use disorders	
Symptoms of alcohol use.	84 (75.0)
Brief advice to people with alcohol problems is effective.	67 (59.8)
Drug use.	62 (55.4)
Psychosis	
Interventions for people with acute psychosis.	46 (41.1)
Symptoms of psychosis.	11 (9.8)
Suicide/Self-harm	
Myths about suicide.	81 (72.3)
Best practice after a suicide attempt.	6 (5.4)
Manifestation of mental illness	
Symptoms of alcohol use.	84 (75.0)
Myths about suicide.	81 (72.3)
Prevalence of mental illness in youth.	31 (27.7)
Severe chronic depression in a mother and repercussions on children.	20 (17.9)
Symptoms of psychosis.	11 (9.8)
Symptoms of depression.	5 (4.5)
Knowledge on provision of care	**Incorrect responses : n (%)**
Non-pharmacological	
Myths about suicide.	81 (72.3)
Brief advice to people with alcohol problems is effective.	67 (59.8)
Advice for people living with depression.	4 (3.6)
Pharmacological	
Administering antidepressants.	52 (46.4)
Depression is always treated with antidepressants.	39 (34.8)
Pharmacological treatment for people with mental illness.	21 (18.8)
Management of mental illness in primary care	
Drug use.	62 (55.4)
Involvement of people with mental illness in their own care.	46 (41.1)
Interventions for people with acute psychosis.	46 (41.1)
Best place to care for people with mental illness.	45 (40.2)
Pharmacological treatment for people with mental illness.	21 (18.8)
Best practice after a suicide attempt.	6 (5.4)

A total of 112 PCPs completed the questionnaire and there is no missing data. Some items are included in more than one sub-theme. Sub-themes are therefore not mutually exclusive.

Attitudes towards mental illness

The overall mean score of the eleven questions from the *MICA-4* was 28.4/66 (SD=6.3; Q1=24.0, Q2=28.0, Q3=32.0). These results suggest some gaps in favorable attitudes towards both mental illness and the field of mental health.

Scores based on favorable answers, per individual item, are provided in Table 3. These answers also make apparent gaps in favorable attitudes towards mental health and mental illness. As shown, most PCPs had unfavorable attitudes about: the dangerousness of people with mental health problems, disclosure about mental health problems to colleagues or friends, the PCP's role in assessing mental health problems in primary care, interactions with people presenting with mental health problems in PCPs' clinical practice, and personal recovery from a mental health problem. However, PCPs favorably answered concepts relating to the importance of physical health in mental health care, the respectability of being a mental healthcare professional, and respect for people with mental health problems.

Table 3: Attitudes towards mental illness and the field of mental health (n=112)

MICA-4 items	**Favorable answers n (%)**
13. If a person with a mental illness complained of physical symptoms (such as chest pain), I would attribute it to their mental illness. (R)	108 (96.4)
15. I would use the terms "crazy," "nutter," "mad," etc. to describe to colleagues people with a mental illness who I have seen in my work. (R)	101 (90.2)
16. If a colleague told me they had a mental illness, I would still want to work with them.	95 (85.6)
1. I just learn about mental health when I have to, and I would not bother reading additional material on it. (R).	95 (85.6)
2. People with severe mental illness can never recover enough to have a good quality of life. (R)	67 (59.8)
4. If I had a mental illness, I would never admit this to any of my friends because I would fear being treated differently. (R)	58 (51.8)
14. General practitioners should not be expected to complete a thorough assessment for people with psychiatric symptoms because they can be referred to a psychiatrist. (R)	57 (50.9)
10. I feel comfortable talking to a person with mental illness as I do talking to a person with physical illness.	47 (42.0)
7. If I had a mental illness, I would never admit this to my colleagues for fear of being treated differently. (R)	46 (41.8)
5. People with mental illness are dangerous more often than not. (R)	31 (27.7)
12. The public does not need to be protected from people with mental illness.	22 (20.0)

Eleven questions from the original *MICA-4* are reported.

For reversed scored items (R), suggested answers tend toward the negative (i.e., 'strongly disagree' and 'disagree'), and these negative categories were collapsed into the single category of 'favorable answers.' Contrarily, for items not reversed, suggested answers tend toward the positive (i.e., 'strongly agree' and 'agree'), and these positive categories were collapsed into the single category of 'favorable answers.'

Missing data <5%.

Self-Efficacy

PCPs obtained an average overall mean score of 5.1/10 (SD=1.5; Q1=4.0, Q2=5.2, Q3=6.3) on the self-efficacy questionnaire. PCPs scored higher on scale 1, which regroups concepts related to self-efficacy about detection of mental health problems in primary care (5.8/10, SD=1.6; Q1=4.6, Q2=6.0, Q3=7.1), than scale 2, which regroups concepts related to self-efficacy about treatment and management of mental health problems in primary care (4.8/10, SD=1.8; Q1=3.6, Q2=5.0, Q3=6.1). These results suggest gaps in self-efficacy.

Average scores for detection themes on the self-efficacy scale were as follows: 6.0/10 (SD=1.9; Q1=4.7, Q2=6.3, Q3=7.5) for detection of mental health problems and 5.4/10 (SD=1.9; Q1=3.8, Q2=5.6, Q3=6.9) for using techniques related to detecting mental health problems. Average scores for treatment and management themes on the self-efficacy scale were as follows: 3.8/10 (SD=1.8; Q1=2.5, Q2=3.5, Q3=5.0) for treatment by pharmacology, 4.7/10 (SD=2.1; Q1=2.9, Q2=4.6, Q3=6.1) for treatment by support, 4.7/10 (SD=2.2; Q1=3.0, Q2=5.0, Q3=6.5) for treatment by psychoeducation, and 5.6/10 (SD=2.0; Q1=4.4, Q2=6.6; Q3=6.9) for management by developing clinical plans for patients.

Limited perception of confidence in capabilities to detect, treat, and manage mental health problems in primary care is also apparent when looking at responses to each individual item. As shown in Table 4, few PCPs agreed that they felt confident in their capability to detect substance use disorders and psychosis (including schizophrenia). In addition, PCPs in our sample struggled with confidence in their capability to pose a mental health diagnosis, use tools and techniques to detect a mental health problem, and explain a mental health diagnosis to patients.

Consistently, PCPs felt less confident in their capability to treat people presenting with symptoms relating to substance use disorders and psychosis (including schizophrenia) than they did with anxiety and depression symptoms, and very few PCPs felt confident in their capability to provide treatment for suicide and/or self-harm. In addition, PCPs in our sample reported very limited confidence in their capability to manage mental health problems in primary care, specifically by developing a clinical plan for patients needing care. Almost all PCPs in our sample felt very confident in their capability to refer people presenting with mental health problems to more specialized settings.

Table 4: Self-efficacy in detecting, treating, and managing mental illness in primary care (n=112)

Self-efficacy, detection	**Agree n (%)**
I feel confident in my capability to detect:	
Problems relating to anxiety.	92 (82.9)
Depression.	83 (74.8)
Suicide/self-harm.	60 (54.0)
Problems relating to alcohol use.	58 (52.8)
Problems relating to drug use.	51 (45.9)
Psychosis (including schizophrenia).	41 (37.3)
I feel confident in my capability to:	
Collect information to detect a mental health problem.	73 (66.4)
Explain the diagnosis to patients.	55 (49.1)
Diagnose a mental health problem.	43 (38.4)
Use tools and techniques to detect a mental health problem.	34 (30.4)
Self-efficacy, treatment, and management	**Agree n (%)**
I feel confident in my capability to provide pharmacological treatment for patients presenting with:	
Problems relating to anxiety.	61 (56.5)
Depression.	43 (38.7)
Problems relating to alcohol use.	11 (10.0)
Problems relating to drug use.	11 (10.1)
Psychosis (including schizophrenia).	11 (10.0)
I feel confident in my capability to provide support (ex: active listening) for patients presenting with:	
Depression.	84 (75.7)
Problems relating to anxiety.	70 (64.3)
Problems relating to drug use.	37 (34.0)
Problems relating to alcohol use.	36 (32.1)
Psychosis (including schizophrenia).	21 (18.9)
I feel confident in my capability to provide psychoeducation for patients presenting with:	
Depression.	58 (52.2)
Problems relating to anxiety.	55 (49.5)
Problems relating to alcohol use.	36 (33.0)
Problems relating to drug use.	32 (28.8)
Psychosis (including schizophrenia).	17 (15.3)
I feel confident in my capability to treat patients having issues relating to:	
Self-harm.	31 (27.9)
Suicide.	26 (23.4)
I feel confident in my capability to develop a clinical plan for patients presenting with:	
Problems relating to anxiety.	56 (50.4)
Depression.	51 (45.9)
Problems relating to alcohol use.	28 (25.5)
Problems relating to drug use.	28 (25.7)
Psychosis (including schizophrenia).	18 (16.3)
I feel confident in my capability to refer my patient.	101 (91.8)
I feel confident in my capability to involve family members/friends in the management plan.	83 (74.8)
I feel confident in my capability to involve other professionals in the management plan.	66 (60.0)

Missing data <5%.

Characteristics associated with mental health knowledge, attitudes, and self-efficacy

Working in Suburb 3 seemed to be significantly associated with higher levels of mental health self-efficacy (B = .859, p = .038, r^2 = .043). The number of weekly work hours reported by PCPs (B = -.285, p = .014, r^2 = .054) and the average number of hours PCPs reported dedicating to mental health care per week (B = -4.608, p = .031, r^2 = .046) seemed to be significantly associated with more favourable mental health attitudes. In addition, participating in a mental health training during the previous twelve months seemed to be significantly associated with higher levels of mental health knowledge (B = .791, p = .041, r^2 = .037) and higher levels of mental health self-efficacy (B = 1.093, p = .011, r^2 = .057).

Mental health self-efficacy seemed to be positively associated with the weekly percentage of PCP-reported clientele engaged in psychoeducation (B = .012, p = .002, r^2 = .090). Mental health knowledge seemed to be significantly negatively associated with the weekly percentage of clientele PCPs reported referring to specialized services (B = -.016, p = <.001, r^2 = .128).

Discussion

We report on PCPs' knowledge and attitudes about mental health, as well as their sense of self-efficacy, prior to the implementation of a mental health training program, and we highlight variables that are associated with these competencies. Results show that PCPs in our sample detect, treat, and manage mental illness in primary care, but limitations to their involvement are apparent.

To the authors' knowledge, this article is the first to detail mental health knowledge, attitudes, and perceived self-efficacy, as well as characteristics that may be associated with such competencies, among PCPs working in the Greater Tunis area of Tunisia. Such results are timely given the following factors: the current push in global mental health to use non-specialists in mental health care [2-4,7]; the need to develop and design tailored medical education curricula and continuing medical education programs, severely lacking in LMICs [8,44,45,70-73]; and the scarcity of mental health research in Tunisia, also a reality in other LMICs [74,75].

Findings in our sample, as compared to others, raise a prominent issue: PCPs show gaps in knowledge about mental illness, hold certain negative beliefs about mental illness and the field of mental health, and lack confidence in specific capabilities [11-13,15,17,23-25,27,42]. These limits are important to highlight because they may hinder mental health care encouraged in non-specialized settings [2-4] and thus the full potential of non-specialists' involvement in the field of mental health [44]. However, worthy of note is that this lack of perceived confidence in specific capabilities may be appropriate, since it does somewhat match and reflect certain levels of knowledge and unfavorable beliefs scored by PCPs in our sample prior to training.

Most incorrect responses reported by PCPs in our sample on the knowledge questionnaire relate to substance use disorders and suicide/self-harm. In addition, PCPs in our sample consistently scored lower on perceived self-efficacy related to detection, treatment, and management of substance use disorders, suicide/self-harm, and psychosis than they did when asked similar questions about depression and problems relating to anxiety. These incorrect answers and lower levels of confidence in capabilities for specific disorders may not be surprising;

non-specialists such as PCPs often continue to favour consultations for depression and/or anxiety, despite some apparent knowledge [11,12,13,15] and confidence gaps [42], over those they deem more complex disorders [11,12,21,22,76-77]. Such notions may also be confirmed in our sample: PCPs estimated that the highest percentage of mental health consultations per week were for symptoms relating to depression and anxiety. However, what we found surprising was that despite PCPs' low scores on perceived self-efficacy related to psychosis, their sub-theme average for knowledge about this condition was one of the highest. Thus, there appears to be a gap between PCPs' theoretical knowledge about psychosis and their confidence in skills related to detection, treatment, and management of this disorder in clinical practice. Interestingly, the opposite finding was reported by Cowan and colleagues (2012) [13]; while most PCPs in their sample in India reported a high degree of self-perceived competence in detecting symptoms of psychosis, they were unable to accurately name three common symptoms related to this condition. Discrepancies between theoretical knowledge of mental health and perceived confidence in mental health capabilities may be important to highlight; having high perceived confidence in specific capabilities, if there are deficits of knowledge in mental health, can potentially spell poorer clinical care and even danger to patients.

The ongoing drafting of national substance use and suicide prevention strategies, as well as the implementation of national anti-stigma campaigns monitored by the *Committee for Mental Health Promotion* at the level of the Ministry of Health, aim to further promote the recognition of substance use disorders, self-harm, and suicide in Tunisia, as these conditions continue to be heavily stigmatized in the country [23,39,78]. Stigmatization may lead to disinterest, especially among primary care staff, underdiagnosis and/or under-reporting, limited options for treatment

beyond specialized care, and few research initiatives in the field [79,80]. Thus, referral of patients presenting with substance use disorders, suicide/self-harm, and psychosis (including schizophrenia) is still very common in Tunisia [78], limiting PCPs' contact and involvement with these conditions in primary care, as shown in our sample.

We found several characteristics among our sample that seemed to be associated with PCPs' competencies. In several cases, such competencies seemed to be associated with levels of clinical practice. Findings from simple linear regression models thus seem to reinforce two important aspects in mental health capacity-building. The first aspect seems to be the importance of providing healthcare professionals the opportunity for positive social contact, interaction, and involvement with people living with mental health issues. Research has shown that this type of contact, interaction, and involvement is effective in decreasing negative beliefs about mental illness [81,82], building confidence with such clientele, and consequently decreasing healthcare professionals' reluctance to engage in mental health care in clinical practice [26,50,83]. Therefore, in parallel to anti-stigma campaigns and the institutionalization of best mental health practices through the drafting of national substance use and suicide prevention strategies in Tunisia, ways to encourage PCPs' positive social interactions and involvement with people presenting with mental health issues in primary care settings, even those they deem to be more complex, would likely be beneficial. Such initiatives may include continuing mental health education programs with access to practica, and, for support with challenging cases, ongoing supervision. Second, these training programs may be tailored to specific governorates given that our findings seem to suggest that work location may be associated with levels of PCPs' mental health self-efficacy. Tailoring training programs and curricula, as well as integrating interactive and practical

components to such programs were also suggested by authors who identified gaps in PCPs' mental health knowledge, attitudes, and self-efficacy in other LMICs [7,12,15,24,84].

Finally, by using the *MICA-4*, we were able to identify negative attitudes towards mental illness and the field of mental health among our sample, which are also common among other non-specialists working in LMICs [14,19,23-25,27-31,33-36]. While the *MICA-4* has been used in other contexts [35,36,85-90], internal consistency and some item-total correlations generated using the sixteen-item scale were poor in our sample. These poor results lead us to question its suitability to assess PCPs' attitudes towards mental illness and the field of mental health in the Greater Tunis area of Tunisia and in French-speaking LMICs more generally. However, we were able to explore mental health stigma using eleven questions of the *MICA-4* with a Cronbach's alpha of .608, an increase from our initial assessment with the original sixteen items. We were thus able to show that most PCPs in our sample held exaggerated negative beliefs about the dangerousness of people with mental health problems. More specifically, most PCPs in our sample did not answer the following questions favorably: 1) people with mental illness are dangerous more often than not; and 2) the public does not need to be protected from people with mental illness. This fear, an effect of stigmatization common in other low-resource settings [12,27-30], may help explain, in part, why most PCPs in our sample (91.8%) reported feeling very confident in their capability to refer patients to more specialized care, which, in Tunisia, is frequently remote from the homes and communities of patients [23,58]. Confidence in referral to specialized care also seems to be concretely translated into self-reported practice; per week, PCPs refer most people consulting for mental health issues to specialized resources (55.6; SD=30.8; Q1=30.0, Q2=50.0, Q3=80.0).

While it is encouraging to note that PCPs in our sample do engage in mental health care, identified gaps in mental health knowledge, attitudes, and self-efficacy, as well as associations between certain characteristics and such competencies uncovered by simple linear regression models, seem to support two mental health initiatives confirmed in Tunisia: the implementation of a mental health training program in the Greater Tunis area, under the auspices of the *Committee for Mental Health Promotion* [23,39,78], and the recent inclusion of a mandatory (previously optional) two-month internship in post-graduate medical curricula to train future PCPs in effective mental health detection, treatment, and management [91]. Continuing mental health training and a mandatory mental health internship with access to support and guidance to encourage positive contact and interaction with people living with mental health issues are thus strategies that Tunisia has adopted to help build non-specialists' competencies in mental health. These also align with internationally supported ways to help target the mental health treatment gap and further integrate mental health into primary and community-based settings [2-4].

Strengths and Limitations

There were methodological strengths and limitations to the study. First, the goal of the trial, in which this paper is inscribed, was not to generalize results to all PCPs working in Tunisia, but to see if the training program worked before considering larger-scale implementation. Hence, we cannot ascertain if our results are generalizable to all PCPs in Tunisia. However, we assume that these competencies and gaps may be similar to those of public sector PCPs working in other areas of Tunisia who would agree to participate in a mental health training. Second, results are based on self-reports, not on observed behaviour or review of patient records. Therefore, we cannot determine whether responses are driven by social desirability. However, the honesty reported by

PCPs on questions related to the dangerousness of people with mental health problems and to the public's need for protection from people with mental illness seems to indicate authenticity. In addition, these questions show very little missing data (<2%). Third, given the nature of self-report questionnaires, practice characteristics reported by PCPs in our sample should be considered an approximation. Fourth, scales used to assess knowledge and self-efficacy were not previously validated. However, we believe a strength of this paper is the provision of some measures of reliability for these scales, based on our sample from the Greater Tunis area, which proved to be acceptable. Fifth, reliability measures for the *MICA-4* based on our sample complement the literature on the *MICA-4*'s psychometric properties, a strength of this paper given that the scale's authors suggest considering its applicability across other samples [62]. However, it is important to note that while the *MICA-4* had acceptable internal consistency in a previous study [62], it did not show results that were as promising in our sample. We therefore aimed to improve internal consistency by reporting solely on eleven items from the original scale, which limited our ability to compare the overall score with other studies using all sixteen questions. Further research is needed to assess whether possible sub-scales are identifiable in our sample and comparable to the ones identified by the authors of the scale [62]. Finally, we believe that further research is needed to explore the associations among socio-demographic and practice characteristics, as well as on PCPs' competencies.

Conclusion

Involving non-specialists such as PCPs in the care of people living with mental health problems is encouraged internationally as one of the initiatives to address the mental health treatment gap in LMICs. While non-specialists do engage in mental health care, it is not uncommon for them to

lack specific mental health competencies used to detect, treat, and manage mental health issues in non-specialized settings. This paper reported on mental health knowledge, attitudes, and self-efficacy among a sample of PCPs working in the Greater Tunis area, prior to the implementation of a mental health training. It also highlighted associations between socio-demographic/practice characteristics and such competencies. Findings may encourage other LMICs to assess the current mental health competencies of non-specialists, information that may be used to develop specific and tailored mental health initiatives to further promote their involvement in effective mental health care, as well as the integration of mental health into primary and community-based settings.

Abbreviations
MNS: mental, neurological, and substance use
LMICs: low- and middle-income countries
PCPs: primary care physicians
WHO: World Health Organization
mhGAP: Mental Health Gap Action Programme
IG: intervention guide
ICC: Intraclass Correlation Coefficient
IC: Confidence Intervals
MICA: Mental Illness Clinicians' Attitudes
SD: standard deviation

Authors' contributions
JS, FChampagne, NL, WM, and FCharfi conceived the study. JS administered questionnaires for data collection, performed statistical analyses with assistance from MR, interpreted the results, wrote the first draft of the manuscript, and made/integrated suggested corrections to subsequent versions. FChampagne, NL, MR, and FCharfi provided input on statistical analyses conducted and critically revised the manuscript to improve its content. In addition, FCharfi provided input on contextual information about the Greater Tunis area of Tunisia. ML and MP proofread and revised the manuscript. All authors read and approved the manuscript.

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Competing interests
Dr. Marc Laporta works for the *Montreal World Health Organization (WHO)-Pan American Health Organization (PAHO) Collaborating Center for Research and Training in Mental Health* (*Douglas Mental Health University Institute*). All other authors declare that they have no competing interests.

Availability of data and material
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Consent for publication
Not applicable.

Ethics approval and consent to participate
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Additional file 1: Item-total correlation and Cronbach's alpha for the MICA-4, based on our sample

	Original scale		Test 1		Test 2		Test 3		Test 4		Test 5	
MICA-4 items	Item-total correlation coefficient	Cronbach's alpha if item excluded	Item-total correlation coefficient	Cronbach's alpha if item excluded	Item-total correlation coefficient	Cronbach's alpha if item excluded	Item-total correlation coefficient	Cronbach's alpha if item excluded	Item-total correlation coefficient	Cronbach's alpha if item excluded	Item-total correlation coefficient	Cronbach's alpha if item excluded
1. I just learn about mental health when I have to, and I would not bother reading addition al material on it. (R).	0.357	0.478	0.468	0.511	0.364	0.523	0.380	0.532	0.342	0.566	0.360	0.572
2. People with severe mental illness can never recover enough to have a good quality of life. (R)	0.146	0.511	0.166	0.542	0.186	0.550	0.207	0.558	0.249	0.578	0.243	0.590
3. Working in the mental health field is just as respectable as other fields of health and social care.	0.030	0.528	0.029	0.561	0.025	0.573	-	-	-	-	-	-
4. If I had a mental illness, I would never admit this to any of my friends because I would fear being treated	0.314	0.471	0.292	0.514	0.296	0.525	0.315	0.533	0.384	0.546	0.424	0.544

differently. (R)												
5. People with mental illness are dangerous more often than not. (R)	0.389	0.455	0.377	0.495	0.286	0.505	0.382	0.518	0.314	0.563	0.306	0.576
6. Health/social care staff know more about the lives of people treated for a mental illness than do family members and friends. (R)	-0.019	0.552	-	-	-	-	-	-	-	-	-	-
7. If I had a mental illness, I would never admit this to my colleagues for fear of being treated differently. (R)	0.222	0.495	0.200	0.536	0.212	0.545	0.215	0.557	0.253	0.578	0.275	0.584
8. Being a health/social care professional in the area of mental health is not like being a real health/social care professional. (R)	0.066	0.534	0.033	0.577	0.031	0.590	0.031	0.603[a]	-	-	-	-
9. If a senior colleague instructed	0.120	0.518	0.168	0.543	0.146	0.559	0.141	0.573	0.116	0.608	-	-

me to treat people with mental illness in a disrespectful manner, I would not follow their instructions.												
10. I feel as comfortable talking to a person with mental illness as I do talking to a person with physical illness.	0.217	0.496	0.235	0.528	0.245	0.538	0.245	0.550	0.239	0.582	0.217	0.600
11. It is important that any health/social care professional supporting a person with mental illness also ensures that their physical health is assessed.	0.016	0.529	0.010	0.563	-	-	-	-	-	-	-	-
12. The public does not need to be protected from people with mental illness.	0.156	0.511	0.158	0.547	0.141	0.563	0.125	0.579	0.121	0.611	0.109	0.627
13. If a person with a mental illness complained of	0.255	0.504	0.275	0.535	0.278	0.546	0.257	0.559	0.281	0.584	0.247	0.596

physical symptoms (such as chest pain), I would attribute it to their mental illness. (R)												
14. General practitioners should not be expected to complete a thorough assessment for people with psychiatric symptoms because they can be referred to a psychiatrist. (R)	0.252	0.487	0.288	0.515	0.294	0.526	0.303	0.536	0.304	0.566	0.309	0.575
15. I would use the terms "crazy," "nutter," "mad," etc. to describe to colleagues people with mental illness that I have seen in their work. (R)	0.259	0.493	0.303	0.521	0.301	0.533	0.295	0.545	0.293	0.573	0.280	0.585
16. If a colleague told me they had a mental illness, I would still want To work with them.	0.277	0.492	0.289	0.525	0.308	0.534	0.308	0.545	0.330	0.569	0.357	0.574

Cronbach's alpha for the scale		**0.521**		**0.552**		**0.563**		**0.573**		**0.598[a]**		**0.608**

R = reversed score item

[a] = This incongruous result is due to how SPSS 25 computes the Cronbach's alpha if deleted.

4.5. Article 4: Short- and long-term impact of the training program

Building capacity in mental health care in low- and middle-income countries by training primary care physicians using the *mhGAP*: a randomized controlled trial

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Key messages:

1) To build capacity in mental health care, the Tunisian Ministry of Health, in collaboration with the *School of Public Health* at the *Université de Montréal* (Québec, Canada), the *WHO* office in Tunisia, and the *Montreal WHO-PAHO Collaborating Centre for Research and Training in Mental Health* (Québec, Canada), offered a mental health training program to primary care physicians working in the Greater Tunis area, and evaluated its effectiveness before considering country-wide implementation.

2) Evaluation findings indicate that an *mhGAP*-based training program might be a feasible way to increase mental health knowledge and self-efficacy and decrease of referrals and negative mental health attitudes among PCPs in Tunisia and other low- and middle-income countries.

Abstract

To address the rise in mental health conditions in Tunisia, a North African country, a training based on the *Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG)* was offered to primary care physicians (PCPs) working in the Greater Tunis area. The training of non-specialists such as PCPs is an internationally supported way to target untreated mental health symptoms. We aimed to evaluate the program's impact on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice, immediately following implementation (at six weeks) and 18 months post-training. We conducted an exploratory trial with a combination of designs: a *pretest-posttest control group design* (an RCT) and a *one-group pretest-posttest design* were used to assess the training's short-term impact; and a repeated measure design was used to assess the training's long-term impact. The former relied on a delayed-intervention strategy; participants assigned to the control group (Group 2) received the training after the intervention group (Group 1). The intervention consisted of a weekly *mhGAP*-based training session (totaling six weeks), comprising general lectures, group discussions, role plays, and a support session offered by trainer-psychiatrists. Data was collected at baseline, prior to randomization; following Group 1's training; following Group 2's training; and 18 months after training. Descriptive, bivariate, and ANOVA analyses were conducted. Overall, 112 GPs were randomized to either Group 1 (n=52) or Group 2 (n=60). The training had a statistically significant short-term impact on mental health knowledge, attitudes, and self-efficacy, but not on self-reported practice. When comparing pre-training results and results 18-month after training, these changes were maintained. PCPs reported a decrease in referrals to specialized services 18 months after training in comparison to pre-training. The *mhGAP* training might increase mental health knowledge and self-efficacy and decrease referrals and negative mental health attitudes among PCPs in Tunisia

and other low- and middle-income countries. Future studies should examine the relationship among these outcome variables.

Keywords

Impact evaluation, mental health, primary care; physicians, *mhGAP*; training, randomized controlled trial, low- and middle-income countries, Tunisia

1. Introduction

1.1. Background

In low- and middle-income countries (LMICs), mental, neurological, and substance use disorders (MNS) are on the rise (Whiteford et al., 2015), which is concerning, since 76-85% of people living with these disorders in such countries do not receive treatment (*WHO*, 2013a). To meet current and projected need, advocates promote "task-sharing," the increased implication of primary and community-based healthcare providers with less training and experience in mental health (Kakuma et al., 2011; Kakuma et al., 2014; Sidhaye et al., 2015; Hoeft et al., 2018). Reasons to implicate non-specialists in the field of mental health abound. First, they far exceed the number of mental healthcare professionals in LMICs (Brucker et al., 2011; Kakuma et al., 2011; van Ginneken et al., 2013; Kakuma et al., 2014; *WHO*, 2018a). Second, studies show that non-specialists can effectively manage mental health problems in non-specialized health settings (Kakuma et al., 2011; van Ginneken et al., 2013; Prince et al., 2014; Keynejad et al., 2018). Third, task-sharing is coveted in resource-limited settings because it creates models of care that encourage change to specialists' roles (Hoeft et al., 2018). For example, it is envisioned that "clinical roles focused on complex psychiatric cases and diagnoses [will be assigned to specialists] whereas less complex cases can be managed by trained non-specialist health workers" (Kakuma et al., 2011, p. 378). In addition, specialists' roles within task-sharing models include supervisory tasks (Patel, 2009; Mendenhall et al., 2014), which fosters collaboration between primary and specialized settings (Hoeft et al., 2018). Last, task-sharing initiatives are cost-effective (Buttorff et al., 2012; Chisholm and Saxena, 2012; Levin and Chisholm, 2015).

Primary care physicians (PCPs) are popular targets of mental health task-sharing initiatives given their strategic healthcare system role (Wittchen et al., 2003). Since PCPs are often the entry point into the healthcare system, they inevitably see people in consultation presenting with mental health problems (Blashki et al., 2003; Wittchen et al., 2003; *WHO* and *WONCA*, 2008). However, studies show gaps in their preparedness to detect and manage MNS in primary care, a severe threat to quality of care (*WHO* and *WONCA*, 2008). To make task-sharing initiatives viable, continuing mental health training is essential (Blashki et al., 2003; *WHO* and *WONCA*, 2008; Kakuma et al., 2014; Mendenhall et al., 2014; Shidhaye et al., 2015; Acharya et al., 2017). However, the *World Health Organization (WHO)*'s *2017 Mental Health Atlas* shows a global shortage of trained mental health workers, including PCPs (*WHO*, 2018a).

Before considering country-wide implementation, our research group offered a training program based on the *Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG) (version 1.0)* (*WHO*, 2010), developed by the *WHO*, to PCPs working in the Greater Tunis area of Tunisia, a lower-middle-income North African country (World Bank, 2017). The *mhGAP*-based training (*WHO*, 2010) highlights competencies and skills that non-specialists, such as PCPs, working in non-specialized settings, may use to address what the *WHO* considers priority MNS disorders. Tunisia was the target of such an initiative for several reasons. Tunisia is an Eastern Mediterranean Region (EMR) country, and the EMR has higher mental disorder burden rates than the global average (Rahman, 2017). Despite clear increases in the burden of mental disorders within the EMR, little investment has been allocated to further develop community mental health and research capacity (Rahman, 2017). Pertinent examples from Tunisia may illustrate these deficits: while mental health training programs have been offered to PCPs, these were not offered

as part of a systematic national program, but rather under the leadership of individual governorate directors. This lack of investment in systematic and continuous implementation is problematic; PCPs are involved in the mental health field albeit recorded unpreparedness (Hend et al., 2012; *Unité de promotion de la Santé Mentale*, 2013; Ben Thabet et al., 2018; Spagnolo et al., 2018a). In addition, to our knowledge, no previous initiative has attempted to evaluate the short- and long-term impact of a mental health training offered to PCPs in the country.

Since the launch of the *2013 Tunisian National Strategy for the Promotion of Mental Health* and the creation of the *Committee for Mental Health Promotion* in 2015 in Tunisia, the revival of continuing mental health training offered to PCPs has been a political priority (*Unité de promotion de la Santé Mentale*, 2013; *Comité technique du dialogue sociétal,* 2014; Spagnolo et al., 2017a; Spagnolo et al., 2018a; Spagnolo et al., 2018b). These programs have been prioritized to further develop proximity health services in order to address the rise in mental health problems, substance use disorders, and suicide since the 2010-2011 Revolution (*Unité de promotion de la Santé Mentale*, 2013; Ouanes et al., 2014; Khelil et al., 2016a; Khelil et al., 2016b; Khelil et al., 2017; Spagnolo et al., 2018b) as well as to address PCPs' deficits in mental health competencies, which limit their involvement in care (Hend et al., 2012; *Unité de promotion de la Santé Mentale*, 2013; Ben Thabet et al., 2018; Spagnolo et al., 2018a). While the *mhGAP*-based training has been implemented in over a hundred countries (*WHO*, 2018b), to our knowledge, our trial is among the few identified initiatives listed in peer-reviewed journals that evaluate the training using a randomized controlled trial and a sample of PCPs in a French-speaking nation (Akol et al., 2018; Keynejad et al., 2018). In addition, we believe this is the first study to report on the sustainability of the *mhGAP*-based training's impact beyond a nine- (Gureje

et al., 2015) and 10-month follow-up period (Budoson et al., 2016). In sum, this trial addresses the growing mental health treatment gap, and may serve to inform the limited evidence on mental health in Tunisia (*Unité de promotion de la Santé Mentale*, 2013), the EMR (Rahman, 2017), and in LMICs (Saxena et al., 2005; Collins et al., 2014).

1.2. Objectives

The overall objective of this paper is to evaluate the impact of an *mhGAP*-based training program (*version 1.0*) on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice. The specific objectives are twofold. First, we aimed to evaluate the training's short-term impact, specifically, immediately following its implementation (at six weeks). Second, we aimed to evaluate the training's long-term impact, specifically, 18 months post-implementation.

2. Methods

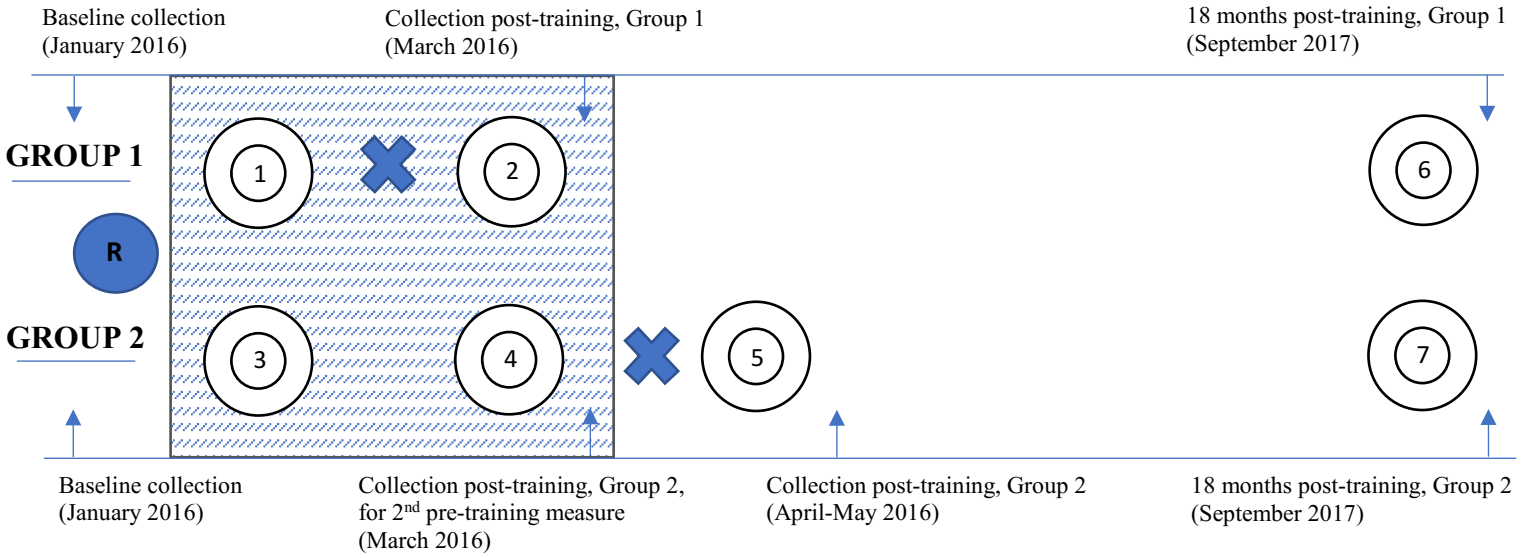
This paper is structured according to the CONSORT 2010 reporting guidelines (Consort, 2017).

2.1. Trial design

Research approval was obtained from the *Université de Montréal* (Québec, Canada) (#15-117-CERES-D) and *Razi Hospital* (Manouba, Tunisia). To meet the overall objective, we conducted an exploratory trial between January 2016 and September 2017 using a combination of designs. To meet the first specific objective, a *pretest-posttest control group design* (Campbell & Stanley, 1963) (an RCT) was used to assess the training's short-term impact (*Figure 1*). For this design, PCPs were randomly assigned to two groups: the intervention group (Group 1) or the control group (Group 2). Group 1 received the training from 9 February to 15 March 2016. To ensure that

both groups received the training (a request by members of the Ministry of Health involved in this study (WM, FC) and governorate directors of the Greater Tunis area given accessibility issues to mental health training in the country) a delayed-intervention strategy was employed through a *one-group pretest-posttest design* (Campbell & Stanley, 1963) to assess the impact of the training program offered to Group 2 (*Figure 2*). Group 2 received the training from 29 March to 27 April 2016. To meet the second specific objective, a *repeated measure design* was used to assess the training's long-term impact (*Figure 3*). This design relied on the pooling of Groups 1 and 2 over three time periods to assess the training program's long-term impact. We believe that pooling was justified for several reasons. First, Groups 1 and 2 (i.e., circles 1, 3, and 4; 2 and 5; and 6 and 7 in Figure 3) were comparable on all characteristics. Second, to ensure the same amount of time elapsed between the pre- and post-training measures for Groups 1 and 2 (i.e., six weeks), we regrouped circles 1 and 4 and circles 2 and 5 (Figure 3). In addition, the amount of time between circles 1 and 4 and circles 2 and 5 (i.e., 6-weeks) was short, minimizing history bias (Campbell & Stanley, 1963). Last, pooling allowed for an increase in statistical power when assessing the evolution of the training's impact over time.

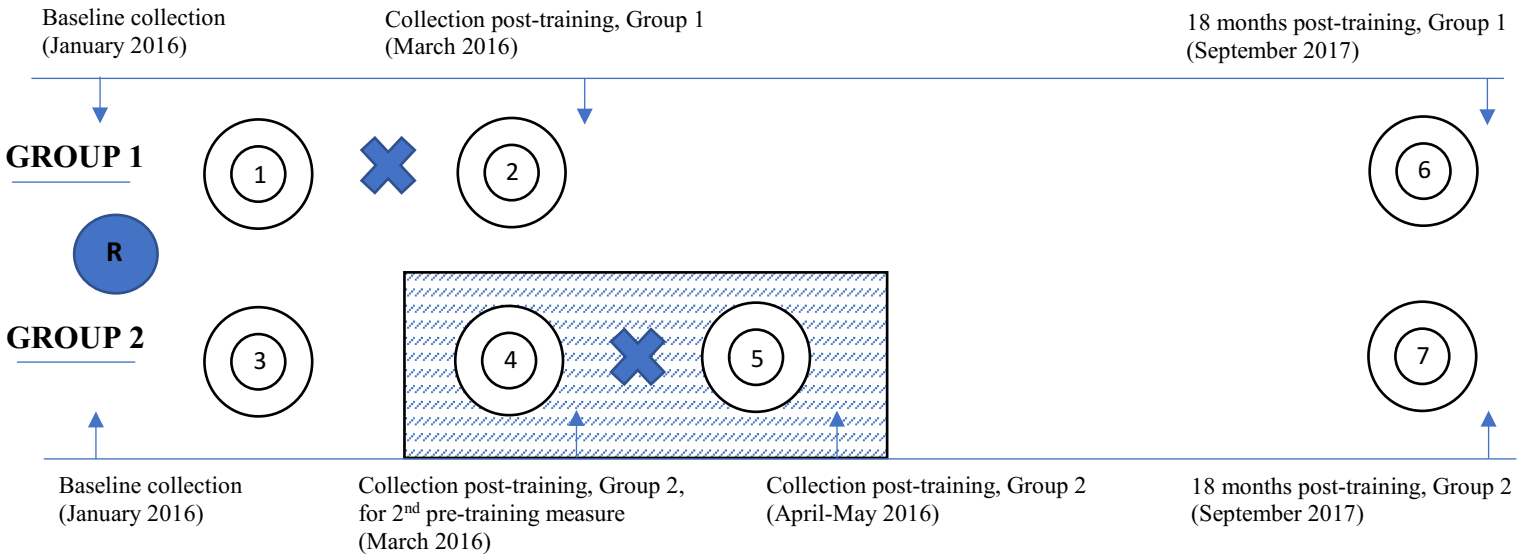
Figure 1: Pretest-posttest control group design (short-term impact)



R = Randomization; X = Training

The shaded area depicts the *pretest-posttest control group design*, and the timing of the intervention. Participants were randomized to either Group 1 (the intervention group) or Group 2 (the control group). Group 1 received the training from 9 February to 15 March 2016 (circles 1 and 2). Group 2 did not receive the intervention during this time (circles 3 and 4). Data was collected through self-administered questionnaires prior to the randomization of both groups (baseline collection: January 2016) and following Group 1's training (March 2016).

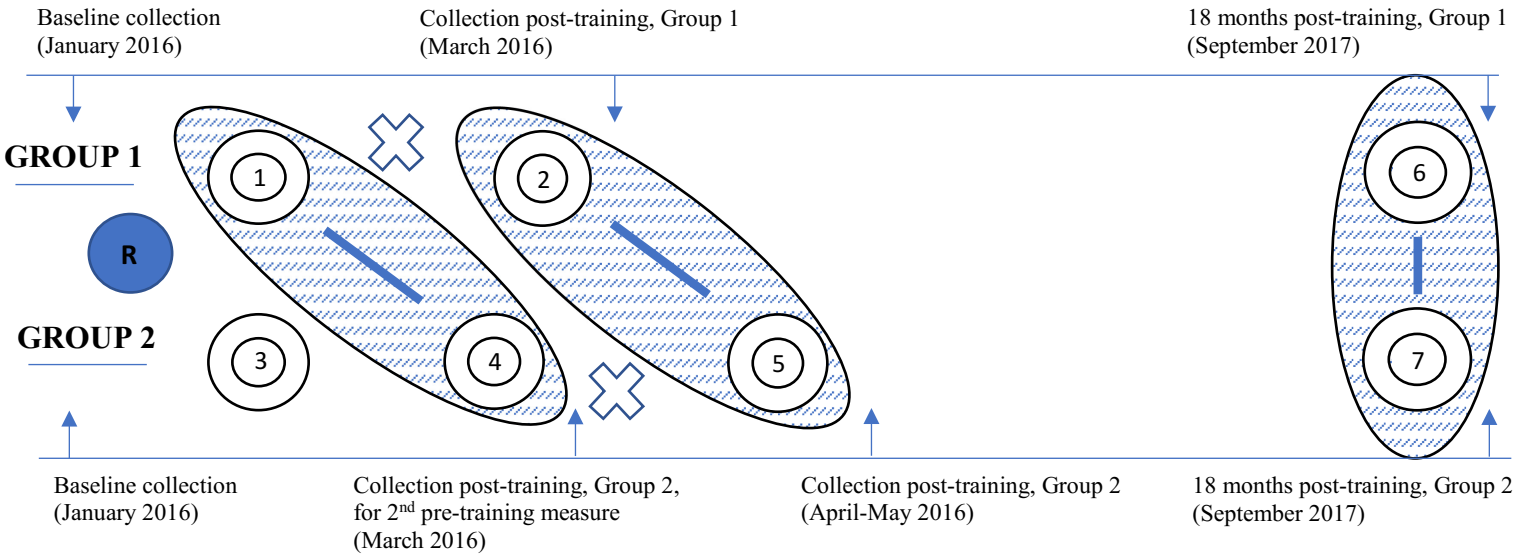
Figure 2: One-group pretest-posttest design (short-term impact)



R = Randomization; X = Training

The shaded area depicts the *one-group pretest-posttest design*, which relied on a delayed-intervention strategy. Following Group 1's training, Group 2 received the training from 29 March to 27 April 2016 (circles 4 and 5). Data was collected through self-administered questionnaires prior to Group 2's participation in the training program (March 2016) and following Group 2's training (April-May 2016).

Figure 3: Repeated measures design (long-term impact)



R= Randomization; X = Training
In this repeated measures design, the shaded areas depict the pooling of Group 1 and Group 2 for analysis of the evolution of the training's impact over three time periods: pre-training (circles 1 and 4), post-training (circles 2 and 5), and 18 months post-training (circles 6 and 7). Pooling at these three times was justified given the similarity of characteristics between groups, and the short amount of time elapsed between circles 1 and 4 and circles 2 and 5. Of note, circles 1, 3, and 4 were comparable on all characteristics, therefore we pooled circles 1 and 4.

The use of a combination of designs is referred to by Campbell and Stanley (1963) as a "*patched up design*" (p. 57), and one of its key features significant to this study is the ability to demonstrate in several manners the effect of an intervention (i.e., the training based on the *mhGAP-IG*). Replicating the effects of an intervention using assorted designs is said to increase the robustness of a study (Campbell & Stanley, 1963). Specifically, following the Theory of Experimentation, *"the more numerous and independent the ways in which the experimental effect is demonstrated, the less numerous and less plausible any singular rival invalidating hypothesis becomes"* (Campbell & Stanley, 1963, p. 36), increasing the study's internal validity. In this study, the effects of the training based on the *mhGAP-IG* shown in Group 1 by the *pretest-posttest control group design* (Campbell & Stanley, 1963) were replicated in Group 2 by the *one-group pretest-posttest design* (Cambell & Stanley, 1963). In addition, findings show that the effects of the training program on both groups were similar (Spagnolo et al., 2017b). *Table 1* ("Additional

file 1") shows that for the following variables, there were statistical differences pre- and post-training, and these differences were similar between groups: mental health knowledge, mental health attitudes, mental health self efficacy, and PCPs' referral habits. While no different pre- and post-training was found for the variable mental health's importance in clinical practice, this status quo was also mirrored between groups.

2.2. Participants

The four governorates comprising the Greater Tunis area were chosen for this trial (i.e., Ariana, Ben Arous, Tunis, and Manouba) because their diversity mirrors the realities seen elsewhere in Tunisia. In addition, this area houses the most public mental health professionals in the country (*WHO*, 2008), facilitating the piloting of a training that relies on mental health care personnel involvement, specifically trainers and supervisors, which are integral to task-sharing models (Hoeft et al., 2018).

Physicians involved in organizing continuing medical education in the Greater Tunis area facilitated recruitment (Spagnolo et al., 2018a). They compiled a list of 345 PCPs who belonged to the primary care physicians' professional order in Tunisia, worked in the public and private care sectors, and previously attended continuing medical education training in the Greater Tunis area. Continuing medical education is recommended and encouraged in Tunisia for advancing PCPs' careers. Therefore, we believe this list regroups public-sector PCPs working in this area with the mentioned characteristics. Of these, 315 met the following study eligibility criteria: working in primary care in the Greater Tunis area (accidently included in the lists); and having five or more years of clinical experience.

Physicians, a psychiatrist involved in the participant recruitment given her ties to community mental health, and JS proceeded to contact the 315 PCPs. One hundred and thirty-two PCPs (n=132; 41.90%) accepted to participate in the trial. The others (n=183) were not included in the trial because of unavailability or not being reached for recruitment. At the beginning of January 2016, JS contacted the 132 PCPs who accepted to participate in the trial to obtain consent. They were then asked to complete a baseline questionnaire by the end of January 2016 prior to training implementation. From the time consent was obtained until this deadline, JS sent reminder emails and made calls to PCPs who did not complete the questionnaire. These reminders were sent once per week for two weeks. One hundred and twelve (n=112) PCPs met the deadline to submit the questionnaire and were thus included in the larger pilot trial.

2.3. Intervention

The *mhGAP-IG (version 1.0)* (*WHO*, 2010) is a standardized training tool requiring adaptation to the local context before implementation. The adaptation process inscribed within this trial and conducted prior to training implementation has been described elsewhere (Spagnolo et al., 2018b). In brief, Tunisian Ministry of Health members (WM, FC) chose specific training modules considered priority conditions in the country. These include: general principles of care, depression, psychosis, suicide/self-harm, and substance use disorders (i.e., alcohol and drug use). These modules were adapted to meet the Greater Tunis area's local primary care realities with the help of WM, FC, three Tunisian psychiatrists ("trainers"), and seven physicians responsible for continuing medical education in the Greater Tunis area ("tutors"). Tutors, well-versed in mental health detection, treatment, and management, supported trainees during and after training. They also assisted trainers during training sessions. WM, FC, trainers, and tutors participated in a

"Training of Trainers" prior to training in order to familiarize themselves with the *mhGAP*, its accompanying guide, and teaching material.

The training was conducted over six weeks for a total of 19 hours. The first five weeks consisted of general lectures, role plays, and group discussions on the chosen modules, totalling 17 hours. The last training session consisted of a two-hour support session animated by trainer psychiatrists. This session allowed trainees to present challenging mental health cases and engage in further role plays.

2.4. Outcomes

Outcomes were chosen according to Kirkpatrick's conceptual model (Kirkpatrick, 1959; Kirkpatrick and Kirkpatrick, 2006), often used for training program evaluation (Smidt et al., 2009). The four factors in Kirkpatrick's conceptual model are: 1) *reactions* (i.e., trainees' impressions of the program); 2) *learning* (i.e., what trainees learned during the program); 3) *behaviour* (i.e., trainees' performance after the program, using newly learned competencies); and 4) *results* (i.e., the program's impact on broader settings, such as organizations) (Kirkpatrick, 1959; Kirkpatrick and Kirkpatrick, 2006). For the trial's purposes, three of these factors were used to evaluate the training program's impact: perceived training quality and utility (*reactions*), which will be published in a separate paper; mental health knowledge, attitudes, and self-efficacy (*learning*); and self-reported mental health practice (*behaviours*). Kirkpatrick's "results" factor was omitted from this evaluation; assessing the training program's impact on healthcare organizations in which trainees' practice was beyond the trial's scope.

The knowledge questionnaire was developed by the *WHO* to accompany the *mhGAP-IG* training package (*WHO*, 2010). The sixteen questions used in the questionnaire highlight information on general principles of care, depression, psychosis, suicide/self-harm, and drug/alcohol use disorders. Correct answers were scored as 1 and incorrect answers as 0. A participant's score is therefore the sum of correct answers for individual items. Overall knowledge scores were converted to a score ranging from 0 to 10 with a higher score indicating more knowledge. This questionnaire reported a good degree of reliability between the two pre-test measures, administered six weeks apart (Spagnolo et al., 2018a).

The *Mental Illness: Clinicians' Attitudes (MICA) Scale (version 4.0)* was used to measure attitudes towards mental illness and the field of mental health (Gabiddon et al., 2013; Indigo Network, 2018). Eleven items (i.e., questions 1, 2, 4, 5, 7, 10, 12, 13, 14, 15, and 16) from the original *MICA-4 (version 4.0)* were used for this trial, given a poor Cronbach's alpha for all sixteen items when applied to our sample (Spagnolo et al., 2018a). For statements 10, 12, and 16, items were scored as follows: 'strongly agree' = 1; 'agree' = 2; 'somewhat agree' = 3; 'somewhat disagree' = 4; 'disagree' = 5; and 'strongly disagree' = 6. All other items were reverse-scored. Scores on individual items were summed to obtain each participant's overall score within a range of 11 to 66 points. A higher global score indicates a more negative perception of mental illness and the field of mental health. The Cronbach's alpha was considered good, along with the reliability found between the two pre-test measures for the eleven items, which were measured six weeks apart (Spagnolo et al., 2018a).

The self-efficacy questionnaire, developed for this trial, consists of thirty-five questions about PCPs' judgement of their capability to detect, treat, and manage depression, psychosis, suicide/self-harm, and alcohol/drug use disorders in primary care. Each statement was scored as follows: 'strongly agree' = 0; 'somewhat agree' = 1; 'neutral' = 2; 'somewhat disagree' = 3; and 'strongly disagree' = 4. A participant's overall score is the sum of correct answers for individual items. Overall scores were converted to a score ranging from 0 to 10, a higher score indicating more self-efficacy. This questionnaire reported a good degree of reliability found between the two pre-test measures taken six weeks apart (Spagnolo et al., 2018a).

Self-reported mental health practice consists of two variables assessed by the socio-demographic questionnaire. The first represents the importance of mental health in PCPs' clinical practice. This variable was created by averaging the percentage of patients consulting for mental health issues seen by PCPs per week, as well as the percentage of time PCPs allocate to mental health per week. This score ranges from 0 to 100. The second variable represents PCPs' habits of making referrals to specialized services. Hence, it is the average percentage of mental health clientele that PCPs refer to specialized services per week. This score ranges from 0 to 100.

Questionnaires, pre-tested (Friedman et al., 2010) by trainers and tutors (Spagnolo et al., 2018a), were administered at four times: at baseline, prior to randomization (January 2016); following Group 1's training (March 2016); following Group 2's training (April-May 2016); and 18 months after implementation (September 2017).

2.5. Sample size

Sample size calculations were conducted using G*Power 3.1.9.2 (Faul et al., 2007). Two a priori calculations were conducted. The first calculation, conducted to meet the first specific objective, assessed the number of needed participants to evaluate the training program's short-term impact using a *pretest-posttest control group design* (Campbell & Stanley, 1963). In G*Power 3.1.9.2, we utilized the test listed as ANOVA: Repeated within-between interaction and indicated, which indicated that a total of 62 PCPs would be a sufficient sample size to yield 80% statistical power to detect a high effect size (i.e., a *Cohen f* of 0.37) [1] (Faul et al., 2007) in the intervention outcome compared with the control outcome (Sullivan and Feinn, 2012). We therefore aimed to recruit at least 75 PCPs, a number that also considered the maximum acceptable attrition rate of 20% (Fewtrell et al., 2008). The second a priori calculation, conducted to meet the second specific objective, assessed the number of needed participants to evaluate the training program's long-term impact using a repeated measures design. In G*Power 3.1.9.2., we utilized the test listed as ANOVA: Repeated measures, within factors (Sullivan and Feinn, 2012), which indicated that a total of 52 PCPs would be a sufficient sample size to yield 80% statistical power to detect a high effect size (i.e., a *Cohen f* of 0.44) (Faul et al., 2007). We therefore aimed to retain at least 63 PCPs in order to also consider the maximum acceptable attrition rate of 20% (Fewtrell et al., 2008). These calculations were conducted with a two-sided alpha = .05 level of significance.

2.6. Randomization and blinding

JS assigned 112 PCPs specific ID numbers and randomized participants to either Group 1 or Group 2 using the Excel RAND function. Trainer-psychiatrists, physicians responsible for

[1] For analyses using ANOVA, *Cohen f* is used to define effect size. A high effect size with *Cohen f* is defined as > 0.35 (Faul et al., 2007).

continuing medical education in the Greater Tunis area of Tunisia, members of the Ministry of Health, the directors of the governorates included in this trial, and members of the *WHO* office in Tunisia were not informed of group allocation.

2.7. Statistical methods

Statistical analyses were performed using SPSS version 25.0 (IMB Corp., 2017). Descriptive statistics and normality values (i.e., skewness/kurtosis) were assessed for the variables. For outcome variables not normally distributed (i.e., the importance of mental health in PCPs' clinical practice), we applied a log transformation to ensure normality of distribution for forthcoming parametric tests using ANOVA (Tabachnick and Fidell, 2016). Little's MCAR (Missing Completely at Random) test was used on data to examine missing data patterns. This test showed that data was MCAR; therefore, we assumed that missingness would not bias the results (Hollis and Campbell, 1999; Schlomer et al., 2010). Given this test, if participants were missing more than 20% of the data on the mental health knowledge, attitudes, and self-efficacy questionnaires, their individual scores were excluded from the overall respective scale score. This resulted in excluding two participants' scores from the self-efficacy questionnaire's baseline overall score. In addition, an overall mental health knowledge, attitudes, and self-efficacy score based on each participant's available data—and the denominator, adjusted to reflect the number of questions answered—was calculated for the data collected at four times.

To complement the MCAR test, we tested for potential bias caused by drop-out. We compared the differences in baseline sociodemographic and practice characteristics between PCPs who completed post-training and/or follow-up (i.e., at 18 months) questionnaires (completers)

and those who did not (non-completers) ("Additional file 2") (Dumville et al., 2006). Differences between completers and non-completers were assessed pre- and post-training (short-term) and pre- and post-training (long-term) by independent t-tests for normally distributed variables and the Mann-Whitney U test for non-normally distributed variables distributions (Friedman et al., 2010). Chi-squared tests were used to compare nominal variables. In cases where at least one cell did not have the expected count (i.e., at least 5), Fisher's exact test was reported. Two-tailed p-values of less than 0.05 were considered statistically significant. Statistically significant differences between completers and non-completers were used to create profiles among completers to assess whether attribution may have impacted mental health competencies post-training and/or at follow-up. Assessment was conducted using correlation analyses. We hypothesized that the intervention would have a similar or lesser effect on completers with similar baseline characteristics than those of non-completers.

Differences between PCPs' sociodemographic and practice characteristics, as well as outcome variables in Group 1 and Group 2 at baseline, were assessed by independent t-tests for normally distributed variables and the Mann-Whitney U test for non-normally distributed variables distributions (Friedman et al., 2010). Chi-squared tests were used to compare nominal variables. In cases where at least one cell did not have the expected count (i.e., at least 5), Fisher's exact test was reported. Means and standard deviations (SDs) were reported for tests conducted on normally distributed data. Quartiles 1 (Q1), 2 (Q2 - the median), and 3 (Q3) were reported for tests conducted on non-normally distributed data. Two-tailed p values of less than 0.05 were considered statistically significant. Results are presented in *Table 1.*

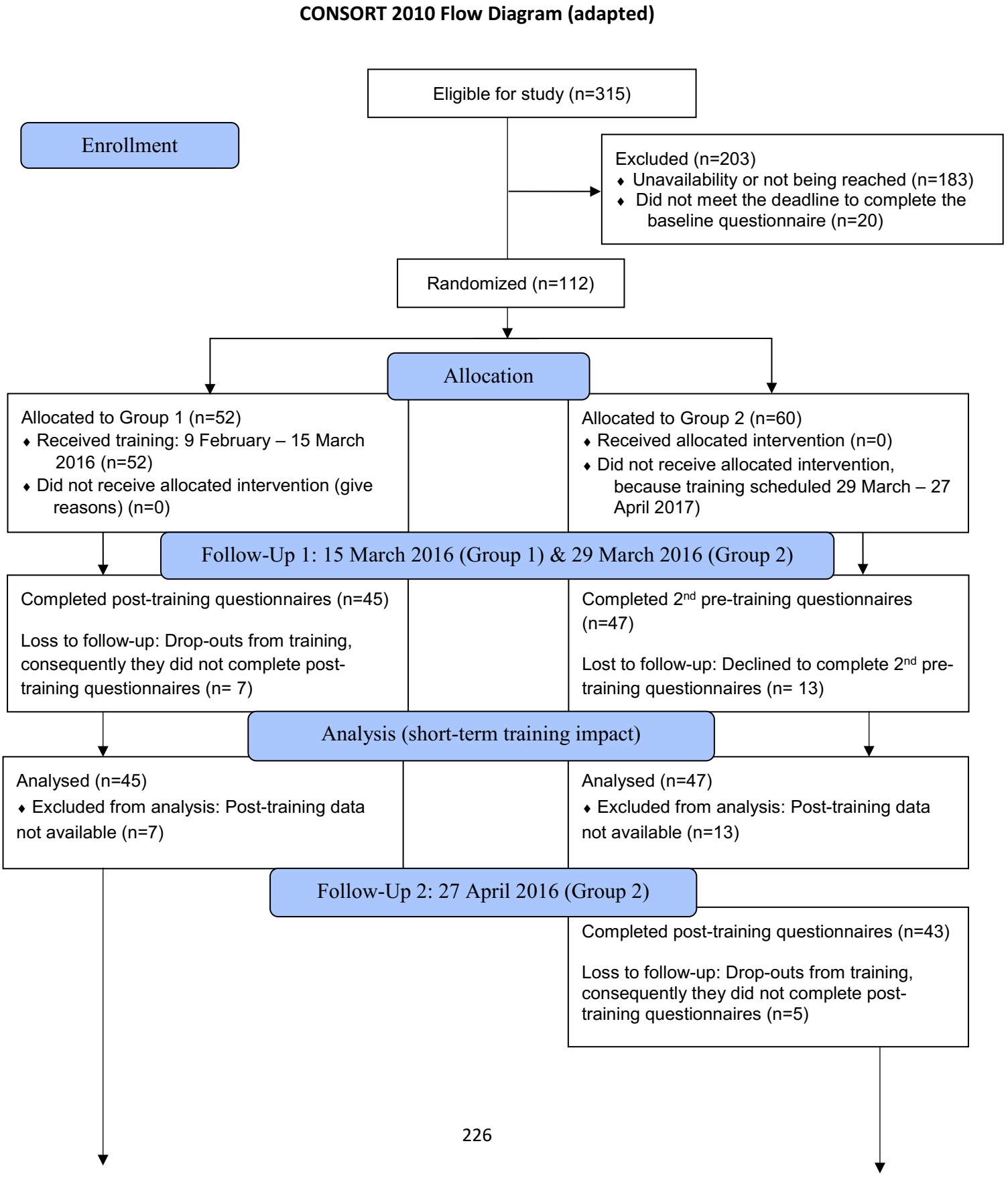
For the *pretest-posttest control group design* (Campbell & Stanley, 1963), we conducted a mixed ANOVA to assess the training program's short-term impact on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice. Homogeneity of variances was met using Levegne's test (Lim & Loh, 1996). PCPs were randomly assigned to two groups (the intervention or control group), and their competencies were assessed at two times (pre- and six weeks post-training) (*Figure 1*). A statistically significant interaction between "group" and "time" indicated a differential effect of the intervention and control condition on an outcome variable. Results are presented in *Table 2*. Second, for the repeated measure design, we conducted a one-way ANOVA with repeated measures to assess the training program's long-impact on mental health knowledge, attitudes, self-efficacy, and self-reported practice. Sphericity was assessed using Mauchly's Test of Sphericity. We pooled Group 1 and Group 2 for analysis of the evolution of the training program's impact over three time periods (*Figure 2*): pre-training (pooling of 1 & 4); post-training, (pooling of 2 & 5); and 18 months post-training (pooling of 6 & 7). Pooling at these three time periods was justified given the similarity of characteristics between groups, and the short amount of time elapsed between 1 and 4, and 2 and 5. Of note, 1, 3 and 4 were comparable on all characteristics, therefore we pooled 1 and 4. For the one-way ANOVA with repeated measures, when the effect of time was significant, post-hoc analyses were generated to uncover which time periods were not equal. Results are presented in *Table 3.* Two-tailed p values of less than 0.05 were considered statistically significant.

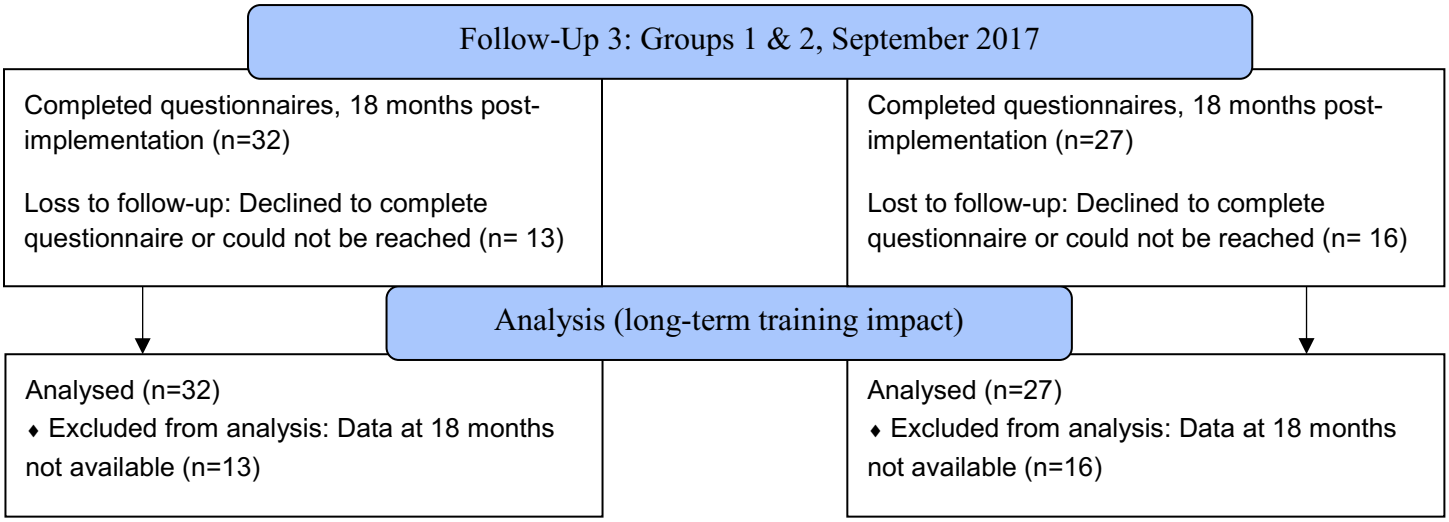
3. Results

3.1. Participant recruitment and data collection

The participant flow diagram is summarized in *Figure 3.* Baseline data was collected from 112 PCPs, randomized to either Group 1 (n=52) or Group 2 (n=60). Forty-five (n=45) PCPs assigned to Group 1 completed post-training questionnaires on 15 March 2016, after the support session, and these were controlled by 47 PCPs assigned to Group 2 who completed a second set of pre-training questionnaires between 15 March and 29 March 2016. Forty-three (n=43) PCPs assigned to Group 2 completed post-training questionnaires on 27 April 2016, after the support session. Data was also collected at 18 months after the training implementation from 59 PCPs (32 in Group 1 and 27 in Group 2).

Figure 4: Participant recruitment and participation





3.2. PCP sociodemographic and practice characteristics at baseline

Table 1 summarises the sociodemographic and practice characteristics of PCPs in Group 1 and Group 2 at baseline. Most PCPs included in our sample were women, were born in Tunisia, spoke Arabic as a mother tongue, and attended medical school in Tunisia. Participants' mean average age was 49.0 years of age (SD=5.5; Q1=46.0, Q2=49.0, Q3=53.0), and they had worked on average approximately 18 years as a PCP (SD=6.0; Q1=15.0, Q2=18.0, Q3=21.8). Few PCPs reported having any mental health training in the last 12 months (i.e., January 2015-2016). PCPs estimated they saw on average 145 patients per week (SD=57.8; Q1=103.8, Q2=138.5, Q3=180.0), approximately 17 of which consulted for mental health issues (SD=19.8; Q1=5.0, Q2=12.0, Q3=21.1). PCPs in our sample reported seeing few patients consulting for mental health issues by appointment. Per week, they primarily provided consultation for anxiety and depression and mostly referred patients to specialized mental health services or provided support, such as

active listening. PCPs followed up with their patients consulting for mental health issues on average roughly seven times per year (Spagnolo et al., 2018a).

No statistically significant differences emerged between the two groups concerning socio-demographic characteristics. In addition, both groups had equivalent baseline mental health knowledge, attitudes, self-efficacy, and self-reported practice. Two practice characteristics were not equivalent between groups. A greater proportion of PCPs working in the governorate of Ben Arous were randomly assigned to Group 2, and PCPs in Group 1 reported a higher percentage of patients consulting for psychosis per week. While both differences were significant, the difference between groups related to percentage of patients consulting for psychosis per week barely met the 0.05 p-value threshold.

Table 1: Socio-demographic and practice characteristics for Group 1 and Group 2 at baseline (n=112)

Socio-demographic characteristics	**Group Assignation**		**p value**
	Group 1 (n = 52)	**Group 2** (n = 60)	
Age (in years), mean (SD)	48.44 (5.31)	49.57 (5.61)	0.28[b]
Gender – n (%)			
Female	40 (76.92)	50 (83.33)	0.39[c]
Male	12 (23.08)	10 (16.67)	
Country of birth – n (%)			
Tunisia	50 (96.15)	59 (98.33)	0.60[d]
Other[g]	2 (3.85)	1 (1.67)	
Mother tongue – n (%)			
Arabic	51 (98.08)	60 (100.00)	0.46[d]
Other[h]	1 (1.92)	0 (0.00)	
Medical school – n (%)			
Tunisia	47 (90.38)	57 (95.00)	0.48[d]
Other[i]	5 (9.62)	3 (5.00)	
Practice characteristics	**Group Assignation**		**p value**
	Group 1 (n = 52)	**Group 2** (n = 60)	
Governorate – n (%)			
Tunis	16 (30.77)	27 (45.00)	0.011[c]
Manouba	9 (17.31)	12 (20.00)	
Ben Arous	16 (30.77)	4 (6.67)	
Ariana	11 (21.15)	17 (28.33)	
Average number of years working as a PCP, mean (SD)	17.27 (5.86)	18.32 (6.08)	0.36[b]
Hours work/week, median (Q1,Q3)	36.00 (30.00, 36.00)	36.00 (36.00, 36.00)	0.50[e]
Mental health training in the last 12 months (Jan. 2015 – Jan. 2016) – n (%)			
Yes	9 (17.31)	5 (8.33)	0.15[c]
No	43 (82.69)	55 (91.67)	
Average number of patient consultations/week, mean (SD)	148.47 (52.05)	142.63 (62.63)	0.59[e]
Average number of consultations for mental health/week, median (Q1,Q3)	10.50 (5.00, 23.98)	12.25 (4.75, 20.00)	0.91[e]
Average number of consultations for mental health/week, median (Q1,Q3)[a]			
By appointment	1.00 (0.00, 4.00)	0.23 (0.00, 2.90)	0.46[e]
Without appointment	9.00 (3.60, 18.00)	10.56 (3.05, 17.75)	0.73[e]
Average number of hours dedicated to mental health care/week median (Q1,Q3)[a]	3.60 (1.80, 5.70)	3.60 (2.46, 7.20)	0.18[e]
% of mental health consultations per week according to diagnosis: Types of mental health consultation per week			
Anxiety, mean (SD)	47.38 (27.60)	51.22 (23.64)	0.44[b]
Depression, median (Q1,Q3)	30.00 (20.00, 40.00)	30.00 (20.00, 50.00)	0.52[e]
Alcohol use disorders, median (Q1,Q3)	3.50 (0.00, 10.00)	3.00 (0.00, 20.00)	0.91[e]
Drug use disorders, median (Q1,Q3)	2.00 (0.00, 10.00)	1.00 (0.00, 5.00)	0.55[e]
Psychosis (including schizophrenia), median (Q1,Q3)	4.00 (1.00, 10.00)	1.00 (0.00, 5.00)	0.048[e]
Suicide/self-harm, median (Q1,Q3)	1.00 (0.00, 2.25)	1.00 (0.00, 5.00)	0.88[e]
% of mental health clientele			
Receiving support (ex.: active listening), mean (SD)	50.16 (34.92)	53.19 (38.75)	0.67[b]
Receiving psychoeducation, mean (SD)	44.18 (37.86)	37.78 (38.95)	0.39[b]
Receiving pharmacology, mean (SD)	41.10 (35.15)	38.31 (37.49)	0.69[b]
Receiving psychotherapy, median (Q1, Q3)	5.00 (0.00, 32.00)	0.00 (0.00, 20.00)	0.29[e]

Average number of follow-up visits / patients with mental health issues, median (Q1,Q3)[a]	4.00 (4.00, 6.00)	4.00 (4.00, 6.25)	0.83[e]
PCPs' competencies (i.e., outcome variables)	**Group Assignation**		**p value**
	Group 1 (n = 52)	**Group 2** (n = 60)	
Knowledge about mental health, mean (SD)	6.50 (1.28)	6.57 (1.43)	0.79[b]
Attitudes towards mental illness and the field of mental health, mean (SD)	28.83 (6.35)	27.94 (6.34)	0.46[b]
Self-efficacy in detecting, treating, and managing mental health problems, mean (SD)	5.36 (1.32)	4.88 (1.66)	0.10[b]
Self-reported practice:			
Importance of mental health in clinical practice, mean (SD) [j]	3.02 (1.16)	3.36 (1.38)	0.17[b]
PCPs' referral habits, mean (SD)[a]	55.89 (30.07)	55.43 (31.64)	0.94[b]

When frequencies do not total 100%, data is missing. [a] Missing values were greater than 5% but less than 10%.
Tests conducted: [b] Independent t-test, [c] Chi-squared test, [d] Fisher's exact test, [e] Mann-Whitney U test.
Category 'other': [g] Algeria, Russia, Morocco, [h] Russian, and [i] Algeria, Russia, Morocco, Iraq, Bulgaria, Romania, Ukraine
[j] Tests were conducted on the log transformation of this variable.

3.3. Short-term impact of the training (*pretest-posttest control group design*)

Table 2 summarises the results of mixed ANOVA that helped assess the training program's impact on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice across two time points (pre- and six weeks post-training). Results correspond to the study's first specific objective.

Statistically significant interactions, which indicate a differential effect of the intervention (i.e., the training program) and the control condition on an outcome, were found for the following outcome measures: mental health knowledge, attitudes, and self-efficacy. When compared to PCPs assigned to Group 2 (the control measure), the training program encouraged: 1) an increase in PCPs' mental health knowledge, $F(1,90) = 19.59$, $p < 0.001$; 2) an increase in self-perceived confidence in capabilities to detect, treat, and manage mental health problems in primary care,

$F(1,90) = 41.56$, $p < 0.001$; and 3) a decrease in negative beliefs about mental illness and the field of mental health, $F(1,90) = 8.44$, $p = 0.005$.

No statistically significant interactions were found for the two variables comprising self-reported mental health practice (i.e., mental health's importance in PCPs' clinical practice and PCPs' referral habits to specialized services per week). These results suggest the training program did not have a differential effect for these two variables, compared to the control measure (Group 2). However, analyses show a significant main effect of time on PCPs' referral habits, $F(1,76) = 4.02$, $p = 0.049$.

Table 2: Interaction effects for mixed ANOVA to assess the training program's short-term impact

PCPs' competencies (i.e., outcome variables)	**Group 1 (intervention)**		**Group 2 (control)**		**Group x time interaction**	
	Pre	**Post**	**Pre**	**Post**	**P value**	**Effect[a]**
	Mean (SD), n	Mean (SD), n	Mean (SD), n	Mean (SD), n		
Knowledge	6.36 (1.28), 45	7.49 (1.24), 45	6.69 (1.40), 47	6.49 (1.31), 47	<0.001	0.179
Attitudes[b]	29.38 (6.56), 45	24.91 (6.45), 45	28.16 (6.73), 47	27.58 (6.83), 47	0.005	0.086
Self-efficacy	5.25 (1.36), 45	7.17 (1.35), 45	4.92 (1.72), 47	5.03 (1.50), 47	<0.001	0.316
MH's importance in clinical practice[c]	0.94 (0.34), 44	0.92 (0.35), 44	1.05 (0.31), 45	1.05 (0.31), 45	0.82	0.001
PCPs' referral habits	59.27 (31.17), 37	44.92 (32.20), 41	52.27 (28.64), 37	51.39 (35.68), 41	0.080	0.040

[a] Eta partial squared (η^2) is the effect size reported.
[b] Higher scores indicate more negative attitudes about mental illness and the field of mental health.
[c] Analyses and results are reported in log form.

3.4. Long-term impact of the training (*repeated measures design*)

Table 3 summarizes the results of the one-way ANOVA with repeated measures in order to assess the evolution of the training program's impact over three time periods: pre-training, immediately after training, and 18 months post-training. Results correspond to the study's second specific objective.

Four variables show statistically significant effects of time. First, results show statistically significant differences between the means of PCPs' referral habits over time, $F(2,94) = 19.784$, $p < 0.001$. Post-hoc analyses indicate the average number of referrals reported by PCPs was higher pre-training than the means of referrals immediately after, $p < 0.001$, confidence interval (CI) [21.182, 41.485] and 18 months post-training, $p < 0.001$, CI [14.702, 35.815], suggesting they reported referring more patients to specialized mental health services pre-training than at these times. In addition, post-hoc analyses show that this change in referral habits, as reported by PCPs, was maintained during the period immediately after and 18 months after training, $p = 0.279$, CI [-17.229, 5.079].

Second, results show statistically significant differences between the mean scores of PCPs' mental health knowledge over time, $F(2, 116) = 29.755$, $p < 0.001$. Post-hoc analyses indicate PCPs' average mean score on the mental health knowledge questionnaire was lower pre-training than immediately after, $p < 0.001$, CI [-1,604, -0.960] and 18 months after training, $p < 0.001$, CI [-1.390, -0.601], suggesting less knowledge about mental health pre-training than at these times. In addition, post-hoc analyses show this change in PCPs' knowledge was

maintained during the period immediately after and 18 months after training, $p = 0.085$, CI [-0.040, 0.612].

Third, results show statistically significant differences between mean scores of PCPs' attitudes towards mental illness and the field of mental health over time, $F(2, 116) = 13.943$, $p < 0.001$. Post-hoc analyses indicate PCPs' average mean score on the attitude questionnaire was higher pre-training than immediately after, $p < 0.001$, CI [2.930, 6.100] and 18 months after training, $p = 0.004$, CI [0.907, 4.428], suggesting more negative attitudes pre-training than at these times. However, post-hoc analyses also reveal this change in PCPs' attitudes was not maintained during the period immediately after and 18 months after training. Specifically, during this time, PCPs' mean attitude score increased, $p = 0.046$, CI [-3.657, -0.038], suggesting more negative attitudes towards mental health and the field of mental health, albeit still less than before the training.

Last, results show statistically significant differences between the mean scores of PCPs' mental health self-efficacy over time, $F(2, 116) = 74.545$, $p < 0.001$. Post-hoc analyses indicate PCPs' average mean score on the mental health self-efficacy questionnaire was lower pre-training than immediate after, $p < 0.001$, CI [-2.475, -1.765] and 18 months after training, $p < 0.001$, CI [-1.526, -0.800], suggesting less confidence in mental health capabilities pre-training than at these times. However, post-hoc analyses also reveal this change in PCPs' self-efficacy was not maintained during the period immediately after and 18 months after training. Specifically, PCPs' mean self-efficacy score decreased during this period, $p < 0.001$, CI [.632, 1.281], suggesting less self-reported confidence in their capabilities, albeit still more than before the training.

There was a non-statistically significant effect of time on the self-reported importance PCPs allocated to mental health in clinical practice, $F(2, 110) = 1.015$, $p = 0.366$. Since the results were not significant, no post-hoc analyses are reported.

Table 3: Time effect for repeated measure ANOVA to assess the evolution of the training's impact

PCPs' competencies (i.e., outcome variables)	**Pre-training**	**Six weeks post-training**	**18 months post-training**	**Effect of time**	
	Mean (SD), n	Mean (SD), n	Mean (SD), n	**p-value**	**Effect[a]**
Knowledge	6.29 (1.32), 59	7.57 (1.19), 59	7.29 (1.30), 59	<0.001	0.339
Attitudes[b]	28.72 (6.74), 59	24.20 (6.84), 59	26.05 (7.49), 59	<0.001	0.194
Self-efficacy	4.99 (1.36), 59	7.11 (1.35), 59	6.16 (1.58), 59	<0.001	0.562
MH's importance in clinical practice[c]	1.02 (0.33), 56	0.96 (0.96), 56	0.97 (0.37), 56	0.37	0.018
PCPs' referral habits	64.29 (30.80), 48	32.96 (31.38), 48	39.03 (29.06), 48	<0.001	0.296

[a] Eta partial squared (η^2) is the effect size reported.
[b] Higher scores indicate more negative attitudes about mental illness and the field of mental health.
[c] Analyses and results are reported in log form.

4. Discussion

This exploratory trial's aim was to assess an *mhGAP*-based *(version 1.0)* training's impact on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice immediately after (i.e., at six weeks) and 18 months post-training. The training had a statistically significant short-term impact on mental health knowledge, attitudes, and self-efficacy, but not on self-reported practice. When comparing results pre- and 18 months post-training, these changes were maintained. In addition, PCPs reported a decrease in referrals to specialized services 18 months after training, in comparison to pre-training.

This trial has two major strengths in light of the global mental health movement. First, the *WHO* developed the *mhGAP-IG* to implement and scale up evidence-based mental health interventions centered around task-sharing in LMICs (*WHO*, 2010; *WHO*, 2016). LMICs seem eager to embrace such an intervention to increase access to needed but unavailable mental health services: over a hundred countries have reportedly implemented an *mhGAP*-based training since its development in 2010 (*WHO*, 2018b). While the implementation of such a training is popular in LMICs, it is rarely evaluated for effectiveness using an RCT design (Akol et al., 2018; Keynejad et al., 2018). However, RCTs are a research facet encouraged in the field of global mental health to *"generate knowledge that is of practical value to local health systems but also [to] build a truly global evidence base as the foundation of the public mental health sciences"* (Thornicroft and Patel, 2014, p. 4). In addition, given the nature of our "patched up design" (Campbell & Stanley, 1963, p. 57), we were able to replicate the effects of the training based on the *mhGAP-IG* over the short-term, increasing the study's internal validity. These positive effects, seen in both Groups 1 and 2, might have been encouraged by innovation factors shared by trained PCPs in a separate paper (Spagnolo et al., 2018c). For example, PCPs shared that the training program was clinically relevant to their daily practice, including knowledge on mental health problems that they see in their everyday practice. In addition, PCPs shared the quality of the training's interactive components, such as role plays, clinical case discussions, group discussions, and videos on effective clinical mental health encounters between healthcare workers and patients. These interactive components, they said, helped to orient future practice and better assimilate the training program's content, while increasing the opportunity for peer learning (Spagnolo et al., 2018c). Thus, an RCT conducted using this "patched up design" in one area of Tunisia, as with our trial, may increase understand of the feasibility and acceptability of using the *mhGAP* training

in the country's other areas and the sustainability of its expected results (Altman, 1995; Siriwardhana et al., 2013). Hence, advocacy to increase research capacity in LMICs persists (Saxena et al. 2007; Collins et al. 2014; Thornicroft and Patel, 2014; Lund et al., 2015), especially for evidence around the *mhGAP-IG* training's effectiveness (Keynejad et al. 2018).

Despite a dearth of studies assessing the *mhGAP-IG* training's effectiveness using an RCT design and a sample of PCPs, Keynejad et al. (2018)'s systematic review does highlight evidence on the training's success to further build mental health competencies among non-specialists in LMICs, using pre-post study designs. Similar to our findings, mental health knowledge, which was also assessed using the *WHO*-developed questionnaire, increased post-training for: PCPs and psychosocial care staff working in a high security zone in Pakistan (Humayun et al. 2017); primary health care workers in Ethiopia (Bruni et al., 2014); doctors, nurses, community health officers, and community health extension workers in Nigeria (Gureje et al., 2015); primary care practitioners working in a post-conflict region in Sri Lanka (albeit not statistically significantly) (Siriwardhana et al., 2016); and student volunteers for a mental health peer counseling program in Nigeria (Ekore et al., 2016). Such findings suggest the *mhGAP-IG* training's utility in various LMICs and for diverse types of non-specialists.

Interestingly, while mental health knowledge was represented among the studies identified in the systematic review (Keynejad et al., 2018), most studies rarely assessed non-specialists' mental health attitudes and self-efficacy pre- and post-training (Budosan et al., 2016; Keynejad et al., 2018; Musyimi et al., 2017) despite their importance to task-sharing initiatives in LMICs. Studies show how commonly non-specialists hold negative views of people consulting for mental

health issues (Henderson et al., 2014). These negative beliefs about mental illness and the field of mental health influence task-sharing models' acceptability and feasibility (Padmanathan and DeSilva, 2013; Mendenhall et al., 2014) by deterring non-specialists from personally engaging with people consulting for mental health issues (Schulze, 2007; Van Boekel et al., 2013), or by preventing such people from seeking services (Clement et al., 2015). In addition, mental health self-efficacy should be considered when assessing *mhGAP-IG* training, since lower confidence in mental health skills is reportedly a main factor influencing non-specialists' decisions to refer patients to specialized services (Anthony et al., 2010), a phenomenon the program aims to reduce if unnecessary (*WHO*, 2010; *WHO*, 2016). In our trial, the *mhGAP-IG* training statistically increased mental health self-efficacy and decreased negative attitudes towards mental illness and the field of mental health, which is encouraging for Tunisia and LMICs with similar profiles that have implemented or wish to implement such a program.

A plausible explanation for the under-representation of such needed outcomes may be related to their absence from the *WHO mhGAP-IG* evaluation toolkit (*WHO*, 2010; *WHO*, 2016). This might hint at the need to expand the standardised outcome measures available in the evaluation toolkit to evaluate the *mhGAP-IG* training's impact on non-specialists' competencies. Given the *mhGAP-IG*'s momentum in LMICs, the additiona of such standardised (but adaptable) tools may further encourage research initiatives and facilitate within- and cross-country comparisons to build a global repertoire of evidence on the training.

This trial's second strength is that, to our knowledge, it is the first to assess the *mhGAP-IG* training's long-term impact beyond a follow-up period of nine (Gureje et al., 2015) and 10

months (Budosan et al., 2016). The sustainability of the training's effects may provide a glimpse into the program's institutionalization (Altman, 1995) and thus justify the often-significant costs in human and technical resources incurred during implementation (Shediac-Rizhallah and Bone, 1998). Interestingly, our findings show that several PCPs' competencies were maintained over 18 months in comparison to pre-training: an increase in mental health knowledge and self-efficacy, as well as decreases in negative beliefs about mental illness and reported referrals to specialized services. We believe that the sustainability of these competency changes may be attributable to two factors. First, they may be attributable to the quality of the intervention and its implementation. Specifically, the *WHO* designed the *mhGAP-IG* training as a package that includes reference tools for easy use by non-specialists: a training guide and master chart with common presentations of MNS conditions. Similar tools, if available to PCPs working in the Greater Tunis area, were severely outdated. In addition, we believe the quality of the intervention and its implementation may have been enhanced, in part, by the adaptation of the *mhGAP-IG* training program to the local primary healthcare realities of the Greater Tunis area, a process involving active input from and ongoing collaboration with our Tunisian collaborators (Spagnolo et al., 2018b). The *WHO* strongly suggests the *mhGAP-IG* training program's contextualization to reflect local particularities and context (*WHO*, 2010; *WHO*, 2016). The adaptation process, in our case, allowed us to gain insight into the difficulties of implementing standardized and recommended facets of the *mhGAP-IG* training program that are particularly important for the sustainability of effects, such as ongoing supervision (Spagnolo et al., 2018b). Therefore, prior to conducting the trial, our Tunisian partners' goal was to create a realistic support network for trainees, both during and after training, that had the highest chances of being institutionalized within the governorates and scaled up to other regions of Tunisia if so decided. Thus, a support

network was created by appointing PCPs in charge of continuing medical education in the Greater Tunis area as "tutors," non-specialists already equipped with mental health knowledge and informed on the *mhGAP-IG* training and program through a structured *Training of Trainers* session. Given their availability, these tutors would be able to support trainees with challenging cases (Spagnolo et al., 2018b). Hence, with the limited availability of specialists in the Greater Tunis area, this tutor network might have alluded to the feasibility and utility of using available resources within already existing health structures to help sustain the training's effects. This solution, which is also discussed in one of the first demonstration projects to report on the *mhGAP-IG*'s utility and the maintenance of its effects (Gureje et al., 2015), might thus hold promise for future implementations of the program in Tunisia and other LMICs.

Second, given the nature of a repeated measures design with a delayed-intervention strategy, we were unable to compare results of the long-term impact to a control group. Specifically, when assessing the impact of the training program at 18 months, both Group 1 and Group 2 had received the training. Therefore, sustainability of certain competencies over the 18 months post-training may be attributable to other factors than the quality of the intervention and its implementation. In other words, the more time elapsed between the end of an intervention, the more difficult it is to associate the effects with the intervention (Brouselle et al., 2014). Sustainability may thus be attributable to contextual factors, supported by the Tunisian Ministry of Health, that interacted with the training program to influence its expected results and facilitate mental healthcare delivery in primary care settings (Unité de promotion de la santé mentale, 2013; Comité du dialogue sociétal, 2014; Spagnolo et al., 2018). Such contextual factors are published in a separate paper (Spagnolo et al., 2018c).

Interestingly, while the sustainability of effects was observed for mental health knowledge, attitudes, self-efficacy, and reported referrals to specialized services, the training did not seem to have any impact on the importance PCPs allocate to mental health practice per week. However, this finding seems to contradict the decrease in referrals PCPs reported making to specialized services per week. Future studies should aim to explore these potentially synergistic relationships.

4.1. Limitations

This trial has several limitations worth considering. First, this pilot trial's objective was to assess whether the training program worked in the Greater Tunis area. We cannot ascertain if our trial's results are generalizable to all PCPs working in Tunisia. We assume the training might have a similar short- and long-term impact on the competencies of public sector PCPs working in other areas of Tunisia who agree to participate in mental health training. However, worthy of note is that, given the exclusion from the study of PCPs with less than five years of clinical experience and those working in any other structure than primary care settings (two eligibility criteria suggested by members of the Ministry of Health involved in the study and governorate directors of the Greater Tunis area of Tunisia), findings from this research cannot be generalized to PCPs with these characteristics in other areas of Tunisia.

Second, Groups 1 and 2 were not comparable at baseline for the following characteristics: the governorates in which PCPs work and the number of people consulting for psychosis (or schizophrenia) per week. While results should be interpreted considering these imbalances, it is worth noting that differences between group baseline characteristics are more common in smaller

samples, specifically those under 200 participants such as ours (Friedman et al., 2010). However, considering our smaller sample size, randomization, for the most part, proved successful (Friedman et al., 2010).

Third, while there is missing data among variables and some sociodemographic and practice characteristics, given the non-significance of Little's MCAR test, missingness should not bias results (Bell et al., 2013). Specifically, Bell and colleagues (2013) suggest that *"[…] simpler methods such as complete case analysis […] have been shown to be biased if data are not missing completely at random"* (p. 2). Hence, we relied on complete case analyses in this trial. While completers and non-completers differed on certain socio-demographic and practice characteristics, these characteristics only seemed to influence the effect of the training on two mental health competencies: the importance PCPs allocated to mental health practice per week and weekly referrals to specialized services. For example, non-completers were generally more experienced PCPs. However, analyses found a negative relationship between experience as a PCP and importance allocated to mental health in practice per week. Hence, had these non-completers remained in the study, the effect of the training on the importance PCPs allocate to mental health practice per week might have been lesser than what was identified in the trial. However, it is worth mentioning that there seemed to be no relationship between the importance PCPs allocated to mental health practice per week and other mental health competencies assessed in the trial, such as mental health knowledge, attitudes, perceived self-efficacy, and weekly referrals to specialized services. In addition, non-completers in Group 1 and Group 2 (the control measure) had distinctive characteristics related to weekly referrals to specialized services. Specifically, non-completers in Group 1 were generally less likely to refer patients to specialized services, but those in Group 2

(the control measure) were generally more likely to refer patients to specialized services. However, analyses found a positive relationship between weekly referrals to specialized services pre- and post-training. Hence, had the non-completers in Group 1 and Group 2 (the control measure) remained in the study, the effect of the training on weekly referrals to specialized services might have been greater in our trial. This potential attrition bias might help explain why: 1) we did not observe a differential effect between Group 1 and Group 2 (the control measure) on weekly referrals to specialized services over the short-term using the *pretest-posttest control group design*; and 2) we did observe such an effect over the short-term (in Group 2) using the *one-group pretest-posttest design* and over the long-term using the *repeated measures design*.

Fourth, since our results are based on self-reports, not on observed behavior or review of patient records, we cannot determine whether social desirability drives responses, especially at post-test after exposure to the training program (Grimm, 2010). Specifically, after the implementation of the training program, PCPs might have been influenced by the organizers' expectations of improvements in mental health attitudes, self-efficacy, and practice. However, social desirability bias might not be as worrisome of an issue in this research, especially for mental health attitudes. First, the goal of the mental health training based on the *mhGAP-IG* was to sensitize participants to their negative beliefs about mental health care and to their negative views of people living with mental illness. In this regard, if the training encouraged participants to recognize these negative beliefs and thus improve their answers on the questionnaires after participation, it seems as though it accomplished its goal. Second, the honesty reported by PCPs on questions with sensitive topics, such as the dangerousness of people with mental health problems and the public's need for protection from people with mental illness (Article 3, Section

4.4), seems to indicate authenticity and not a desire to please the training's organizers. In addition, self-reports of practice characteristics, such as the importance PCPs reported allocating to mental health and referrals to specialized services per week, should be considered an approximation. Future research avenues may include collecting such information by consulting patient records. However, we believe that self-reported information of such variables was appropriate especially since research uncovered challenges with mental health statistics and record-keeping in the Greater Tunis area (Spagnolo et al., 2018c). Also, studies show that the self-reporting of practice behaviours produces reliable information when measuring the effectiveness of a training program of PCPs' practice (Curry & Purkis, 1986).

Last, scales used to assess knowledge and self-efficacy were not previously validated. However, in a separate article, we do provide some measures of reliability for these scales, based on our sample from the Greater Tunis area, and these proved to be acceptable (Spagnolo et al., 2018a).

5. Conclusion

This trial assessed the short- and long-term impact of an *mhGAP*-based training program offered to PCPs in the Greater Tunis area of Tunisia. Results show this training program's usefulness in increasing mental health knowledge, attitudes, and self-efficacy immediately after training. When comparing results pre- and 18 months post-training, these changes were maintained. In addition, 18 months post-training, PCPs reported a decrease in referrals to specialized services in comparison to pre-training. These results are promising for Tunisia, and, more generally, LMICs that are increasingly interested in developing non-specialists' competencies to address untreated

mental health symptoms. Given that this trial was a pilot, future studies should explore the relationship among mental health knowledge, attitudes, self-efficacy, and self-reported practice, to uncover the synergy among these outcomes immediately after training and 18 months post-training.

Abbreviations
mhGAP = Mental Health Gap Action Programme
IG = Intervention Guide
PCPs = primary care physicians
LMICs = low- and middle-income countries
MNS = mental, neurological, and substance use disorders
WHO = World Health Organization
EMR = Eastern Mediterranean Region
RCT = Randomized controlled trial
MICA = Mental Illness: clinicians' attitudes
MCAR = Missing completely at random
ANOVA = Analyses of variance
SD(s) = standard deviation(s)
Q1 = Quartile 1
Q2 = Quartile 2
Q3 = Quartile 3
CI = Confidence Interval

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Competing interests

Dr. Marc Laporta works for the *Montreal World Health Organization (WHO)-Pan American Health Organization (PAHO) Collaborating Center for Research and Training in Mental Health* (Douglas Mental Health University Institute). All other authors declare they have no competing interests.

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Additional File 1: Comparison of training effects between Group 1 and Group 2 (short-term impact)

PCPs' competencies (i.e., outcome variables)	Group 1 (intervention)		Group 2 (intervention)		Time		Group x time interaction	
	Pre	Post	Pre	Post	P value	Effect[a]	P value	Effect[a]
	Mean (SD), n	Mean (SD), n	Mean (SD), n	Mean (SD), n				
Knowledge	6.36 (1.28), 45	7.42 (1.24), 45	6.56 (1.32), 43	7.70 (1.36), 43	<0.001	0.411	0.745	0.001
Attitudes[b]	29.38 (6.56), 45	24.91 (6.45), 45	27.94 (6.94), 43	23.99 (6.52), 43	<0.001	0.326	0.687	0.002
Self-efficacy	5.25 (1.36), 45	7.17 (1.35), 45	5.05 (1.45), 43	7.18 (1.30), 43	<0.001	0.684	0.477	0.006
MH's importance in clinical practice[c]	0.94 (0.34), 44	0.92 (0.35), 44	1.05 (0.32), 41	1.01 (0.36), 41	0.373	0.010	0.736	0.001
PCPs' referral habits	59.27 (31.17), 37	44.92 (32.20), 37	53.76 (36.00), 38	32.76 (33.06), 38	<0.001	0.175	0.462	0.007

[a] Eta partial squared (η^2) is the effect size reported.
[b] Higher scores indicate more negative attitudes about mental illness and the field of mental health.
[c] Analyses and results are reported in log form.
Tests conducted: Mixed ANOVA (reporting means and standard deviations (SD)).

Additional file 2: Baseline sociodemographic and practice characteristics for completers (C) and non-completers (NC)

Socio-demographic characteristics	**Short-term**									**Long-term**		
	Group 1 (pre-post)			**Group 2 (control)**			**Group 2 (pre-post)**			**Groups 1 & 2**		
	C (n=45)	**NC (n=7)**	**p**	**C (n=47)**	**NC (n=13)**	**p**	**C (n=43)**	**NC (n=17)**	**p**	**C (n = 59)**	**NC (n = 53)**	**p**
Age (in years), median (Q1,Q3)	48.0 (45.0, 52.5)	50.0 (40.0, 52.0)	.401[a]	49.0 (46.0, 52.0)	52.0 (49.0, 56.0)	.047[c]	49.0 (46.0, 52.0)	51.0 (48.5, 55.5)	.060[c]	48.0 (45.0, 52.0)	51.0 (47.0, 53.5)	.033[a]
Sexe – n (%)												
Female	35 (77.78)	5 (71.43)	.656[b]	40 (85.11)	10 (76.92)	.675[b]	38 (88.37)	12 (70.59)	.128[b]	50 (84.75)	40 (75.47)	.242[b]
Male	10 (22.22)	2 (28.57)		7 (14.89)	3 (23.08)		5 (11.63)	5 (29.41)		9 (15.25)	13 (24.53)	
Country of birth – n (%)												
Tunisia	43 (95.56)	7 (100.00)	1.00[b]	47 (100)	12 (92.31)	.217[b]	43 (100)	16 (94.12)	.283[b]	58 (98.31)	51 (96.23)	.602[b]
Other[g]	2 (4.44)	0 (0.00)		0 (0)	1 (7.69)		0 (0)	1 (5.88)		1 (1.69)	2 (3.77)	
Mother tongue – n (%)												
Arabic	44 (97.78)	7 (100.00)	1.00[b]	47 (100)	13 (100)	-	43 (100)	17 (100)	-	59 (100)	52 (98.11)	.473[b]
Other[h]	1 (2.22)	0 (0.00)		0 (0)	0 (0)		0 (0)	0 (0)		0 (0)	1 (1.89)	
Medical school – n (%)												
Tunisia	40 (88.89)	7 (100.00)	1.00[b]	46 (97.87)	11 (84.62)	.115[b]	42 (97.67)	15 (88.24)	.191[b]	55 (93.22)	49 (92.45)	1.00[b]
Other[i]	5 (11.11)	0 (0.00)		1 (2.13)	2 (15.38)		1 (2.33)	2 (11.76)		4 (6.78)	4 (7.55)	
Practice characteristics	**Short-term**									**Long-term**		
	Group 1 (pre-post)			**Group 2 (control)**			**Group 2 (pre-post)**			**Groups 1 & 2**		
	C (n = 45)	**NC (n = 7)**	**p**	**C (n = 47)**	**NC (n =13)**	**p**	**C (n = 43)**	**NC (n = 17)**	**p**	**C (n = 59)**	**NC (n = 53)**	**p**
Governorate – n (%)												
Tunis	13 (28.89)	3 (42.86)	.187	22 (46.81)	5 (38.46)	.713	20 (46.51)	7 (53.85)	.519	22 (37.29)	21 (39.62)	.519
Manouba	9 (20.00)	0 (0.00)		8 (17.02)	4 (30.77)		7 (16.28)	5 (29.41)		10 (16.95)	11 (20.75)	
Ben Arous	12 (26.67)	4 (57.14)		3 (6.38)	1 (7.69)		2 (4.65)	2 (11.76)		9 (15.250	11 (20.75)	
Ariana	11 (24.44)	0 (0.00)		14 (29.79)	3 (23.08)		14 (32.56)	3 (17.65)		18 (30.51)	10 (18.87)	
Number of years working as PCP, median (Q1,Q3)	17.0 (14.0, 21.0)	17.0 (5.0, 21.0)	.307[a]	18.0 (15.0, 20.0)	22.0 (16.0, 27.0)	.026[a]	18.0 (14.0, 20.0)	18.0 (16.5, 27.0)	.007[a]	17.0 (14.0, 19.0)	19.0 (15.0, 25.0)	.027[a]
Hours work/week, median (Q1,Q3)	36.0[d] (30.0, 36.0)	36.0 (30.0, 36.0)	.626[a]	36.0 (36.0, 36.0)	36.0 (27.0, 36.0)	.506[c]	36.0 (27.0, 36.0)	36.0 (30.0, 36.0)	.394[c]	36.0[d] (35.8, 36.0)	36.0 (30.0, 36.0)	.258[c]
Mental health training in the last 12 months – n (%)												
Yes	7 (15.60)	2 (28.60)	.590[b]	5 (10.64)	0 (0)	.575[b]	5 (11.63)	0 (0)	.309[b]	8 (13.56)	6 (11.32)	.781[b]
No	38 (84.40)	5 (71.40)		42 (89.36)	13 (100)		38 (88.37)	17 (100)		51 (86.44)	47 (88.68)	
Average number of patient consultations/week, median (Q1,Q3)	150.0[d] (108.8, 180.0)	137.0 (120.0, 150.0)	.577[a]	125.0[d] (100.0, 180.0)	120.0 (92.5, 165.0)	.748[c]	120.0[d] (97.5, 172.5)	150.0 (103.5, 175.0)	.830[a]	140.0 (110.0, 170.0)	137.0[d] (100.0, 180.0)	.461[a]

Average number of consultations for mental health/week, median (Q1,Q3)	10.3[d] (5.3, 21.9)	15.0 (2.4, 30.0)	.738[c]	12.3[d] (3.5, 17.3)	15.0 (5.4, 46.8)	.459[c]	12.0[d] (3.2, 28.5)	15.0 (6.8, 29.6)	.291[c]	10.8[d] (5.0, 20.0)	15.0[d] (5.1, 25.1)	.255[c]
Average number of consultations for mental health/week, median (Q1,Q3)												
By appointment	1.0[e] (0.0, 4.4)	0.8[f] (0.0, 2.4)	.721[c]	0.3[e] (0.0, 2.6)	0.0 (0.0, 3.9)	.855[c]	0.2[e] (0.0, 2.3)	0.9 (0.0, 3.9)	.496[c]	0.1[f] (0.0, 2.0)	1.3[f] (0.0, 4.8)	.083[c]
Without appointment	8.0[e] (3.6, 16.1)	17.1[f] (7.6, 35.6)	.150[c]	10.4[e] (3.0, 16.2)	11.2 (4.2, 40.8)	.357[c]	9.9[e] (3.0, 17.0)	10.7 (4.2, 29.6)	.599[c]	9.0[f] (3.3, 17.1)	10.6f (3.5, 18.3)	.642[c]
Average number of hours dedicated to mental health care/ week, median (Q1,Q3)	3.60[f] (1.80, 5.25)	4.00[f] (3.70, 5.73)	.092[c]	3.6[d] (2.9, 7.2)	3.6[f] (0.7, 7.2)	.408[c]	3.6[d] (2.9, 7.2)	3.6[e] (0.7, 7.2)	.481[c]	3.6[f] (2.1, 5.9)	3.6[f] (2.0, 6.2)	.853[c]
% of mental health consultations per week according to diagnosis: Types of mental health consultation per week, median (Q1,Q3)												
Anxiety	40.0 (20.0, 60.0)[d]	70.0 (50.0, 80.0)	.057[a]	50.0 (30.0, 70.0)	55.0 (36.3,78.8)[e]	.172[a]	50.0 (30.0, 70.0)	50.0 (35.0, 73.8)[e]	.422[a]	40.0 (30.0, 60.0)[d]	55.0 (36.3, 78.8)[d]	.029[a]
Depression	30.0 (20.0, 40.0)[d]	20.0 (10.0, 50.0)	.600[c]	30.0 (20.0, 50.0)	22.5 (10.0, 63.8)[e]	.532[c]	30.0 (20.0, 50.0)	20.3 (10.0, 52.5)[e]	.407[a]	30.0 (20.0, 50.0)[d]	25.0 (20.0, 33.8)[d]	.037[c]
Alcohol use	5.0 (0.0, 10.0)[d]	2.0 (0.5, 9.0)	.603[c]	5.0 (0.0, 20.0)	1.5 (0.0, 4.5)[e]	.267[c]	3.0 (0.0, 20.0)	2.0 (0.0, 5.0)[e]	.400[c]	5.0 (0.0, 10.0)[d]	2.5 (0.0, 17.5)[d]	.922[c]
Drug use	2.0 (0.0, 10.0)[d]	1.0 (0.5, 5.0)	.681[c]	1.0 (0.0, 10.0)	0.8 (0.0, 3.0)[e]	.352[c]	1.0 (0.0, 10.0)	1.0 (0.0, 3.0)[e]	.440[c]	2.0 (0.0, 10.0)[d]	1.0 (0.0, 5.0)[d]	.761[c]
Psychosis	5.0 (1.0, 10.0)[d]	3.0 (0.5, 5.0)	.322[c]	1.0 (0.0, 5.0)	1.3 (0.0, 8.8)[e]	1.00[c]	1.0 (0.0, 5.0)	2.5 (0.0, 8.8)[e]	.675[c]	2.0 (0.0, 5.0)[d]	2.0 (0.5, 10.0)[d]	.291[c]
Suicide/self-harm	1.0 (0, 3.0)[d]	1.0 (0.0, 2.0)	.642[c]	1.0 (0.0, 5.0)	0.3 (0.0, 5.0)[e]	.637[c]	1.0 (0.0, 5.0)	0.8 (0.0, 5.0)[e]	.790[c]	1.0 (0.0, 4.5)[d]	1.0 (0.0, 5.0)[d]	.787[c]
% of mental health clientele: Median (Q1,Q3)												
Receiving support	50.0 (20.0, 82.5)[e]	60.0 (5.0, 80,0)	.729[a]	50.0 (10.0, 100.0)	65.0 (15.0, 100)[e]	.593[a]	50.0 (25.0, 100.0)	50.0 (4.8, 95.0)[e]	.720[a]	50.0 (20.0, 90.0)[f]	50.0 (12.5, 96.3)[d]	.937[a]
Receiving psychoed	45.0 (7.5, 80.0)[e]	60.0 (10.0, 95.0)	.627[a]	30.0 (0.0, 80.0)	1.0 (0.0, 57.5)[e]	.318[a]	40.0 (0.0, 80.0)	3.5 (0.0, 50.0)[e]	.102[a]	45.0 (0.75, 80.0)[d]	20.0 (0.0, 70.0)[d]	.459[a]
Receiving pharma	30.0 (2.0, 80.0)[d]	50.0 (40.0, 50.0)	.459[c]	20.0 (1.0, 70.0)	50.0 (6.3, 80.0)[e]	.320[a]	20.0 (1.0, 70.0)	40.0 (7.8, 80.0)[e]	.314[a]	20.0 (0.5, 50.0)[d]	50.0 (10.0, 80.0)[d]	.073[a]
Receiving psychoth	5.0 (0.0, 30.0)[e]	20.0 (5.0, 60.0)	.179[c]	0.0 (0.0, 20.0)	0.0 (0.0, 21.3)[e]	.471[c]	0.0 (0.0, 20.0)	0.0 (0.0, 21.3)[e]	.551[c]	0.5 (0.0, 20.0)[d]	5.0 (0.0, 30.0)[d]	.748[c]
Average number of follow-up visits / patients with mental health issues, median (Q1,Q3)	4.0[f] (4.0, 6.0)	4.0[g] (4.0, 7.0)	.914[c]	4.0[f] (4.0, 6.0)	6.0[g] (4.0, 12.0)	.097[c]	4.0[g] (4.0, 6.0)	5.5[g] (4.0, 12.0)	.102[c]	4.0 (4.0, 6.0)	4.0 (4.0, 6.50)	.904[c]

Mental health competencies	Short-term									Long-term		
	Group 1 (pre-post)			Group 2 (control)			Group 2 (pre-post)			Groups 1 & 2		
	C (n = 45)	NC (n = 7)	p	C (n = 47)	NC (n =13)	p	C (n = 43)	NC (n = 17)	p	C (n = 59)	NC (n = 53)	p
Importance of mental health practice[h]	2.9[d] (2.2, 3.9)	3.6 (3.2, 3.9)	.314[a]	3.2 (2.6, 3.9)	3.2 (2.1, 5.0)	.885[a]	3.2 (2.5, 3.9)	3.2 (2.1, 4.7)	.928[a]	3.2[d] (2.3, 3.9)	3.2 (2.4, 4.0)	.444[a]
Patients referred	60.0[f] (40.0, 80.0)	33.0 (20.0, 40.0)	.010[a]	50.0[d] (28.8, 80.0)	90.0[e] (42.5, 100.0)	.035[a]	50.0[d] (23.8, 80.0)	70.0[e] (40.0, 97.5)	.089[a]	60.0[e] (30.0, 82.5)	50.0[e] (30.0, 80.0)	.445[a]
Knowledge	6.3 (5.6, 7.5)	7.5 (6.9, 8.1)	.042[a]	6.9 (5.6, 8.1)	6.3 (4.4, 7.5)	.237[a]	6.9 (5.6, 8.1)	6.3 (5.0, 7.5)	.402[a]	6.3 (5.6, 7.5)	6.8 (5.6, 7.5)	.154[a]
Attitudes	29.0 (25.5, 32.5)	24.0 (22.0, 29.0)	.114[a]	27.0 (24.0, 33.0)	27.0 (24.0, 30.0)	.617[a]	28.0 (25.0, 34.0)	26.0 (24.0, 29.0)	.095[a]	29.0 (25.0, 34.0)	27.0 (24.0, 31.0)	.213[a]
Self-efficacy	5.4 (4.3, 6.2)	6.4 (5.2, 6.7)	.139[a]	4.9 (3.6, 6.2)	4.4 (3.6, 65.8)	.744[a]	4.9 (3.3, 6.2)	4.5 (4.0, 6.2)	.853[a]	4.9 (3.6, 6.1)	5.2 (4.3, 6.4)	.583[a]

[a] Independent Student t-test [b] Fisher's exact test [c] Mann Whitney U test [d] Missing <5% [e] Missing >5%, but less than 10% [f] Missing >10%, but less than 15% [g] Missing >15%
[h] Tests were conducted using the log form of this variable.

4.6. Article 5: Type III implementation analysis

"We find what we look for, and we look for what we know": Factors interacting with a mental health training program to influence its expected outcomes in Tunisia

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Abstract

Background

Primary care physicians (PCPs) working in mental health care in Tunisia often lack knowledge and skills needed to adequately address mental health-related issues. To address these lacunas, a training based on the *Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG)* was offered to PCPs working in the Greater Tunis area between February and April 2016. While the *mhGAP-IG* has been used extensively in low- and middle-income countries (LMICs) to help build non-specialists' mental health capacity, little research has focused on how contextual factors interact with the implemented training program to influence its expected outcomes. This paper's objective is to fill that lack.

Methods

We conducted a case study with a purposeful sample of 18 trained PCPs. Data was collected by semi-structured interviews between March and April 2016. Qualitative data was analyzed using thematic analysis.

Results

Participants identified more barriers than facilitators when describing contextual factors influencing the *mhGAP*-based training's expected outcomes. Barriers were regrouped into five categories: structural factors (e.g., policies, social context, local workforce development, and physical aspects of the environment), organizational factors (e.g., logistical issues for the provision of care and collaboration within and across healthcare organizations), provider factors (e.g., previous mental health experience and personal characteristics), patient factors (e.g., beliefs

about the health system and healthcare professionals, and motivation to seek care), and innovation factors (e.g., training characteristics). These contextual factors interacted with the implemented training to influence knowledge about pharmacological treatments and symptoms of mental illness, confidence in providing treatment, negative beliefs about certain mental health conditions, and the understanding of the role of PCPs in mental health care delivery. However, post-training, participants still felt uncomfortable with certain aspects of treatment and the management of some mental health conditions.

Conclusions

Findings highlight the complexity of implementing an *mhGAP*-based training given its interaction with contextual factors to influence the attainment of expected outcomes. Results may be used to tailor structural, organizational, provider, patient, and innovation factors prior to future implementations of the *mhGAP*-based training in Tunisia. Findings may also be used by decision-makers interested in implementing the *mhGAP-IG* training in other LMICs.

Keywords

Implementation; *mhGAP*; training; mental health, primary care; physicians; case study; Tunisia

Background

Authors have strongly advocated for further integrating mental health in primary care settings [1-5] to address the mental health treatment gap, which is especially alarming in low- and middle-income countries (LMICs) [3,6-9]. A plethora of factors cause this gap, including, but not limited to, insufficient and unevenly distributed mental health resources [10-14]. For example, out of the limited number of health workers with mental health competencies and skills, the majority work in high-income countries (HICs) [10,13,15,16], despite an estimated three-quarters of the global disease burden caused by such disorders affecting LMICs [17]. Untreated mental health issues are associated with increased mortality and disability rates, reducing the life expectancy of people living with serious mental disorders by up to 20 years on average [18-20].

A strategy encouraged by the *World Health Organization* (*WHO*) to tackle the limited number and unequal distribution of mental health workers is the use of non-specialists [21-22]. To prepare them for their role in mental health care, and to scale up such services, trainings based on the *Mental Health Gap Action Programme* (*mhGAP*) *Intervention Guide* (*IG*), which regroups evidence-based interventions for what the *WHO* considers priority conditions [23-25], have been encouraged. These priority conditions include depression, psychosis, bipolar disorder, epilepsy, developmental and behavioural disorders, dementia, alcohol and drug use disorders, and suicide/self-harm [23,25]. The *mhGAP-IG (version 1.0)* was first launched in 2010 [23], and has since been updated to *version 2.0* based on new evidence and extensive feedback from those who used the first version [25]. While the *mhGAP*-based training, in both of its versions, has been implemented in over a hundred countries [26,27], little research has focused on how factors within specific contexts interact with the implemented training program to influence its expected

outcomes [27,28-31]. Such findings highlight real-world challenges to the training's uptake and scale-up in specific resource-limited settings [32-34] and may encourage decision-makers to create a system facilitating non-specialists' involvement in mental health care [4,27,35-37].

We developed an exploratory trial [38-39] that seeks to contextualize, implement, and evaluate a mental health training program for primary care physicians (PCPs) in the Greater Tunis area of Tunisia based on the *mhGAP-IG (version 1.0)* [23] before country-wide implementation. The trial has two objectives. First, using a randomized controlled trial, we aimed to assess the potential value of capacity building by training PCPs working in primary care settings in the Greater Tunis area with a training based on the *mhGAP-IG (version 1.0)* [23]. We hypothesized the training would improve PCPs' mental health knowledge, attitudes, perceived self-efficacy, and self-reported practice. Results will be published in a separate paper. The second objective, the results of which are presented in this paper, was to identify contextual factors that interacted with the implemented training to influence its expected outcomes. This evaluation type is referred to as Type III implementation analysis [33,40], a current priority in global mental health [15].

To our knowledge, this is the first documentation of such factors after the implementation of a mental health training program in Tunisia. Our findings will help build research capacity in Tunisia [41] and in LMICs more generally [15,42]. Our findings will also add to the limited (but growing) peer-reviewed research on the *mhGAP-IG* training [27], all the while highlighting crucial information to prepare for the program's country-wide use in Tunisia [43].

Implementing a training based on the mhGAP-IG in Tunisia

Tunisia, a lower-middle income North African country [44], is among the many nations worldwide making mental health a priority [4,45], particularly because of the recorded rise of mental health problems, substance use disorders, and suicide rates since the 2010-2011 Revolution, which protested high levels of youth unemployment, political repression, and government corruption [41,46-52]. The development and adoption of the *2013 Tunisian National Strategy for the Promotion of Mental Health* aims to facilitate the transition from institutional to community-based mental health care. This transition strives to expand access to needed mental health services [41], notably through the revival of continuing mental health education programs [41,43]. While mental health training programs have been offered to PCPs in the past, these were implemented under the leadership of individual governorate directors, and not under a national program. Thus, training implementation was previously conducted non-systematically. In addition, these training programs were general and thematic lectures about mental health and illness, with limited interactive components and mental health resources for trainees.

A training based on an adapted version of the *mhGAP-IG (version 1.0)* [23] was implemented as a pilot initiative between February and April 2016. Collaborators include the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide* at the level of the Ministry of Health in Tunisia, the *School of Public Health* at the *Université de Montréal* (Québec, Canada), the *WHO* office in Tunisia, and the Montreal *WHO-Pan American Health Organization (PAHO) Collaborating Center for Research and Training in Mental Health* (Québec, Canada). The training's goal was to increase PCPs' mental health competencies and skills [41,53,54], thus further encouraging mental health's integration in

primary settings, increasing access to effective services, and creating proximity mental health services [41,43,55].

Training details have been described elsewhere [56]. In brief, *mhGAP-IG (version 1.0)* modules [23] were selected by members of the Tunisian Ministry of Health and adapted to meet the primary care realities of the Greater Tunis area. Training included modules on depression, psychosis, self-harm/suicide, and alcohol/drug use disorders, chosen to meet the country's pressing mental health needs. First, data suggests that consultations specifically for anxiety and depression have increased after the Tunisian Revolution [41,46,47]. Second, records show that the number of deaths by suicide rose approximately two times and self-immolation, three times during the four years following the Revolution [50,51]. Third, rates of substance use (specifically of opioids, cannabis, ecstasy, and alcohol) and substance use disorders have reportedly increased, especially among those under 35 years of age [41,48]. Last, in Tunisia, it is reported that annual mortality rates associated with schizophrenia have increased given its link with deaths by suicide [52]. A general introduction to the *mhGAP*, the *IG*, and the module "*General Principles of Care*" were also included in the training. Training sessions were facilitated by Tunisian psychiatrists and supported by PCPs working to promote continuing mental health training in the Greater Tunis area (i.e., tutors), all trained in the proper use of the *mhGAP-IG*. Training sessions, offered once a week for five weeks, included general lectures, role plays, and group discussions. These were followed by a support session where trainer-psychiatrists facilitated clinical case discussions and role plays. In total, the training program lasted six weeks.

Objective of the paper

With the present paper, we aim to identify contextual factors that interacted with the implemented mental health training program based on the *mhGAP-IG (version 1.0)* to influence its expected outcomes in the Greater Tunis area of Tunisia.

Methods

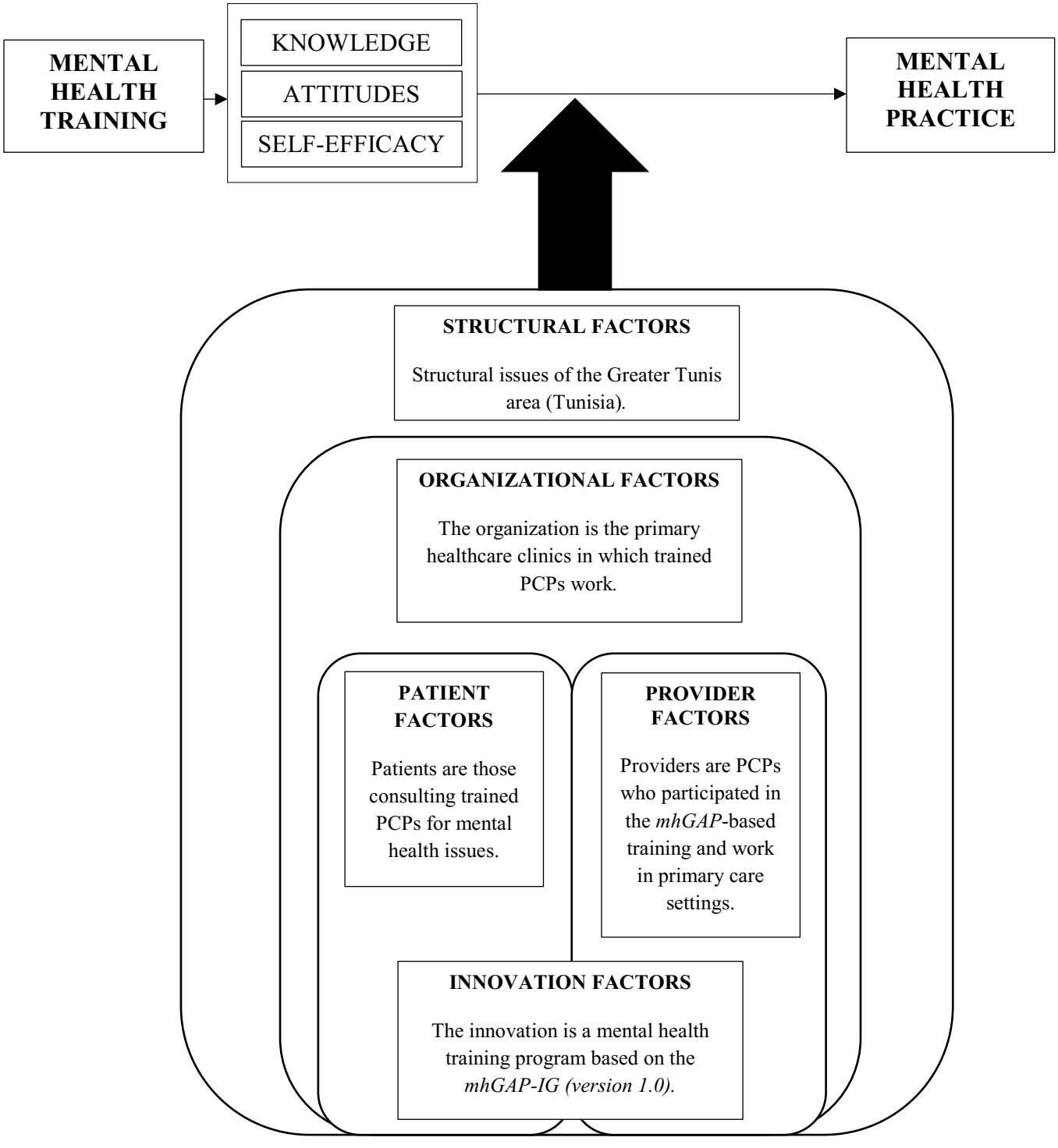
Conceptual framework

We chose Chaudoir and colleagues' (2013) framework [57] to guide this paper because it builds upon two pre-existing and widely used frameworks [32,58] by adding patient factors to their unifying four-factor constructs. Exploring patient factors is particularly important to our paper, since mental illness's stigma may prevent patients from seeking professional help, which has been shown to perpetuate the mental health treatment gap [37,59].

Chaudoir and colleagues' (2013) framework [57] consists of the following categories: 1) structural factors (i.e., the outer setting comprising the broader sociocultural context or community); 2) organizational factors (i.e., characteristics of the organization where providers use the intervention); 3) provider factors (i.e., characteristics of those implementing the intervention); 4) innovation factors (i.e., characteristics of the implemented intervention); and 5) patient factors (i.e., characteristics of those receiving the intervention from providers).

Figure 1 illustrates our multi-factor framework. For this paper's purposes, it was used to develop interview questions, as well as to analyze and sort data.

Figure 1:
Multi-factor framework highlighting contextual factors interacting with the training program to influence its expected outcomes



Study design

We conducted a *case design with three embedded levels of analysis* [60,61], the case being the organization of a mental health training program based on the *mhGAP-IG*, offered to PCPs working in the Greater Tunis area. Three factors influenced this design. Firstly, the case study method is suggested when conducting Type III implementation analysis [33]. Secondly, the *single case design* was chosen because our case is a *common case* [60]. More specifically, the Greater Tunis area is often where interventions are piloted, given the setting's diversity (i.e., urban, rural, semi-urban, and semi-rural), which is representative of other areas of Tunisia. Therefore, lessons learned from the in-depth exploration of factors perceived to interact with the implemented training to prevent the attainment of its expected outcomes may help shed light on such factors in other areas of Tunisia [60,62]. Lastly, the case study has *embedded levels of analysis* [60] because our aim was to identify contextual factors interacting with the implemented training to influence its expected outcomes according to a multi-factor framework [57]. While Chaudoir and colleagues (2013) [57] identify five levels in their framework, these may be regrouped into three levels of explanation [60]: structural (i.e., the health system in the Greater Tunis area), organizational (i.e., primary healthcare clinics' organizational context), and individual (i.e., provider, patient, and innovation factors).

Study settings and participants

We conducted the exploratory trial in the four governorates of the Greater Tunis area: Ariana, Tunis, Ben Arous, and Manouba. Sampling for the larger trial in which this paper is inscribed has been described in detail elsewhere [54]. In brief, a total of 112 PCPs were randomized to either Group 1 or Group 2. Both groups received the training, but at different times. Specifically, Group

1 received the training between February and March 2016, whereas Group 2 received the training between March and April 2016. Forty-five PCPs in Group 1 completed the training program. To recruit participants for this paper, the first author contacted by telephone the 45 PCPs who had completed the first round of training offered in February-March 2016. Since these PCPs already met eligibility criteria for the exploratory trial [54] and had an in-depth understanding of the *mhGAP*-based training, the sampling method was purposeful [61]. Of the 45 PCPs contacted, 27 agreed to be interviewed. Nine PCPs decided not to participate in the interviews after initial agreement, given other commitments, which resulted in interviews with 18 participants.

Questionnaires designed for the exploratory trial were administered prior to randomizing participants to either Group 1 or Group 2. Therefore, we had the socio-demographic and practice characteristics of the 18 PCPs who agreed to participate in the interviews. This descriptive data is presented in Table 1.

Table 1: Characteristics of the PCPs in the study prior to the implementation of the training (n=18)

Characteristics	**Continuous variables**	**Categorical variables**
Socio-demographic characteristics	**M (SD)** **(Q1, Q2, Q3)**	**n (%)**
Age (in years)	47.8 (4.2) (44.8, 48.0, 52.3)	-
Women	-	16 (88.9)
Born in Tunisia	-	18 (100)
Mother tongue, Arabic	-	18 (100)
Medical school in Tunisia	-	16 (88.9)
Practice characteristics	**M (SD)** **(Q1, Q2, Q3)**	**n (%)**
Governorate		
Ariana	-	6 (33.3)
Tunis	-	5 (27.8)
Ben Arous	-	4 (22.2)
Manouba	-	3 (16.7)
Mental health training in the last twelve months (yes)	-	4 (22.2)
Average number of years working as a PCP	18.2 (5.3) (12.8, 18.0, 21.5)	-
Hours work / week [a]	35.5 (3.2) (36.0, 36.0, 36.0)	-
Average number of patient consultations / week	138.1 (45.1) (100.0, 120.0, 180.0)	-
Average number of consultations for mental health / week	17.0 (12.7) (8.3, 15.3, 21.9)	-
Average number of consultations for mental health / week [a]	2.4 (3.9)	-
By appointment	(0.0, 1.0, 2.6)	
Without appointment	14.5 (13.3) (6.2, 12.5, 18.6)	
Average number of hours dedicated to mental health care / week [a]	4.2 (2.5) (2.3, 3.6, 6.2)	-
% of mental health consultations per week according to diagnosis:		
Types of mental health consultation per week:		
Anxiety	53.0 (28.3) (30.0, 50.0, 82.5)	-
Depression	33.7 (23.1) (22.3, 30.0, 42.5)	-
Alcohol use disorders	6.2 (7.6) (0.0, 5.0, 10.0)	-
Psychosis (including schizophrenia)	5.2 (5.8) (0.8, 2.5, 10.0)	-
Drug use disorders	3.9 (4.1) (0.0, 2.5, 8.5)	-
Self-harm/ suicide	1.8 (2.2) (0.0, 1.0, 2.3)	-
% of mental health clientele		
Referred to specialized care [a]	59.6 (32.0) (50.0, 60.0, 85.0)	-
Receiving support (ex.: active listening)	50.7 (33.9)	-

	(30.3, 50.0, 80.0)	
Receiving psychoeducation	43.6 (35.1)	-
	(7.5, 50.0, 80.0)	
Receiving pharmacology	42.7 (37.6)	-
	(1.8, 40.0, 82.5)	
Receiving psychotherapy	10.6 (18.3)	-
	(0.0, 0.0, 15.0)	
Average number of follow-up visit / patient with mental health issues	4.7 (2.2)	-
	(3.0, 4.0, 5.3)	

[a] Missing values were greater than 5% but less than 10%.

Data collection

For this paper, data was collected in March and April 2016 by semi-structured individual and group interviews. Four were group interviews, with PCPs from the governorate of Ariana (n=6), Manouba (n=2), Ben Arous (n=4), and Tunis (n=3).[a] Three PCPs participated in individual interviews because they could not attend the scheduled group interviews. These included one PCP from Manouba, and two PCPs from Tunis. Group interviews lasted between 70 and 90 minutes and individual interviews between 50 and 70 minutes. All interviews were conducted in French by the first author. In Tunisia, French is the language in which medical school is taught, and all medical staff is fluent.

An interview guide with open-ended questions based on the framework developed by Chaudoir and colleagues (2013) [57] was developed by the first author and her doctoral supervisors (FC and NL) (see "Additional file 1"). Questions match Chaudoir and colleagues' [57] five categories and cover: 1) structural issues affecting mental health care by PCPs in the Greater Tunis area, such as mental health policies, social context, local workforce, and aspects of the physical environment; 2) organizational factors affecting the ways in which mental health care is delivered by PCPs and supported within primary healthcare clinics; 3) provider factors, such as specific characteristics that might influence PCPs' use of the mental health training and

involvement in the field of mental health; 4) innovation factors, such as PCPs' perceptions of the training (i.e., its compatibility with primary care context and its quality); and 5) patient factors, such as patients' characteristics that might influence health-related beliefs. Individual and group interviews were audio recorded and transcribed verbatim.

Data analysis

Qualitative data analyses were conducted using deductive and inductive approaches [61] and necessitated multiple steps. First, the interview guide developed from Chaudoir and colleagues' (2013) categorical framework [57] served as a "template" for coding [61,63,64] and was used to develop a preliminary code book before the coding process began [61,64,65]. Second, all transcripts were checked and read thoroughly by the first author before coding, which allowed for a general understanding of the data. Third, four initial transcripts were coded by the first author using the preliminary code book. During this phase, new codes that emerged were added to the code book [65]. Fourth, the first author proceeded to regroup codes into sub-themes and themes, which were compared to Chaudoir and colleagues' (2013) categories [57]. Codes that did not fit into Chaudoir and colleagues' (2013) framework [57] include PCPs' descriptions of the training's impact on their competencies and practice, as well as suggested recommendations to improve the training program and mental health care delivery in the Greater Tunis area. PCPs' competencies and skills were regrouped into "positive" or "negative" effects, and codes associated with these effects were counted [65]. Sub-themes regrouped into Chaudoir and colleagues' (2013) framework [57] were divided into two categories: facilitators and barriers. Codes associated with "facilitators" and "barriers" were counted [65]. Fifth, the first author presented the preliminary code book and regrouped codes with accompanying illustrative examples and citations to her

doctoral supervisors for approval. During this phase, codes, sub-themes, and themes were discussed. New codes, sub-themes, and themes were generated, specifically related to providers' descriptions of the training's impact on their competencies and skills, and provider factors inscribed within Chaudoir and colleagues' (2013) framework [57]. Once agreement on codes, sub-themes, and themes was obtained between the first author and her doctoral supervisors, the first author coded the remaining transcripts. An overview of the codes (and their categorization into positive/negative effects or facilitators/barriers, where applicable), sub-themes, and themes included in the final code book is presented in "Additional file 2."

Socio-demographic and practice characteristics of the 18 participating PCPs were analyzed using SPSS version 25.0 [66], and descriptive statistics were reported. Group frequencies and percentages were reported for categorical variables. Means, standard deviations (SD), as well as quartiles 1 (Q1), 2 (Q2 – the median), and 3 (Q3) were reported for continuous variables.

Scientific rigor

Validity checks are recommended when conducting qualitative research [65]. We employed member-checking, multiple data examiners, and triangulation of multiple data sources [61,65]. Member-checking entails taking a findings summary back to the participants who provided the original data and asking them if the data reflects their reality [65]. The first author, her doctoral supervisors, the *WHO* office in Tunisia, and the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide* organized a dissemination session in Tunis on 22 September 2017, where preliminary research findings from the exploratory trial were

shared, including preliminary codes, sub-themes, themes, and supporting examples. The Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide* invited all 112 PCPs of the larger trial (which included PCPs who participated in individual or group interviews for this paper), trainer-psychiatrists, PCPs responsible for continuing medical education in the Greater Tunis area, and governorate directors. In total, 61 participants were present at the dissemination session, including the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide*. This session helped validate preliminary findings and generate discussions around their key themes, which in turn became the basis for recommendations on ways to ensure effective mental health care delivery in primary care settings. These recommendations, drafted in collaboration with the different stakeholder groups present at the session, were the basis of a report written by the first author and validated by the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide* before being sent to all session attendees.

A second validity strategy employed was the inclusion of multiple data examiners. The preliminary code book developed by the first author was presented to her two doctoral supervisors for feedback. The supervisors provided feedback on the codes, sub-themes, themes, and data associated with the four initial transcripts coded [65]. This process ensured accuracy of data analysis and data reporting.

The last validity strategy employed was the triangulation of multiple data sources, which took two different forms in the trial. First, by interviewing PCPs from different governorates of the Greater Tunis area of Tunisia and with diverse experiences in mental health, we were able to

check for the consistency of what was shared about the same issue [61]. Second, Patton (2015) [61] suggests no single method is ever adequate to reveal a research problem's different facets. Therefore, the qualitative findings presented in this paper will be used to complement results of the randomized controlled trial. This complementarity enabled us to generate findings contributing to our overall understanding of an *mhGAP*-based training's impact on its expected outcomes [61].

Results

Results are presented in three parts. The first part describes participants' perceptions of the training's impact on their competencies and practice (i.e., expected outcomes). Codes are regrouped into two main categories: positive effects (15 codes) and negative effects (5 codes). The second part highlights contextual factors interacting with the implemented training to influence its expected outcomes. Codes are regrouped under five factors [57], which are divided into key themes and sub-themes. Codes are then regrouped into two main categories: barriers (37 codes) and facilitators (31 codes). The third part explores participants' recommendations to address these barriers, specifically by improving the training program and the ways PCPs deliver mental health care in the Greater Tunis area.

Part 1: PCPs' perceptions of the training's impact on their competencies and practice

After participation in the training, PCPs shared the program's mostly positive effects on their competencies and practice. Most PCPs appreciated their increased familiarity with pharmacological treatments. After the training, they were better able to decide whether to prescribe medication to patients presenting with mental health issues and to identify which

medications should be prescribed. For example, the training taught them that antidepressants may be considered for moderate-severe depression, but less so for minor depression. This new knowledge increased PCPs' confidence to prescribe, change patients' medications, or renew existing prescriptions. Post-training, PCPs felt more knowledgeable about symptoms related to mental illness, which increased their confidence in treating patients. For example, new knowledge among trainees commonly included being able to ask patients about suicidal thoughts without worrying they might increase their suicide risk.

Most PCPs mentioned improvements in attitudes towards mental health and illness. According to them, the training helped demystify certain beliefs about mental health issues and mental health care in non-specialized settings. For example, after the training, most PCPs acknowledged substance use disorders as illnesses, not moral, personal faults. This change in perception allowed PCPs to understand that many people living with substance use disorders suffer in silence and it encouraged them to view people presenting with such disorders in the way they would patients consulting for physical conditions. In addition, after training, most PCPs understood that not all mental health issues require specialized care:

> *"Before I thought all these [mental health] pathologies should be referred to psychiatrists, psychologists, child psychiatrists, or others. The training helped me demystify things and made me take care of those patients." (Interview 2, participant 5)*

With this new understanding, PCPs' interest and investment in mental health increased. Hence, post-training, they wanted to allocate additional time to people consulting for mental health issues and ensure adequate follow-up. For example, since many patients with mental health issues come to the clinic solely to pick up medication every 15 days, PCPs would make it a point to check in with them.

Post-training, PCPs shared that they more comfortably engaged with patients to obtain information that could help them pose a mental health diagnosis. Specifically, most PCPs learned how to guide their interrogation (for example, by asking "good" questions suggested during the training) when mental health problems were suspected among patients. Knowing how to detect symptoms related to mental illness and to ask these "good" questions encouraged PCPs to be more aware of mental health conditions in practice, regardless of patients' consultation motives:

> *"The pathology of mental illness is frequent [in our area]. But, we find what we look for, and we look for what we know […] now we uncover a lot more, especially cases of depression." (Interview 5, participant 13).*

Post-training, PCPs learned how to expand their treatment repertoire beyond pharmacology. PCPs were more inclined to consider psychosocial interventions. Greater confidence in prescribing medications and engaging in psychosocial interventions has, according to PCPs, increased the number of patients they treat for mental health issues weekly. In addition, they are more inclined to ensure greater continuity of care:

"For all patients with schizophrenia, I informed the nurses to remind me to see them at least every three months. It is necessary to keep a contact between the patient and the doctor." (Interview 3, participant 7)

Not all PCPs thought the training improved their mental health competencies and skills. While most PCPs did acknowledge an increase in their knowledge about medication, some said they were still unfamiliar with certain aspects of pharmacology. Despite training, PCPs still did not possess enough knowledge about medications' side effects, interactions among molecules, or suggested treatment length, often preventing PCPs from having the courage to prescribe certain medication types (ex.: neuroleptics and antipsychotics). Some PCPs also shared that while the training helped demystify the field of mental health, they still feared treating schizophrenia, psychosis, and substance use disorders given perceived limited capabilities. While they can recognize these disorders in practice, they still believe these illnesses always necessitate treatment and follow-up in specialized care.

Part 2: Exploring contextual factors that influenced the implemented training's expected outcomes

Results show that contextual factors interacted with the implemented training to influence its expected outcomes illustrated in Part 1. The subsequent sections present these contextual factors, organized according to Chaudoir and colleagues' framework (2013) [57], and how they facilitated or challenged PCPs' competencies and skills (also presented in Table 2).

Table 2: Barriers and facilitators influencing the implemented training's expected outcomes

Dimension	*Barriers*	*Facilitators*
Structural factors	PCPs cannot prescribe certain molecules. Substance use disorders are often managed judicially. PCPs feel that physical health is valued more than mental health. Mental health statistics are not taken seriously. PCPs still use "ancient" mental health tools in practice. Substance use disorders are stigmatized in Tunisia. Mental health care within institutions is stigmatized. There is a lack of continuity in mental health trainings. There is a lack of obligatory mental health internships after medical school to further develop professional practice. If there are mental health trainings, not all PCPs can attend. There is only one mental health hospital in the country, and it is not accessible to all.	Laws and restrictions are changing to reflect current trends in mental health. There is increased attention put on mental health statistics. Mental health is recognized in the country through the development of the national programme for mental health promotion. Strategies are used to increase awareness of mental health conditions. There is less stigma towards certain types of mental disorders since the Revolution. The Ministry adopted a new medical curriculum, encouraging increased teachings and internships in mental health for future family physicians.
Total	**11 barriers**	**6 facilitators**
Organizational factors	Trained PCPs are not always at the same primary healthcare clinic, affecting continuity in care. There is a lack of medication in primary healthcare clinics. If medication is available, it is easily stolen. If medication is available, it is not evenly distributed. If medication is available, it runs out quickly. There is a lack of time to provide adequate mental health care. There is a high turnover of employees within primary healthcare organizations. PCPs expressed difficulties working with other health care professionals in the primary healthcare clinic. Primary healthcare clinics do not encourage staff meetings. Collaborations with the mental health hospital is difficult.	Medication is available within primary healthcare clinics. PCPs engage in case discussions with colleagues about mental health. Collaborations with PCPs responsible for continuing medical education helps with mental health care. There are opportunities for collaborations with other healthcare professionals.
Total	**10 barriers**	**4 facilitators**
Provider factors	PCPs do not have previous mental health training.	PCPs have participated in mental health trainings.

	PCPs do not like treating certain types of mental illnesses. PCPs do not get involved with pharmacological treatment. PCPs are not interested in mental health.	PCPs participated in a mental health internship during medical school. Many years of field experience have equipped PCPs with confidence in their general clinical skills. PCPs are personally motivated to provide mental health care. PCPs have personal preferences for certain types of illnesses. PCPs participate in mental health training during their own time (outside of office hours).
Total	**4 barriers**	**6 facilitators**
Patient factors	Patients think that receiving care in primary healthcare clinics is sub-par to receiving care by a specialist. Patients are treated differently once "society" knows they live with mental health issues. Patients do not seek care because they are afraid of legal issues. Patients do not seek care because they do not want to be noticed by community members. In consultation, patients are interrupted by other patients. Patients are not aware that mental health services are available at primary healthcare clinics. Patients do not know that mental health services are confidential.	Patients prefer seeking and receiving care at the primary healthcare clinic because it is less stigmatizing than the mental health hospital. Patients like receiving care at the primary healthcare clinic because they may go unnoticed. Patients like receiving care at the primary healthcare clinic because it is offered quickly. Patients think that the mental health hospital is very stigmatizing. Patients think that the mental health hospital is too far. Patients think that receiving services at the mental health hospital takes too long. Patients are more open about their own mental health. Patients will seek care at the primary healthcare clinic between appointments with psychiatrists.
Total	**7 barriers**	**8 facilitators**
Innovation factors	Modules chosen do not correspond to the clientele seen by PCPs. PCPs did not like all the theory provided during the training. PCPs did not like that they were not able to learn about all the modules included in the guide. PCPs did not like role plays. PCPs found there was not enough time for all the content provided.	Modules chosen correspond to the reality seen by PCPs. Modules chosen correspond to the reality of the Greater Tunis area. PCPs appreciated the clinical discussions during the training as they helped orient practice. PCPs liked the role plays because they helped learning. PCPs liked that they could learn from their peers. PCPs enjoyed the videos shown during the training. PCPs liked the training guide.
Total	**5 barriers**	**7 facilitators**
TOTAL	**37 barriers**	**31 facilitators**

1. Structural factors

PCPs highlighted more barriers (11 codes) than facilitators (6 codes) when describing broader context or community factors interacting with the implemented training to influence its expected outcomes.

1a) Public policies

PCPs explained that restrictions challenge their involvement in pharmacological treatment, especially when prescribing *Haloperidol (e.g., Haldol)* and *Lorazepam (e.g., Temesta)*, two listed medications in the *mhGAP-IG (version 1.0).* Thus, while these medications are available in Tunisia, these restrictions make PCPs believe that only psychiatrists can prescribe them.[b] In addition, PCPs stated that substance use disorders are often criminalized. For example, there are criminal sanctions for minor drug consumption and possession for personal use. These judicial implications, according to participants, restrict their involvement in care because they fear legal repercussions for their patients. However, PCPs were optimistic about certain changes in legislation. Revisions to the drug law's current draft legislation would introduce a more human rights-based approach, such as the abolition of prison time for first-time offenders, which would encourage participants to treat people with substance use disorders.

1b) Social context

According to PCPs, the most stigmatized mental health conditions in Tunisia are substance use disorders, especially given the criminality (by law) associated with consumption and possession. However, PCPs mentioned that since the 2010-2011 Revolution, there has been a slow but steady shift in the community perception of people with substance use disorders:

"'Consumption' means that the person cannot control himself anymore. That's it, so we must consider him as a sick person and not as a social offender." (Interview 5, participant 12)

This perceptual change was instigated, according to PCPs, by increased drug circulation and consumption since the Revolution. PCPs mentioned that they also noticed anxiety and depressive disorders being less "taboo" in their practice than before the Revolution, since they are more common. This allows PCPs to "practice" what they learned during training.

Increased community awareness about mental illness, according to PCPs, is due to the Ministry's prioritization of community-based mental health care. For example, the Ministry has recognized the need to decentralize mental health services by developing a *Committee for Mental Health Promotion* through which a mental health strategy was disseminated. Multiple initiatives have been undertaken to meet objectives listed in the strategy. First, PCPs mentioned that they noticed an increase in ways to help address negative attitudes towards mental illness:

"I've noticed more television shows in the evening that invite many psychiatrists to talk about the recognition of cases of depression in Tunisia." (Interview 7, participant 15)

Secondly, the Ministry has been recently encouraging PCPs to record mental health statistics per primary healthcare clinic. Simply keeping statistics has increased participants' awareness of mental illness in their practice. Lastly, PCPs believe the Ministry's tactic to promote community-

based mental health services is a way to counter the stigma of receiving care at the only operating mental health hospital in the country, *Razi Hospital*. Patients associate the hospital with alienation and a "place for the mad."

While PCPs acknowledge decision-makers have a new interest in promoting mental health, challenges are still apparent. For example, PCPs are convinced that, compared to physical illness, mental illness is "forsaken":

> *"For hypertension and diabetes, there is an entire organization that deals with them. Statistics, drugs, care in general, people responsible for them are very thorough for these problems, which are international public health problems. But, for mental health […] mental health is not as well supported in the end." (Interview 1, participant 1)*

Given this favoritism, PCPs noticed that decision-makers and clinic administrators are less concerned with "precise" mental health statistics than statistics for physical illnesses. In addition, the government documents on mental health and illness that PCPs consult are often outdated; they are rarely as frequently updated or distributed as those for physical illnesses.

1c) Local workforce

PCPs shared current activities organized to develop the local workforce's mental health capacities. First, given PCPs' strategic position in the community and healthcare system, in 2011, the Ministry revamped the medical curriculum for future family physicians. It now includes additional

mental health courses and a mandatory two-month internship in post-graduate medical curricula for family physicians, previously optional. Therefore, under this medical education reform, all newly trained family physicians will be equipped with increased mental health care abilities.[c] While participants shared approval for these much-needed additions to the medical school curriculum, they worried those untouched by the new mental health curriculum would be forgotten. Participants were quick to share their concern that the *mhGAP-IG* training would not be used to help fill gaps in competencies among newly graduated physicians and those untrained by the new curriculum. This apprehension emerged because continuity in mental health trainings rarely occurs:

> *"Every time we do a mental health training program in Tunisia, a program where everybody is trying hard, everyone wants to be in this program, and after two or three months, four months, five months, there is no follow-up, no continuity, none." (Interview 3, participant 9)*

Participants stated that if these mental health trainings based on the *mhGAP-IG* were to continue, not all PCPs could attend, preventing desired results from the intervention. They explained that in areas where physicians are scarce, not all can be excused from clinical duties to attend the training. This creates inconsistencies in mental health competency levels within and across regions. In addition, participants would have liked a mental health internship to complement the *mhGAP-IG* training. They believed this lacuna would also cause inconsistencies in mental health care, this time among current PCPs and recent medical school graduates under the new curriculum.

1d) Aspects of the physical environment

PCPs shared that patients are inevitably referred to *Razi Hospital* given: 1) restrictions in place preventing physicians from prescribing certain medications listed in the *mhGAP-IG*; and 2) their perceived limited capabilities in addressing certain mental health conditions. Patients, however, are quick to refuse referrals to *Razi Hospital*, since it is far for most of them, public transportation to the hospital is limited, and taxi costs are high. In addition, consultation at *Razi* often requires long hours. A PCP explained that people living with psychosis are commonly required to travel up to four hours to and from *Razi* and wait up to two hours to see the psychiatrist. These barriers often instigate missed appointments, relapse, or, for patients who, on the rare occasion, may have the financial means, a push towards the private sector. Given prescription restrictions and their uneasiness with certain treatments even after training, PCPs feel like they cannot accommodate patients who miss appointments with their treating psychiatrists.

2. Organizational factors

PCPs highlighted more barriers (10 codes) than facilitators (4 codes) when describing organizational factors interacting with the implemented training to influence its expected outcomes.

2a) Logistical issues

PCPs shared contrasting views on medication within their respective healthcare organizations. Some were satisfied with the types and amounts of medication available, but most mentioned they found it difficult to use the implemented *mhGAP*-based training, since no treatments beyond antidepressants were available. Participants added that if medications were available in primary

healthcare clinics, they would often run out within days, which forces a "first come, first serve" philosophy. Given this philosophy and most patients' inability to pay out-of-pocket for medication via the private sector, PCPs often noticed some patients remaining without medication for days. In addition, participants mentioned that if psychotropics were available in certain clinics, they could become targets of theft, given the drugs' high street value since the 2010-2011 Revolution, and an increase in dependency related to their use.[d] According to PCPs, theft poses severe security issues toward themselves, other healthcare personnel, and consulting patients.

Participants shared that even though they might have the will, knowledge, skills, and access to medication to address mental illness in practice, they cannot find the time to do so. Given their restricted work schedule (i.e., 8h-14h, Monday to Saturday) and the high patient volume (i.e., often over 25 patients per day), they feel as though they cannot adequately engage with people consulting for mental health issues. This affects their ability to offer adequate support.

PCPs shared two additional logistical barriers influencing the implemented training's expected outcomes. First, participants working in peripheral regions of the Greater Tunis area said they often rotate primary healthcare clinics, which affects continuity in care. Patients who consult for mental health-related issues and return for further consultation might not be able to see the same doctor, making therapeutic alliance more difficult. Second, many participants worry about the high PCP turnover in primary healthcare clinics. As PCPs mentioned, more experienced PCPs usually practice in the Greater Tunis area, since younger doctors are solicited in Tunisia's remote regions. Therefore, clinics in the Greater Tunis area often experience a high turnover of physicians; many leave for retirement or are solicited into administrative positions, which require

quick replacement. High turnover affects the sustainability of mental health knowledge acquired through training within respective clinics.

2b) Organizational culture: intra- and inter-collaboration

The *mhGAP-IG* training encourages collaboration with various healthcare professionals for cases requiring more expertise, or when specific issues challenge trainees. The training suggests specialists (i.e., psychiatrists, in the case of the Greater Tunis area) should be the "go to" for support. However, participants noted that since referral is done by letter, collaborations are difficult with the mental health hospital, where most psychiatrists work. To compensate for this barrier, participants said that within each governorate, physicians with more mental health knowledge and skills than the average PCP are available. Contacting these physicians is faster and easier than attempting to engage with specialists. Participants could rely on them during and after training if treatment questions arose. In addition, some PCPs mentioned they were fortunate to work near the few psychologists and social workers in the area. They would contact them if physicians with more mental health knowledge and skills were unavailable.

Participants recognized the importance of working with colleagues within their respective healthcare organizations to reinforce their knowledge and skills. While some PCPs stated they engage in monthly staff meetings where they discuss challenging mental health cases, most did not have this "luxury." In addition, because the training was solely offered to PCPs, they often felt unsupported by other healthcare professionals at the primary healthcare clinic (i.e., nurses and paramedics), given their limited knowledge about the topic. For example, many participants mentioned nurses commonly questioned PCPs' authority to provide mental health treatment or

heard untrained medical staff using inappropriate, stigmatizing terms to refer to mental health patients. Thus, making mental health a priority within the primary healthcare organization was difficult post-training, given other healthcare professionals' limited support and understanding.

3. Provider factors

PCPs highlighted more facilitators (6 codes) than barriers (4 codes) when describing provider factors interacting with the implemented training to influence its expected outcomes.

3a) Providers' previous medical experience

While most PCPs said the *mhGAP*-based training was the first they had ever attended, some did acknowledge previous participation in mental health training sessions dating back to the mid-2000s. Some trainings were provided by pharmaceutical representatives, who are well-versed on drugs to treat mental health problems, others were organized by representatives of governorates, consisting of theoretical sessions on bipolar disorder, depression, psychosis, schizophrenia, and treatment for substance use disorders. Few PCPs shared that they had chosen mental health internships during medical school. Regardless of participants' previous experience, they all recognized the need to learn and/or refine mental health skills through the *mhGAP*-based training.

Interestingly, participants shared one commonality: certainty that their seniority as a PCP equipped them with superior general clinical abilities. Therefore, regardless of having participated in previous mental health training sessions or internships, PCPs felt pride in their ability to develop rapport with patients and engage in active listening, skills they thought helped them better assimilate general principles of care for people living with mental health problems:

"Consultation with chronic patients is an individualized practice. So, the attending physician is the doctor in which the patient confides, even independently of mental health problems. In mental health, there is the same listening. That is, we have practiced it in other areas, other than mental health." (Interview 8, participant 16)

3b) Providers' personal characteristics

According to participants, personal interest led to their participation in the *mhGAP*-based training. This is alluded to in how the training was provided on a voluntary basis outside of office hours. Most PCPs said they attended the training because they had developed personal preferences for certain types of mental health conditions (i.e., depression) and they knew the training would highlight them.

It is also important to note, however, that even though interviewees participated in the *mhGAP*-based training, some of their views may have challenged the implemented program's expected outcomes. Firstly, some PCPs were still not enthralled by mental health care after training but forced themselves to engage with people presenting with mental health conditions given their rise in frequency. Hence, practicing mental health was an effort for them, some even calling it "unpleasant." Secondly, PCPs mentioned that despite the training, they did not feel comfortable treating certain types of mental health conditions and never would. These include psychosis and substance use disorders. Lastly, some PCPs did not understand their role in prescribing medication to treat mental illness. They believed it was beyond their capacities, even with training, and therefore they have no interest in this form of treatment.

4. Patient factors

PCPs highlighted more facilitators (8 codes) than barriers (7 codes) when describing patient factors interacting with the implemented training to influence its expected outcomes.

4a) Patients' beliefs about the health system and its professionals

According to participants, patients prefer avoiding *Razi Hospital* for mental health care. The hospital's stigma makes them believe that if referred there, it is because they are "crazy," "unrecoverable," and "deranged." Patients are also less likely to seek care at the hospital because it is far for most and requires an entire day to be treated, given high demand for specialists. Therefore, PCPs believe patients will be more inclined to seek mental health care at the primary healthcare clinic. The primary healthcare clinic is less stigmatizing, and patients' issues may be difficult for others to identify amid the vast range of consultations:

> *"When people with mental health conditions receive care within primary care clinics, they will be integrated with the common person, that is to say no one will know if consultation will be for depression, an angina, or for other reasons. That's the positive side." (Interview 8, participant 16)*

However, some PCPs worried that patients might not readily seek mental health care within clinics because, until recently, mental health care has been primarily encouraged within institutions. In addition, patients know that the prescription of certain treatments, given restrictions, are solely reserved for psychiatrists. Therefore, some patients might be wary that mental health services offered by trained non-specialists are not as effective as specialists' care.

4b) Patients' motivation to seek care

Participants highlighted multiple barriers to patients' motivation to seek care. Despite a noticeable push to raise mental illness awareness, participants noticed most patients prefer avoiding mental health consultations. Patients are therefore "forced" to consult by worried family members or friends. Participants identified two reasons for this demotivation. First, patients fear other consulting community members recognizing them at the primary healthcare clinic, most of whom know each other. Being recognized is problematic especially in the case of substance use disorders, given the legal repercussions of consumption and possession. In addition, the fear of being treated differently leads to patients' demotivation to seek care. For example, PCPs noticed that patients officially diagnosed with a mental health condition often lose trustworthiness and are labelled "deviant":

> *"Having a mental illness means we do not trust you anymore, it means that we are afraid of you, it means […] we're not going to give you money because you're going to lose it. You're not doing well, you are not normal, you are pathological. I cannot give you the keys of my car. His mom, his dad, his brother, his friend, they will not trust him anymore." (Interview 1, participant 1)*

Logistical issues also influence motivation to seek care. According to participants, because the *mhGAP*-based training was a pilot initiative in the Greater Tunis area, most patients are not aware some PCPs have participated in the program and can provide effective mental health care. If, by chance, patients are aware PCPs have been newly trained, they worry that services are not

confidential. For example, patients were wary of providing a reason for consultation to the welcome staff (i.e., secretariat) at the clinic out of fear that this might be shared with others and thus increase their chances of being labelled negatively by other community members. Lastly, participants shared that the interruption of patients by others waiting to be seen by physicians is common in Tunisia, which makes patients uncomfortable, especially when consulting for mental health-related issues.

Encouragingly, participants shared a logistical issue they believe would promote the use of their competencies and skills acquired through the *mhGAP*-based training. Most patients will inevitably seek care at the primary healthcare clinic between scheduled appointments with psychiatrists if complications occur. Therefore, given specialists' unavailability beyond scheduled appointments, PCPs may be used as "fillers" between appointments, if they feel capable of addressing the mental health concern. Satisfied with services received through this type of unexpected consultation, some patients have even asked to be transferred to PCPs' care.

5. Innovation factors

PCPs highlighted more facilitators (7 codes) than barriers (5 codes) when describing characteristics of the training program that facilitated or challenged the attainment of its expected outcomes.

5a) Program's compatibility with clinical practice

Participants shared that their perception of the implemented training's clinical utility influenced the intervention's ability to ensure the attainment of desired outcomes. First, they shared that the

modules chosen for the training program correspond to realities seen in their everyday practice. They confirmed that they see depression cases daily, while conditions related to other modules covered (i.e., psychosis, self-harm/suicide, and substance use disorders) are also seen. Second, PCPs shared that the modules were well-chosen because they consider the Greater Tunis area's mental health trends, especially since the Revolution. However, PCPs cautioned against excluding what they considered clinically useful modules. Since PCPs conduct clinical practice in schools weekly, they were surprised that modules on developmental and behavioural disorders were omitted, and that there was little to no information on youth mental health topics. In addition, given limited dementia and epilepsy specialists, PCPs said they need training for these disorders, which was also omitted.

5b) Program's quality

PCPs evaluated the degree of the program's quality based on its practicality. For example, since many PCPs rarely discuss clinical cases with colleagues in their respective healthcare organizations, they appreciated the time allocated for clinical discussion during training sessions. These discussions, as shared by participants, helped orient future practice, and provided the opportunity for peer learning. In addition, PCPs enjoyed role plays, especially since this facet of training was novel to them. According to participants, role plays helped orient their questions about mental illness to facilitate detection and better their general approach with patients. However, participants thought that the implemented training program overly focused on theory, a reality even acknowledged by PCPs who did not have previous mental health experience. Importantly, participants thought practicality would aid them much more than theory, given their confidence in general clinical skills acquired through years of experience:

"I would have liked something more practical because at our age and with our experience attending a theoretical class is not very interesting. What we have in the handout is very clear. All they [the trainers] did was re-read it for the general lecture. So, it was not very practical." (Interview 7, participant 15)

Participants also thought that the degree of the training program's quality was related to the type of mediums presented to them. Such mediums, they highlighted, helped them better assimilate the training program's content. Specifically, PCPs appreciated the videos, as they illustrated effective clinical mental health encounters between healthcare workers and patients. Participants who had participated in previous mental health training programs mentioned that they had never seen videos illustrating effective mental health practice with patients. In addition, PCPs appreciated receiving the *mhGAP-IG* manual because they were accustomed to consulting outdated mental health pamphlets, if any at all. The guide's practicality empowered PCPs during and after training because they felt that knowledge was "at their fingertips." Beyond practicality, knowing that the guide was created by the *WHO*, and that the training was supported by members of the Ministry of Health and the *WHO* office in Tunisia, PCPs felt as though they were included in a global movement for better mental health care.

PCPs also mentioned barriers to attaining the implemented training's expected outcomes. Firstly, the guide (i.e., the *mhGAP-IG version 1.0*) provided to all trainees contains thirteen modules. PCPs questioned why they were only taught six modules, especially since training resources were already mobilized. Secondly, PCPs questioned the training schedule. The training

was offered after their clinical practice, one afternoon a week for six weeks. In this short time, they thought too much content was provided, which influenced some of their colleagues' decisions to drop out of the program. Participants would have preferred training over the entire day, with theoretical sessions in the morning and the rest of the day reserved for more practical aspects (i.e., role plays, small group discussions, and clinical case presentations). Lastly, some PCPs, while a minority, were displeased with the role plays. They felt uncomfortable, "put on the spot," and nervous. During role plays, PCPs were often asked to role play as patients, which they found difficult. They thus believed that their inability to adequately represent a consulting patient jeopardized the goal of the role plays: to reinforce theoretical learning through practice.

Part 3: Potential solutions suggested by trained PCPs

Participants offered recommendations to address contextual factors they believe interacted with the implemented training to influence its expected outcomes (i.e., desired competencies and skills). These recommendations are useful given that they derive from trainees with in-depth understanding of the components of the implemented training and the factors within their immediate and broader environment that interacted with the program to influence its expected outcomes.

Improving the broader context

To ensure expected outcomes are attained by the implemented training program, PCPs suggested further considering the standardization of mental health practice. For example, PCPs mentioned the necessity of ensuring that mental health resources, such as psychiatrists, psychologists, social workers, and medications, all listed in the *mhGAP-IG*, are equitably distributed across the country.

To ensure resources meet current mental health needs, PCPs suggested that decision-makers pay better attention to gaps in mental healthcare delivery, particularly by inquiring about primary care realities experienced across the country and visiting areas where the *mhGAP*-based training will be offered.

According to PCPs, the standardization of mental health care delivery to help reach the implemented training's desired outcomes also means providing practical solutions to encourage PCPs' roles in mental health care. Interestingly, these suggestions mirror the current practice for other chronic illnesses, such as diabetes and hypertension. Participants shared the utility of dedicating a person responsible for mental health within each governorate. This person would be in contact with PCPs to inquire about current mental health statistics and encourage evidence-based practice, examples of which are listed in the *mhGAP-IG*. In addition, PCPs saw the advantage of encouraging appointment scheduling for people consulting for mental illness, which would allow them more time in consultation and facilitate continuity in services.

Consensus among PCPs is that in Tunisia, mental health training programs are initiated, but rarely sustained, a reality that may prevent the sustainability of the implemented training's desired outcomes. Hence, training programs and refresher courses for PCPs should be prioritized. Participants also suggested mental health internships in continuing medical education should be offered to integrate knowledge, since PCPs are legally entitled to excuse themselves from clinical practice to pursue practical learning in any discipline.

In addition, PCPs confirmed that support from and collaboration with specialists is essential to reinforce the competencies and skills developed through training. First, specialists' help with challenging cases is viewed as vital, especially when side effects from medications are apparent. PCPs lacked this knowledge even after training. Second, participants said their new competencies and skills may be furthered by encouraging a culture of retroactive feedback. PCPs expressed the need for specialist feedback on cases they refer. This lack of feedback is detrimental to the training's application and affects continuity in care.

While these listed recommendations are imperative, they become ineffective if PCPs continue to have restrictions regarding the prescription of certain medications suggested by the training guide.

Improving the organizational context

Participants listed logistical challenges within healthcare organizations that they thought interacted with the implemented training to challenge its expected outcomes. They provided recommendations to address one of these challenges. Participants hoped their organizations would encourage mental health discussions among colleagues. They suggested having someone within the organization, such as a PCP or an administrator, organize time for such discussions, where challenging cases and queries about medication may be presented. Participants believe this space for mental health dialogue could ensure mental health's prioritization in practice and further encourage collaboration within the organization.

Improving the mental health training program

Participants suggested ways to improve the training program, which, according to them, might help better achieve its desired outcomes. Firstly, all participants suggested making the program more practical. Specifically, they suggested: facilitating additional clinical case discussions beyond the two-hour session provided; including a mandatory internship after the training to complement theoretical learning; providing substantially more information on conducts for mental health treatment; including more role plays to further facilitate knowledge integration; and providing PCPs with clinical tools to ensure they can adequately pose a mental health diagnosis in consultation. While participants appreciated the guide and its accompanying master chart highlighting the common presentations of priority conditions to be assessed, they would also like specific tools such as questionnaires with suggested cut-off scores to help concretely diagnose patients.

Secondly, all participants said future trainings should better reflect contextual realities experienced in primary healthcare clinics so as to be more clinically useful. For example, PCPs suggested: 1) including more information on treatments for substance use disorders and general pharmacology, specifically with regards to side effects and interactions between medications; 2) providing information on therapy with patients, specifically cognitive-behavioral therapy, given limited availability for such training in Tunisia [56]; and 3) prioritizing modules pertaining to youth mental health, to facilitate their responsibilities in schools.

Lastly, participants suggested ways to address the logistical issues of the implemented training program, which they believed prevented the attainment of its desired outcomes. PCPs did

not appreciate being "rushed" to learn about mental health over a brief period (six weeks). Thus, participants suggested elongating the training and adding more sessions to cover additional topics. In addition, PCPs suggested finding an alternative schedule. Participating in the training in the afternoon after a day of consultations, as was done, made it hard to retain information. Furthermore, while PCPs were provided with a pamphlet regrouping copies of the presentation slides, they thought this redundant information. For the next trainings, they suggested documents be written succinctly, with easy take-home messages from the theoretical presentations, group discussions, and role plays.

Discussion

This paper provides a glimpse into the complexity of offering a mental health training based on the *mhGAP-IG* to PCPs working in the Greater Tunis area of Tunisia given contextual factors that interacted with the implemented intervention to influence its expected outcomes. Results from this Type III implementation analysis [33] are useful for two main reasons. First, findings may inform results obtained on mental health knowledge, attitudes, self-efficacy, and self-reported practice questionnaires from our randomized controlled trial [43]. For example, in this paper, we presented more barriers (37 codes) than facilitators (31 codes) when identifying contextual factors influencing the implemented training's desired outcomes. PCPs still felt uncomfortable with certain aspects of treatment despite their participation in the training program, specifically in pharmacology and with specific mental health conditions, such as psychosis, schizophrenia, and substance use disorders. Therefore, we expect to find lower scores for these criteria on the questionnaires.

Second, at the heart of this paper is Tunisia's interest in building non-specialists' mental health capacities, which is also an international effort to further develop effective mental health services in primary care settings [4,23,25]. Therefore, in addition to informing our randomized controlled trial, our findings uncovered contextual factors that can be tailored to prepare for future implementations of the *mhGAP*-based training in Tunisia's other regions and address the mental health treatment gap [41,43,56]. Decision-makers may rely upon participants' in-depth knowledge about their communities and primary healthcare organizations to improve the training program and environment in which it was (and will be) implemented [58]. Such findings also contribute to a research priority in global mental health: generating evidence on communal factors supporting the involvement of non-specialists in mental health care delivery [67]. This evidence may be used as a guide to improve health services in LMICs while being sensitive to local particularities [67-69].

As suggested by authors who have engaged in developing non-specialists' mental health capacity through offering training programs: *"making it easier for generalists to acquire and practice skills in the recognition of and treatment of mental health problems […] is not sufficient, and it will not be possible to meet need by continuing to pursue the idea of simply training more people"* [67]. Therefore, to optimize PCPs' role in the field of mental health in Tunisia, initiatives beyond training are fundamental. These include modifications to structural and organizational factors [35]. Interestingly, previous studies have observed key structural and organizational challenges facing non-specialists' provision of mental health care in LMICs that are similar to the ones we have identified [37,68,69]. Similar barriers include: 1) challenging policies (in our case, restrictions preventing PCPs from prescribing certain medications and the criminalization of

substance use disorders); 2) mental health training (in our case, lack of continuity in mental health trainings and limited encouragement for participation in mental health internships, part of continuing medical education); 3) mental health resources (in our case, limited availability and uneven distribution of medications); and 4) organization and planning (in our case, obstacles to continuity in care, lack of time to provide mental health care, high turnover of trained employees, other professionals' limited support for the integration of mental health into primary care, and limited mental health support).

Two aspects of our findings surprised us. First, participants did not allude to a structural factor that authors have previously identified when reviewing the feasibility and acceptability of relying on non-specialists for mental health care in LMICs: funding allocated to mental health [68]. While mental health funding may be beyond the scope of PCPs' comprehension, it nonetheless remains an important structural factor to consider when aiming to decentralize mental health services by further relying on primary care settings and the involvement of non-specialists in mental health care delivery [4,10,16,24]. With limited government investment allocated to mental health in LMICs, Tunisia included, most funding continues to sustain institutional settings [16,24,70]. Focusing on institutional settings thus poses a severe threat to future trainings based on the *mhGAP-IG* [4,23-25] and to the use and sustainability of competencies and skills acquired through training [68,69].

Another surprising aspect of our findings pertains to a comparison between our results and those by Chaudoir and colleagues (2013) [57], who state in a review that they were least likely to come across variables related to structural and patient factors. Interestingly, when exploring

contextual factors interacting with the implemented training program to influence its desired outcomes, our findings show that the study's participants were primarily concerned with these two types of constructs. Structural factors (e.g., policies, social context, development of the local workforce, and physical aspects of the environment) and patient factors (e.g., beliefs about the health system and healthcare professionals, as well as motivation to seek care) were addressed by more codes than organizational, innovation, and provider factors alone. We explain the discrepancy between Chaudoir and colleagues' (2013) findings [57] and ours in several ways. First, the use of non-specialists in mental health care delivery at the level of primary care generates a new vision countering the long-standing position of institutional-based mental health care in LMICs. This new vision upholds the key features of primary care services outlined by Starfield (1994) [71], such as first-contact, comprehensive, and coordinated care. Thus, relying on trained non-specialists inevitably requires a restructuring of systemic and organizational factors in order to create and support a healthcare system ready to welcome new treatment and management roles. These roles include non-specialists' increased involvement in detection, treatment, and management, with the role of specialists consisting of consultation, supervision, and further trainings [12,13]. However, despite the Ministry's prioritization of mental health in Tunisia, our findings highlight significant barriers that may challenge these new roles. These include: restrictions limiting PCPs' prescribing power, the questioning of mental health care in primary care settings, and deficits in continuing (and sustained) medical education programs targeting mental health.

Second, as participants shared, patients prefer seeking mental health care at local primary healthcare clinics rather than at institutions, which suggests patients' approval of offering mental

health training to non-specialists such as PCPs. However, according to PCPs, patients are still affected by sociocultural nuances (i.e., the perception of mental health and mental health care) within the broader context, which PCPs believe influence their help-seeking behavior even within primary healthcare clinics. For example, our study's participants suggest patients are wary of trained PCPs because they are not "specialists." In addition, the stigma against mental illness worries patients. For example, patients fear being treated differently if they are labeled with a mental health condition. As other studies suggest, positive effects resulting from targeting such sociocultural nuances within the broader context may trickle down to the micro level to improve patients' willingness to seek help confidently within the community [68,69,72].

Limitations

Limits to the study should be noted. Firstly, our sample consists of PCPs working in the public sector from one area of Tunisia. Implementing the training in different areas of Tunisia and interviewing participating PCPs from those areas could result in additional contextual factors interacting with the program to influence its expected outcomes. Nonetheless, we believe our findings are quite comprehensive and useful because PCPs in the Greater Tunis area experience similar barriers to effective mental health care as in other regions. Secondly, we captured participants' perceptions of barriers and facilitators interacting with the implemented training to influence its expected outcomes at one time, shortly after the intervention's completion. While this short-term follow-up is valuable, long-term follow-up could inform decision-makers how contextual factors interacted with the implemented training program to influence the evolution of desired outcomes. Thirdly, the training's expected outcomes, as listed in this paper in Part 1 of the results section, are based on participants' perceptions. While this information is useful to

complement our randomized controlled trial, results obtained on mental health knowledge, attitudes, perceived self-efficacy, and self-reported practice questionnaires from the trial might better reflect the acquired competencies and skills from the implemented training. In addition, participants shared what they believed impacted patients' help-seeking behaviour. Interviewing people with mental health problems who consulted trained PCPs would thus have been useful to confirm or complement these perceptions. Lastly, this paper presents contextual factors interacting with the implemented training to influence the training's expected outcomes (i.e., a Type III implementation analysis). In retrospect, exploring how contextual factors impacted the planned implementation of the training program would have been beneficial (i.e., a Type I implementation analysis) [33]. This complementary information might have painted a more accurate picture of the implemented program and its interaction with contextual factors in the context of the Greater Tunis area.

Conclusion

This case study highlights the complexity of implementing an *mhGAP*-based training in the Greater Tunis area of Tunisia given its interaction with contextual factors to hinder or facilitate the attainment of its expected outcomes. While participants did acknowledge the implemented training's many positive effects on their competencies and skills, post-training, contextual barriers prevented them from feeling comfortable with certain aspects of treatment and the management of specific mental health conditions. Hence, in order to ensure PCPs' effective involvement in mental health care, contextual barriers interacting with the implemented training as identified in this paper should be addressed before future implementations of an *mhGAP*-based training. Findings may also be used by decision-makers of other LMICs interested in implementing an

mhGAP-based training yet facing similar challenges in further involving non-specialists in effective mental health care delivery at the level of primary care.

List of abbreviations
PCPs = primary care physicians
mhGAP = Mental Health Gap Action Programme
IG = Intervention Guide
LMICs = low- and middle-income countries
WHO = World Health Organization

Declarations

Ethics approval and consent to participate
Research approval was obtained from the Université de Montréal (Québec, Canada) (#15-117-CERES-D), and Razi Hospital (Manouba, Tunisia). Participant consent was provided in written form.

Consent for publication
Not applicable.

Availability of data and material
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests
Dr. Marc Laporta is a staff member of the *Montreal World Health Organization-Pan American Health Organization Collaborating Center for Research and Training in Mental Health.* All other authors declare that they have no competing interests.

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Authors' contributions
JS, FC1, NL, MP, WM, and FC2 conceived the study and contributed to its design. JS developed the interview guide, recruited participants, collected the data, analyzed and interpreted the data, wrote the first draft of the manuscript, and made/integrated suggested corrections to subsequent

versions. ML was instrumental in the development of the training program and structure for the Greater Tunis area of Tunisia. Consequently, ML was involved in the interpretation of the research results in light of the training program's implementation in the Greater Tunis area of Tunisia. IG and NB were instrumental in tailoring the developed training program and content to reflect the primary care realities of the Greater Tunis area. FC2, IG, and NB provided input on contextual information about the Greater Tunis area of Tunisia. FC1, NL, and MP critically revised the manuscript to improve its content. All authors read and approved the manuscript.

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Endnotes
[a] Numbers in brackets highlight individuals from each governorate who participated in the group interviews. [b] A circular exists limiting the prescription of certain psychotropic drugs (ex.: benzodiazepines) at the level of primary care. This regulation preventing the prescription of these psychotropic drugs was not revised after the implementation of training initiatives targeting PCPs' mental health competencies. [c] The first wave of family physicians who participated in this new medical curriculum is scheduled to graduate in 2019. [d] In certain healthcare clinics, psychotropic drugs have been subject to theft, as they are often coveted in the Greater Tunis area by people living with substance use disorders. Measures have been taken to limit the availability of psychotropic drugs in healthcare clinics where reports of theft have been made. Consequently, these measures create uneven distribution of such drugs in primary care settings.

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Additional file 1: Example of interview questions

Theme 1: Structural factors

Why was a mental health training program offered to primary care physicians in the Greater Tunis area of Tunisia? (This probe: who normally organizes mental health trainings and at what frequency, etc.)

How does the political or social climate in the Greater Tunis area facilitate or hinder the use or outcomes (i.e., mental health knowledge, attitudes, self-efficacy, and practice) of the implemented training program?

How do public policies facilitate or hinder the use or outcomes (i.e., mental health knowledge, attitudes, self-efficacy, and practice) of the implemented the training program?

How do aspects of the physical environment in the Greater Tunis area facilitate or hinder the use or outcomes (i.e., mental health knowledge, attitudes, self-efficacy, and practice) of the implemented the training program?

Theme 2: Organizational factors

How are mental health services organized in your delegation? What is the effect of this organization on your mental health care delivery?

Given the organization of mental health services within your delegation, what organizational factors facilitate or hinder the use or outcomes (mental health knowledge, attitudes, self-efficacy, and practice) of the implemented the training program?

What factors within your specific healthcare organization facilitate or hinder the use or outcomes (i.e., mental health knowledge, attitudes, self-efficacy, and practice) of the implemented the training program? (ex: culture of learning, supervisors/administrators, etc.)

Theme 3: Provider factors

Why did you sign up for the mental health training?

What experience (i.e., participation in previous training programs, internships, courses, etc.) do you have in mental health?

What aspects of the implemented training program were the most important to your clinical practice?

What was the impact of the training program on your clinical practice? What impact of the training program on your clinical practice did you hope to see, but, unfortunately, did not?

Theme 4: Patient factors

What types of mental health consultations do you receive in your clinical practice?

What impact has the implemented training program had on your patients consulting for mental health problems?

What changes (positive or negative) have you seen in your patients consulting for mental health problems after you participated in the training?

Theme 5: Innovative factors

What is your opinion about the structure (i.e., a session once a week, theory and practice, support session at the end of the training program, trainers and tutors, etc.) of the training program?

As a trainee, what did you like about participating in the training program?

As a trainee, what did you dislike about participating in the training program?

In your opinion, is there anything missing from the training program that you would have found useful?

What aspects learned in the training program do you plan to use in clinical practice?

How does this mental health training program compare with others you have received?

Additional file 2: Final code book

Parts	***Themes***	***Sub-themes***	***Codes***
Part 1: The effects of the training on primary care physicians' (PCPs) competencies and skills.	1. Describing the effects of the training on PCPs' competencies.	1a) PCPs' knowledge about mental health and illness.	(+) PCPs are more familiar with medication. (+) PCPs are more knowledgeable about ways to approach mental illness in clinical practice. (+) PCPs are more knowledgeable about symptoms related to mental illness. (-) PCPs are still unfamiliar with medication.
		1b) PCPs' attitudes towards mental health and illness.	(+) PCPs acquired a better understanding of the "suffering" associated with mental illness. (+) The training helped demystify the management of mental health issues in primary care settings. (+) The training targeted the negative beliefs about certain mental health issues. (+) PCPs allocate more time to mental health during practice. (+) PCPs are more patient with people consulting for mental health issues. (-) PCPs are still afraid of treating certain types of mental health conditions.
	2. Describing the effects of the training on PCPs' practice.	2a) PCPs' detection skills to address mental health issues.	(+) PCPs feel confident asking "good" questions to inquire about mental health and illness.

			(+) PCPs are more inclined to check mental health in regular consultation. (+) PCPs can more easily detect symptoms related to mental illness in patients.
		2b) PCPs' treatment skills to address mental health issues.	(+) PCPs are more inclined to consider psychosocial treatment. (+) PCPs have more confidence to prescribe. (+)PCPs are more confident to see (and treat) a greater number of patients with mental health problems. (+) PCPs try to ensure a greater continuity in care. (-) PCPs are not confident providing treatment using certain types of medications. (-) PCPs are not confident treating certain types of mental health conditions. (-) PCPs are not confident managing and following-up on treatments for certain patients.
Part 2: Contextual factors that interact with the implemented training program to influence its	**DIMENSION 1: STRUCTURAL-LEVEL FACTORS**		

expected outcomes (illustrated in Part 1). This part is organized according to Chaudoir and colleagues' (2013) [57] conceptual framework.	1a) Public policies (i.e., laws and restrictions) interact with the training program to influence its expected outcomes.	Mental health laws and restrictions affecting adequate mental health practice.	(barrier) PCPs cannot prescribe certain molecules. (barrier) Substance use disorders are often managed judicially. (facilitator) Laws and restrictions are changing to reflect current trends in mental health.
	1b) The social context (perceptions, values) interacts with the training program to influence its expected outcomes.	The Ministry's prioritization of mental health care in the country.	(barrier) PCPs feel that physical health is valued more than mental health. (barrier) Mental health statistics are not taken seriously. (barrier) PCPs still use "ancient" mental health tools in practice. (facilitator) There is an increased attention put on mental health statistics. (facilitator) Mental health is recognized in the country through the development of the national programme for mental health promotion. (facilitator) Strategies are used to increase awareness of mental health conditions across the country.
		The perception of mental health conditions in Tunisia.	(barrier) Substance use disorders are stigmatized in Tunisia. (facilitator) There is less stigma towards certain types of mental disorders since the 2010-2011 Revolution.

		The perception of mental health care within institutions	(barrier) Mental health care within institutions is stigmatized by the community.
	1c) Infrastructure (i.e., the local workforce) interacts with the training program to influence its expected outcomes.	The development of non-specialists' mental health capacities.	(barrier) Lack of continuity in mental health trainings. (barrier) Lack of obligatory mental health internships in continuing medical education to further develop professional practice. (barrier) If there are mental health trainings, not all PCPs can attend. (facilitator) The Ministry adopted a new medical curriculum, encouraging increased teachings and internships in mental health for future family physicians.
	1d) The physical environment (i.e., topographical elements that pose barriers or encourage clinical access) interacts with the training program to influence its expected outcomes.	Difficulty accessing the mental health hospital and its services.	(barrier) There is only one mental health hospital in the country, and it is not accessible to all.
	DIMENSION 2: ORGANIZATIONAL-LEVEL FACTORS		
	2a) The logistical issues within the healthcare organization interact with the training program to influence its expected outcomes.	There are logistical issues when providing mental health care within primary healthcare clinics.	(barrier) Trained PCPs are not always at the same primary healthcare clinic, which affects continuity in care.

			(barrier) There is a lack of medication in primary healthcare clinics. (barrier) If medication is available, it is easily stolen in certain primary healthcare clinics. (barrier) If medication is available, it is not evenly distributed. (barrier) If medication is available, it runs out quickly. (barrier) Lack of time to provide adequate mental health care. (barrier) High turnover of employees within healthcare organizations. (facilitator) Medication is available within primary healthcare clinics.
	2b) The organizational culture (i.e., a system of shared beliefs, values, and assumptions about care) interacts with the training program to influence its expected outcomes.	Intra-collaboration.	(barrier) PCPs expressed difficulties working with other healthcare professionals in the primary healthcare clinic. (barrier) Primary healthcare clinics do not promote staff meetings. (facilitator) PCPs engage in case discussions with colleagues about mental health.
		Inter-collaboration.	(barrier) Collaborations with the mental health hospital is difficult.

			(facilitator) Collaborations with PCPs responsible for continuing medication education helps with mental health care delivery. (facilitator) There are opportunities for collaborations with other healthcare professionals.
	DIMENSION 3: PROVIDER-LEVEL FACTORS		
	3a) Providers' previous medical experiences interact with the training program to influence its expected outcomes.	PCPs' involvement in mental health activities during their careers.	(barrier) PCPs do not have previous mental health training. (facilitator) PCPs participated in previous mental health trainings. (facilitator) PCPs participated in a mental health internship during medical school.
		Providers' seniority in the field as a PCP.	(facilitator) Many years of field experience have equipped PCPs with confidence in their general clinical skills.
	3b) Providers' personal characteristics interact with the training program to influence its expected outcomes.	PCPs' desire to learn about and provide mental health care stems from personal interest.	(barrier) PCPs do not like treating certain types of mental health conditions. (barrier) PCPs do not get involved with pharmacological treatment. (barrier) PCPs are not interested in mental health. (facilitator) PCPs are personally motivated to provide mental health care. (facilitator) PCPs have personal preferences for certain types of mental health conditions.

			(facilitator) PCPs participate in mental health training during their own time (outside of office hours).
	DIMENSION 4: PATIENT-LEVEL FACTORS		
	4a) Patients' beliefs about the health system and its professionals interact with the training program to influence its expected outcomes.	Help-seeking behaviour is influenced by perceptions of primary healthcare clinics.	(barrier) Patients think that receiving care in primary healthcare clinics is sub-par to receiving care by a specialist. (facilitator) Patients prefer seeking and receiving care at the primary healthcare clinic because it is less stigmatizing than the mental health hospital. (facilitator) Patients like receiving care at the primary healthcare clinic because they are not noticed. (facilitator) Patients like receiving care at the primary healthcare clinic because it is offered quickly.
		Help-seeking behaviour is influenced by perceptions of the mental health hospital.	(facilitator) Patients think that the mental health hospital is very stigmatizing. (facilitator) Patients think that the mental health hospital is too far. (facilitator) Patients think that receiving services at the mental health hospital takes too long.
	4b) Patients' motivation to seek care interacts with the training	Motivation to seek care is influenced by views of mental illness.	(barrier) Patients are treated differently once "society" knows they live with mental health issues.

	program to influence its expected outcomes.		(barrier) Patients do not seek care because they are afraid of legal issues. (barrier) Patients do not seek care because they do not want to be noticed by community members. (facilitator) Patients are more open about their own mental health.
		Motivation to seek care is influenced by logistical issues in primary healthcare clinics.	(barrier) In consultation, patients consulting for mental health conditions are interrupted by other patients. (barrier) Patients are not aware that mental health services are available at the primary healthcare clinics. (barrier) Patients do not know that mental health services are confidential. (facilitator) Patients will seek care at the primary healthcare clinic between appointments with psychiatrists.
	DIMENSION 5: INNOVATION-LEVEL FACTORS		
	5a) PCPs' perception of the training's compatibility with the context in which it was implemented is a factor that influences its expected outcomes.	Training modules were clinically useful.	(barrier) Training modules chosen do not correspond to the clientele seen by PCPs. (facilitator) Training modules chosen correspond to the reality seen by PCPs. (facilitator) Training modules chosen correspond to the reality of the Greater Tunis area.

	5b) PCPs' perception of the program's quality is a factor that influences its expected outcomes.	PCPs' perception of the program's practicality.	(barrier) PCPs did not like all the theory provided during the training. (facilitator) PCPs appreciated the clinical discussions during the training as they helped orient future practice. (facilitator) PCPs liked the role plays because they helped learning. (facilitator) PCPs liked that they could learn from their peers.
		PCPs' perceptions on training content.	(barrier) PCPs did not like that they were not able to learn about all the modules included in the training guide. (barrier) PCPs did not like role plays. (barrier) PCPs found there was not enough time for all the content provided. (facilitator) PCPs enjoyed the videos shown during the training. (facilitator) PCPs liked the training guide.
Part 3: Potential solutions to address contextual factors, as suggested by trained PCPs	1. Improving the broader context in which a mental health training program is implemented, to influences its expected outcomes.	1a) Further developing national capacity for mental health care.	Availability of sufficient mental health resources (psychiatrists, psychologists, social workers, medication) across the country. Assigning a person responsible for mental health within each governorate. Informing the community that mental health services are available through trained PCPs.

			Constantly evaluating mental health care and resources.
		1b) Building PCPs' capacities in mental health.	Ensuring continuity of mental health training programs. PCPs would like support from psychiatrists when working with difficult cases. PCPs would like feedback on their referrals to specialized services.
		1c) Ensuring that PCPs do not have restrictions for the prescription of needed medications.	Removing restrictions that prevent PCPs from prescribing certain types of medications.
	2. Improving the organizational context in which a mental health training program is implemented, to influence its expected outcomes.	2a) Developing a greater culture of learning within the organization.	Having someone within the primary healthcare clinic organize discussions on mental health among colleagues.
	3. Improving the mental health training program, to influence its expected outcomes.	3a) Making the training more practical.	Encouraging more clinical case discussions. Including an internship after the training program. Focusing more on "what to do" (*conduite à tenir*) for people presenting with mental health related issues in primary healthcare clinics. Providing PCPs with clinical tools (ex.: questionnaires) to help diagnose and treat.
		3b) Making the training more clinically useful.	Need for more information on therapeutic endeavors with patients.

			Need for more training on substance use disorders. Need for more training modules (i.e. youth mental health, epilepsy, dementia). Need for more training on pharmacology. Need for additional role plays.
		3c) Addressing the logistical issues of the training.	Adding more sessions and topics. Providing various kinds of materials to participants, in complement to the guide. Altering the schedule of the training.

CHAPTER 5: DISCUSSION

5.1. Synopsis

This discussion chapter presents an overview of the dissertation's findings (5.2). The study's contributions are highlighted through a "lessons learned" article (5.3), published in the *Journal of Global Health Reports* (April 2019). Contributions were supported by literature from the *Global Mental Health* field. Following the dissertation's contributions are its training and research limitations (5.4). Concluding this discussion chapter are future practice and research recommendations (5.5).

5.2. Synthesis of results

This dissertation has two objectives. First, it aims to assess the impact of a training program based on the *mhGAP-IG* (*version 1.0*) (*WHO*, 2010) on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice. To meet this objective, an exploratory trial was conducted, which comprised different designs: a *pretest-posttest control group design* (an RCT) and a *one-group pretest-posttest design* (Campbell & Stanley, 1963) used to assess the training's short-term impact on both Group 1 and Group 2; and a *repeated measures design* used to assess the training's long-term impact (Article 4, Section 4.5). Given that the nature of a "*patched up design*" (Campbell & Stanley, 1963, p. 57), we were able to demonstrate the effect of the training based on the *mhGAP-IG* using a combination of designs. Replicating the effects of the training increased the study's internal validity. Second, implementation analysis (Champagne et al., 2011) was used to explore how contextual factors affected implementation (i.e., through the tailoring of the *mhGAP*-based training program, content, and structure to the primary care realities of the Greater Tunis area) (Article 2, Section 4.3) and how they interacted with the training program to influence its expected outcomes (Article 5, Section 4.6). Beyond these two objectives, the dissertation paints a baseline portrait of the mental health knowledge, attitudes, self-efficacy, and self-reported practice of a sample of PCPs, while identifying what characteristics are associated with these competencies (Article 3, Section 4.4). This objective was suggested by local partners in order to generate useful information for informing continuing medical education content and policies.

To embrace the combination of "mixed methods" used in this dissertation, the next sections aim to synthesize results by "integrating" both quantitative and qualitative data (Creswell & Plano Clark, 2018). Specifically, given that the embedded "mixed methods" design was

employed, quantitative findings were complemented by qualitative ones (Creswell & Plano Clark, 2018). In other words, qualitative data, collected among trainees assigned to Group 1 who completed the training program, helped explore factors that might facilitate and hinder the attainment of its expected results, assessed by employing an RCT design and replicated by the *one-group pretest-posttest design*.

The *mhGAP*-based training was tailored to the primary care realities of the Greater Tunis area of Tunisia prior to implementation, which began in February 2016 (Spagnolo et al, 2018b). Tailoring the standard *mhGAP-IG* training is recommended by the *WHO* in order to increase local ownership of the program, and encourage its implementation (*WHO*, 2010; 2016). Contextual factors from the Greater Tunis area of Tunisia encouraged such a tailoring. The training program was conducted over six weeks for a total of 19 hours. The first five weeks, totalling 17 hours, consisted of general lectures, role plays, and group discussions on the chosen modules by members of the Ministry of Health in order to meet the most pressing needs in the country (i.e., general principles of care, depression, psychosis, self-harm/suicide, and substance use disorders (alcohol and drugs)). The last training session consisted of a two-hour support session animated by trainer psychiatrists. This session allowed trainees to present challenging mental health cases and engage in further role plays. Training also was designed to include "tutors" as supports to trainees during and after training.

Short-term evaluation of this adapted training program using a *pretest-posttest control group design* (Campbell & Stanley, 1963) shows that a differential effect between the training and the control groups was found for the following outcome measures: mental health knowledge,

attitudes, and perceived self-efficacy. Specifically, when compared to PCPs assigned to Group 2 (the control measure), PCPs in Group 1 showed an increase in mental health knowledge and self-efficacy, as well as a decrease in negative attitudes towards mental illness and the field of mental health (Article 4, Section 4.5). These promising changes immediately after the training and similarly observed after Group 2's training by a *one-group pretest-posttest design* (Campbell & Stanley, 1963), were also alluded to by PCPs assigned to Group 1, who were interviewed after the completion of their participation in the program in March and April 2016 (Article 5, Section 4.6) (Spagnolo et al., 2018c). For example, PCPs shared they felt more knowledgeable about many aspects of mental illness and its care, more confident in their abilities to detect mental health problems, more equipped with information on certain types of pharmacotherapy, better able to engage in psychosocial interventions with certain people consulting with mental illness, and better able to understand that not all mental health issues require specialized care (Article 5, Section 4.6) (Spagnolo et al., 2018c). Contextual factors shared by PCPs might have encouraged these improvements post-training. These include PCPs' satisfaction with the training program given its clinical utility and interactive components, their motivation to participate in the training, which was shown by the voluntary nature of program and the fact that it occurred outside of office hours, and their interest in effective mental health care delivery (Article 5, Section 4.6).

Of note, the training program, when compared to the control measure (Group 2), had no differential effect on two mental health competencies immediately after training. These included the importance allocated to mental health in PCPs' clinical practice per week (a combination of the percentage of time allocated to mental health per week and the percentage of people consulting for mental health problems per week) and PCPs' weekly referral habits to specialized services

(Article 4, Section 4.5). These results were surprising, especially when interpreting qualitative results for potential explanations. These results reveal that the PCPs interviewed had greater confidence in treating certain types of mental health conditions with the use of pharmacology and psychosocial interventions. Hence, interviewed PCPs were convinced that this increase in confidence would translate into an increase in the number of patients they treat for mental health issues weekly and the weekly time they allocate to mental health (Article 5, Section 4.6) (Spagnolo et al., 2018c). A closer look at methodological and practice aspects might answer why these results were non-statistically significant. First, PCPs who participated in the training program, as highlighted by qualitative data, were already personally involved in mental health care delivery (Article 5, Section 4.6) (Spagnolo et al., 2018c). Hence, the training might only have had a small change (and thus effect) on the importance allocated to mental health in PCPs' clinical practice per week. Second, despite increased attention PCPs put on mental health statistics in Tunisia, PCPs shared that they thought such statistics are not taken seriously in comparison with those of other health problems (Article 5, Section 4.6) (Spagnolo et al., 2018c). Hence, self-reported statistics on clinical practice might not reflect actual behaviour change. Third, quantitative results show that non-completers in Group 1 and Group 2 (the control measure) had distinctive characteristics related to weekly referrals to specialized services. These differences might suggest attribution bias, which could potentially explain why no differential effect between Group 1 and Group 2 (the control measure) was observed on weekly referrals to specialized services over the short term using the *pretest-posttest control group design* (Campbell & Stanley,1963), while such a difference was found using the *one-group pretest-posttest design* (Table 1, Section 3.4.2.) and over the long term using the repeated measures design (Article 4, Section 4.5). Fourth, studies highlight that it might be more difficult to alter actual behaviour post-

training than mental health competencies such as knowledge and self-efficacy (Beidas & Kendall, 2010). Last, studies indicate that organizational supports are strongly linked to behaviour changes and thus the success of training programs (Turner & Sanders, 2006; Beidas & Kendall, 2010). Organizational barriers, identified by interviewed PCPs, that might have interacted with the training program to prevent change in practice characteristics could include limited resources and support at the healthcare clinic for mental health care delivery (e.g., lack of medication in primary healthcare clinics, difficulty working with other (untrained) healthcare personnel, no encouragement for staff meetings to discuss challenging mental health cases, and difficulty collaborating with mental health specialists).

One of the most striking findings of this dissertation is the sustainability of changed mental health competencies pre-training in comparison to 18 months post-implementation. For example, the repeated measures design demonstrates that when comparing pre-training results and results 18-month after training, favourable changes in mental health knowledge, attitudes, and perceived self-efficacy were maintained. In addition, PCPs reported a decrease in referrals to specialized services 18 months after training in comparison to pre-training (Article 4, Section 4.5). These results were surprising since the PCPs interviewed mentioned more barriers than facilitators when describing contextual factors interacting with the implemented training to influence its expected outcomes (Article 5, Section 4.6) (Spagnolo et al., 2018c). However, sustainability of the results might allude to two factors. First, sustainability of desired training effects might be due to favourable contextual factors for the use of non-specialists in mental health care delivery in the Greater Tunis area of Tunisia. One such factor includes strong political commitment to mental health in Tunisia. Such commitment is illustrated by contextual factors such as the Ministry's

revamping of the medical school curriculum to include increased teachings and internships in mental health for future family physicians (Ministère de la santé publique, 2011), the launch of the *2013 Tunisian Mental Health Strategy*, a strategy that aims to transition mental health care from institutional to community-based settings (Ministry of Health, 2013), and the creation of the *Committee for Mental Health Promotion* in 2015 (Ministry of Health, 2013). This political enthusiasm for and commitment to mental health was highlighted by PCPs in interviews (Article 5, Section 4.6) (Spagnolo et al., 2018c). Another factor that might help explain the sustainability of desired mental health competencies could be PCPs' perceived satisfaction related to the training program's quality. For example, interviewed PCPs mentioned that they found the training program clinically useful, thus meeting unmet needs, appreciated the interactive components of the training program, liked the training guide, and felt supported by PCPs responsible for continuing medical education in the Greater Tunis area ("tutors") (Article 5, Section 4.6) (Spagnolo et al., 2018c). Interestingly, studies show that including these "interactive" and "supportive" components in a mental health training are more likely to positively influence desired effects (Beidas & Kendall, 2010; Blashki et al., 2003; Bloom, 2005; Hodges et al., 2001; Padmanathan & DeSilva, 2013). Of note, the importance PCPs allocate to mental health practice per week remained unaffected even over the long term. This status quo might also be explained by the reasons provided above.

While statistically significant changes were maintained pre-training and 18 months after training, it is important to highlight questionable trends in the program's evolution. For example, post-hoc analyses of the repeated measures design reveal statistically significant decreases in PCPs' positive attitudes towards mental illness and the field of mental health, as well as decreases

in mental health self-efficacy 18 months after training, in comparison to immediately after training (i.e., six weeks post-training) (Article 4, Section 4.5). In other words, even though they remained more favourable than prior to training, PCPs' favourable mental health attitudes and self-efficacy scores decreased significantly at 18 months in comparison to immediately after training. Barriers uncovered in PCP interviews, some of which were also highlighted when contextualizing the training program, content, and structure to the Greater Tunis area of Tunisia (Article 2, Section 4.3) (Spagnolo et al., 2018b), might help explain these decreases in favourable mental health competency scores: the criminalization of substance use and misuse, lack of continuity in mental health training programs and refresher courses, restrictions placed on PCPs' ability to prescribe certain pharmaceuticals, limited support for mental health care within healthcare clinics, and patients thinking that receiving care in primary healthcare clinics is sub-par to receiving care by a specialist. In addition, despite the implementation of "tutors" to assist PCPs in mental health care delivery, it becomes difficult, given inability to fully conduct Type I implementation analysis (Champagne et al., 2010), to know how they are explicitly conducting their supportive role post-training. Maintenance in training outcomes over the long term have been said to require ongoing support and/or supervision (Blashki et al., 2003; Davies & Lund, 2015; Hoeft et al., 2018; Mendenhall et al., 2014; Padmanathan & De Silva, 2013; Petersen et al., 2011), and transformation at systemic and organizational levels (Blanco-Vieira et al., 2018; Davis et al., 2012; Dubois & Singh, 2009; Gask & Morriss, 1999; Keynejad et al., 2018; Mendenhall et al., 2014; Padmanathan & De Silva, 2013; Semrau et al., 2015).

5.3. Dissertation's contributions

5.3.1. Candidate's contribution to the article

The sixth article included in this dissertation (Section 5.3.2) provides an overview of the study's contributions and pertinence, particularly to the field of *Global Mental Health*. These contributions have been summarized in the form of a "lessons learned" manuscript, supported by evidence in the field of *Global Mental Health* to highlight their international pertinence. For this article, the candidate: 1) was involved in the conception of the study in which this manuscript is inscribed; 2) developed the idea for the "lessons learned" manuscript; 3) collected, analysed, and was involved in the interpretation of the data (quantitative and qualitative) referred to in the paper; 4) wrote the first draft of the manuscript; and 5) integrated suggested corrections by co-authors into subsequent versions.

5.3.2. Article 6: study’s contributions through lessons learned

A program to further integrate mental health into primary care: Lessons learned from a trial in Tunisia

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Abstract

Background: Tunisia is a lower-middle-income country located in North Africa. Since the 2010-2011 Revolution, a campaign of civil resistance to protest high levels of youth unemployment, difficult living conditions, and government corruption, a rise in mental health problems, substance use disorders, and suicide attempts/deaths has been recorded. To address untreated mental health symptoms, a mental health program was developed in collaboration with members of the Ministry of Health in Tunisia, the *School of Public Health* at the *Université de Montréal* (Québec, Canada), the *World Health Organization* (*WHO*) office in Tunisia, and the *Montreal WHO-Collaborating Center (CC) for Research and Training in Mental Health* (Québec, Canada).

Program description: The training was based on the *Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG)*, a program developed by the *WHO* to help further develop the mental health competencies of non-specialists working in non-specialized settings. Our team adapted the *mhGAP-IG* training to the primary care realities of the Greater Tunis area, offered the training program to PCPs between February and April 2016, and evaluated the program using a randomized controlled trial and implementation analysis.

Discussion: The adaptation, implementation, and evaluation of the training program equipped our team with important lessons learned, supported by evidence in the field of *Global Mental Health*. First, developing partnerships helped create a feasible program that met the practical and research needs of the country. Second, benefitting from political commitment to mental health facilitated the development of partnerships, the implementation of the training program, and the training's accompanying evaluation. Third, piloting the program helped identify challenges attributed to the

training program and its implementation, the mental health care system, and the research tools, information that may be used to "build back better." Last, sharing research findings collaboratively helped ensure their validity and encouraged greater knowledge uptake.

Conclusion: We hope that sharing such lessons learned will aid other countries with similar profiles to develop and/or adapt, implement, and evaluate programs that target untreated mental health symptoms in primary and community-based settings and hence address priorities in *Global Mental Health.*

Background

Tunisia is a lower-middle-income country [1] located in North Africa. Since the 2010-2011 Revolution, a campaign of civil resistance to protest high levels of youth unemployment, political repression, government corruption, and difficult living conditions [2], a rise in mental health problems, substance use disorders, and suicide attempts/deaths has been recorded [3-9]. Through *"the societal dialogue,"* a participatory process that aimed to understand the health concerns of Tunisian citizens and create possible health reform tracks that would aid decision-makers in improving the health of all, accessing mental health care was recognized as a key challenge [10]. Commitment to improving access to needed mental health services was also endorsed by the Tunisian Ministry of Health, particularly by the development of the *2013 Tunisian National Strategy for the Promotion of Mental Health* [6] and the creation of the *Committee for Mental Health Promotion* in 2015. Underlining the urgency of this commitment is also Tunisia's location within the *Eastern Mediterranean Region* (*EMR*), one of the *World Health Organization* (*WHO*) regions with the least number of countries to have produced a mental health plan or strategy [11] and with one of the highest rates of mental disorder burden compared to the global average [12].

Despite the Ministry's commitment to further the transition from institutional to community-based mental health care [6], challenges to mental health care offered in primary care settings continue to abound. First, personnel trained in effective mental health care are lacking: 1) mental health nurses and psychosocial care providers are not enough to meet current need [13]; and 2) while primary care physicians (PCPs) see patients consulting for mental health problems in primary care, studies show their limited capacities in the field [6,14-16]. Second, while the Ministry has adopted the *2013 Tunisian National Strategy for the Promotion of Mental Health*,

some barriers continue to challenge the treatment and management of mental health conditions in primary and community-based settings: 1) substance use disorders are heavily stigmatized in Tunisia [6,17,18]; and 2) restrictions placed upon PCPs related to the prescription of psychotropic medications [19]; and 3) the continued allocation of most of the funding for mental health (and, therefore, resources) to specialized care [6,17,18].

Feasible and scalable ways to address the rise of untreated mental health symptoms in primary care settings is therefore a priority in Tunisia and other low- and middle-income countries (LMICs) facing similar issues [20-22]. Given the involvement of PCPs in mental health care, albeit with often limited capabilities [6,14-16], a mental health training program was offered to these non-specialists. Specifically, a training program based on the *Mental Health Gap Action Programme (mhGAP) Intervention Guide (IG)* (*version 1.0*) [23], developed by the *WHO*, was offered to PCPs working in the Greater Tunis area between February and April 2016, and evaluated between January 2016 and September 2017. The training program's implementation and evaluation were part of a pilot project undertaken collaboratively between members of the Ministry of Health in Tunisia, the *School of Public Health* at the *Université de Montréal* (Québec, Canada), the *WHO* office in Tunisia, and the *Montreal WHO-Collaborating Center (CC) for Research and Training in Mental Health* (Québec, Canada).

The *mhGAP-IG* is a training included under the *mhGAP* umbrella, an evidence-based program that aims to help build system capacity in LMICs by further developing and integrating mental health into primary care and community-based settings [24,25]. The *mhGAP-IG* training, currently in its second version [26], is used to help train non-specialists working in non-

specialized settings in effective mental health care for what the *WHO* considers priority mental, neurological, and substance use disorders in LMICs. These include: depression, psychosis, epilepsy/seizures, developmental disorders, behavioural disorders, dementia, alcohol use disorders, drug use disorders, and self-harm/suicide [23,26]. The guide is unique. First, the *mhGAP-IG* was developed through a rigorous process. A systematic review of evidence available in mental health (e.g. detection, treatment, and management) was conducted, extracting data on interventions that have been proven effective [27]. The *mhGAP-IG* presents these interventions (i.e. "what to do") using easy-to-follow diagrams [23,26]. Second, the *mhGAP-IG* was developed through international participatory processes. Specifically, the guide was developed by including expert opinions from researchers, decision-makers, and healthcare professionals [27,28]. Third, the guide is updated every couple of years to include the latest evidence on mental health care delivery in LMICs specifically, as well as extensive feedback from experts who have used its previous versions [26,28]. Last, the *mhGAP-IG* is accompanied by training and evaluation tools to facilitate implementation and research. These include: facilitator guides, trainee guides, PowerPoint presentations, a contextualization guide to help adapt the training material and content to local healthcare realities, knowledge questionnaires, and supervision sheets [28].

Since its launch in 2010, the *mhGAP-IG* training has been utilized in over a hundred countries [29,30]. Given that it is a standard training program, the *WHO* suggests its adaptation before implementation. The next section of the paper gives a brief overview of the training program's adaptation to and implementation in the Greater Tunis area of Tunisia.

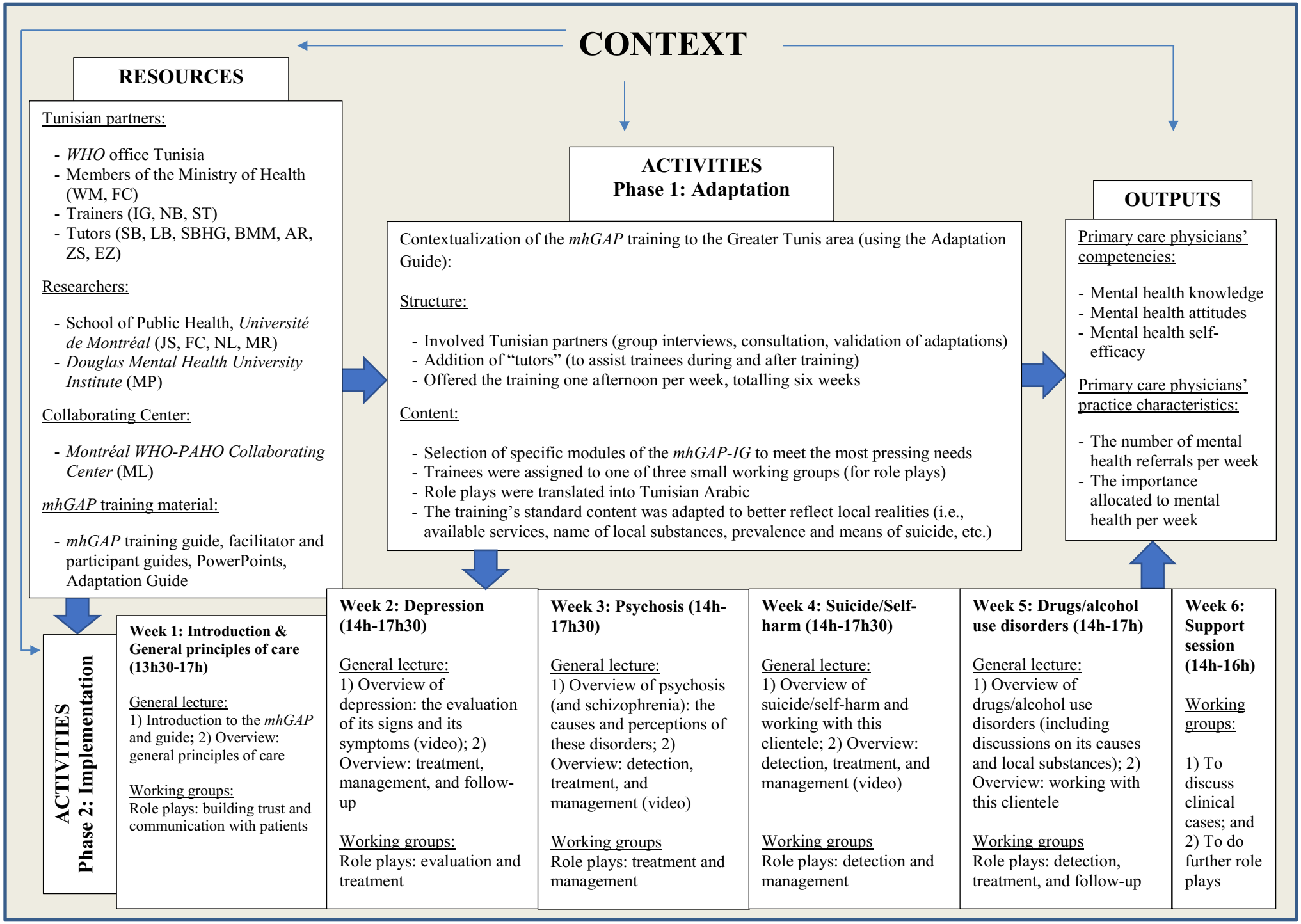
Program description

Members of the Tunisian Ministry of Health (WM and FC) chose specific *mhGAP-IG* training modules [23] considered priorities in the country. These included: general principles of care, depression, psychosis, suicide/self-harm, and substance use disorders (i.e. alcohol and drug use). Using the *mhGAP-IG*'s accompanying Adaptation Guide, these modules were adapted to meet the Greater Tunis area's local primary healthcare realities in consultation with members of the Tunisian Ministry of Health, three Tunisian psychiatrists ("trainers"), and seven physicians responsible for continuing medical education in the Greater Tunis area ("tutors") [17]. Tutors, well-versed in mental health detection, treatment, and management, were assigned to help trainees during and after training. They also assisted trainers during training sessions.

The training was conducted over six weeks for a total of 19 hours. The first five weeks consisted of general lectures, role plays, and group discussions on the chosen modules, totaling 17 hours. The last training session consisted of a two-hour support session animated by trainer-psychiatrists. This session allowed trainees to present challenging mental health cases and perform further role plays. *Figure 1* highlights components of the training's adaptation and implementation in the Greater Tunis area of Tunisia.

The training program was evaluated in two ways. First, using a randomized controlled trial, our team assessed the training program's impact on PCPs' mental health knowledge, attitudes, self-efficacy, and self-reported practice (i.e. the importance allocated to mental health care per week and the number of referrals to specialized services done per week). These competencies and practice characteristics are listed as "outputs" in *Figure 1*. Second, using

Figure 1: mhGAP-IG implementation model for the Greater Tunis area of Tunisia



implementation analysis, our team explored how contextual factors might influence the program's implementation (i.e. through the adaptation of the training program to local primary healthcare realities of the Greater Tunis area [17]) and might interact with the program to influence its expected outcomes [19].

Objective

In this paper, we share the lessons learned from our program that focused on integrating mental health into primary care in Tunisia by adapting, implementing and evaluating a training based on the *mhGAP-IG* (version 1.0) [23] in the Greater Tunis area. Such lessons are supported by relevant literature in the field of *Global Mental Health*. We hope that our experiences may be useful to other LMICs in their quest to target untreated mental health symptoms with similar programs in primary or community-based settings.

Discussion

Lesson 1: Developing partnerships

Partnerships are relationships between stakeholder groups with different skills and expertise but collaboratively working together to accomplish a goal [31]. In the case of our program, relationships with the following partners were developed: a research institution (the *School of Public Health* at the *Université de Montréal*), the political realm (the Tunisian Ministry of Health), the medical field (members of the Tunisian Ministry of Health who closely collaborated, through their affiliation with *Hôpital Razi* and *Hôpital Mongi-Slim*, with three Tunisian psychiatrists and seven PCPs in charge of continuing medical education in the Greater Tunis area), and international organizations (the *WHO* office in Tunisia and the *Montréal WHO-PAHO CC for Training and*

Research in Mental Health). Of note, these partnerships also constitute ties between a high-income country (HIC) (i.e. Canada) and an LMIC (i.e. Tunisia).

A priority in *Global Mental Health* is to create partnerships in order to generate information that establishes *"the health needs in a given setting, to propose culturally apt and cost-effective individual and collective interventions, to investigate their implementation, and to explore the obstacles that prevent recommended strategies from being implemented"* [32]. However, the traditional position of research institutions in HICs—that is, as producers and gatekeepers of knowledge, following their own research agendas independently of those of key stakeholders where research is to be conducted [33]—fails to address this priority in the field of *Global Mental Health* [34]. Instead, partnerships must ensure that needs are adequately identified, articulated, and addressed, specifically by stakeholders with vested interest in them [35]. Partnerships must also ensure methodological aspects of research are developed to ensure their feasibility within local contexts [36].

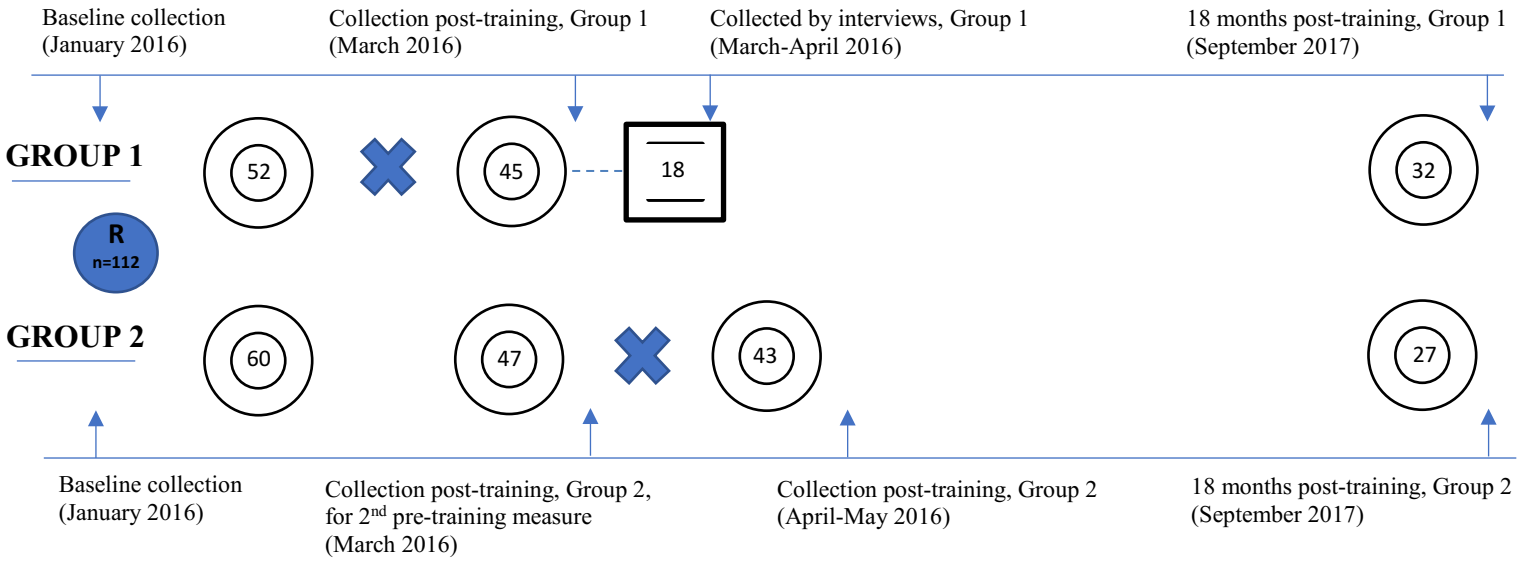
Input from members of the Ministry of Health guided our program. Based on their involvement in the development and launch of the *2013 Tunisian National Strategy for the Promotion of Mental Health* [6], they highlighted practical and research needs to be addressed in collaboration with our research team, using each stakeholder group's strengths and skills. For example, while mental health training programs have been offered to PCPs in Tunisia, these were not offered as part of a systematic national program, such as under the leadership of the *Committee for Mental Health Promotion.* They were offered, however, under the leadership of individual governorate directors. Therefore, it was of interest to include a mental health training program as

part of a national entity's responsibilities [6,15]. The Director of the *Montréal WHO-PAHO CC for Research and Training in Mental Health* suggested the use of the *mhGAP-IG* training due to his familiarity with the program, his knowledge of its wide implementation in LMICs (29, 30), and its novel training aspects, such as role plays, videos, and tools (i.e. guides and evaluation components) [28]. Besides meeting practical needs in the country, the implementation of the *mhGAP-IG* in Tunisia would also serve to expand the program's limited evidence in French-speaking nations [37]: Tunisia, to our knowledge, is one of the first French-speaking nations to implement and evaluate a mental health training based on the *mhGAP-IG* [29,38].

In addition, members of the Ministry of Health informed our team of the country's research gaps in the field of mental health. These included: a portrait of PCPs' mental health competencies in the Greater Tunis area, to help inform training material and aspects of health policy; an understanding of contextual barriers preventing the attainment of desired mental health training results, never explored before in Tunisia; and a short- and long-term assessment of the impact of an implemented mental health training program on PCPs' competencies, also never before assessed. Our research team sought to address these gaps by developing specific research objectives with accompanying methodologies that were deemed feasible by members of the Ministry of Health, all the while building local research capacity [6,35]. A randomized controlled trial (RCT) was thus suggested by members of the Ministry of Health and the WHO office in Tunisia. It was also supported by the directors of the governorates of the Greater Tunis area. This methodology allowed us to invite public-sector PCPs working in the Greater Tunis area to the mental health training and randomize participants into two groups: Group 1 (n=52) and Group 2 (n=60). Both groups participated in the mental health training program at different times,

ensuring: 1) that all those interested would receive the training; 2) that the training's short-term impact on PCPs' mental health competencies would be assessed in comparison to a control measure; and 3) that the training's long-term impact would be assessed by pooling both groups, increasing statistical power. Offering the training to both groups but at different times also encouraged the interviewing of PCPs who completed the first round of training in order to explore how contextual factors interacted with the implemented program to influence its expected outcomes. Of the 45 PCPs assigned to Group 1 who completed the training, 18 participated in individual or group interviews between March and April 2016 [19]. In addition, the RCT's pre-training questionnaires, administered to consenting PCPs prior to randomization (n=112), helped us to paint a portrait of their mental health clinical practice and competencies [15]. *Figure 2* illustrates the adopted methodology to evaluate the training program in the Greater Tunis area of Tunisia.

Figure 2: Evaluation of the mhGAP-IG training in the Greater Tunis area of Tunisia



R = Randomization
X = Training

The research objectives and methods discussed and developed in partnership are not only of interest to Tunisia but fit globally into the larger initiative of building research capacity in *Global Mental Health.* First, conducting an RCT where the intervention is offered to both groups of participants at different times responds to ethical questions raised around offering an intervention to one group over another despite the limited mental health resources in LMICs [35]. Second, to evaluate a mental health intervention such as a training program, RCTs and implementation analyses as complementary methodologies are encouraged to help generate practical (but local) knowledge for health systems [36]. This practical and local evidence may influence important decisions regarding the intervention's scale-up within specific contexts [39, 40]. Third, results respond to the deficits in mental health evidence from LMICs [35]. Specifically, while 90% of the global population live in LMICs, only between 3% and 6% of the mental health research published in high-impact journals comes from such countries [32].

Some grants support partnerships for the development of research capacity, specifically for those partnerships within the field of *Global Mental Health* and with a vested interest in developing collaborations between income groups [35,41]. These targeted opportunities are important considering the limited global health funding allocated specifically to *Global Mental Health* research, especially within LMICs [11,32,35,42]. However, for this program, funding was obtained through organizations that support such partnerships more generally in the field of health: 1) *Mitacs Globalink* [43], an organization funded in part by the *Government of Canada* to create partnerships between academic institutions in order to better train students in global health research; and 2) the *New Initiatives Funding of l'Institut de recherche en santé publique de l'Université de Montréal* (*IRSPUM*) [44], which supports new collaborations in order to develop

research on topics currently under-represented at the *School of Public Health* at *Université de Montréal.* By applying to funding from initiatives beyond those centered solely on *Global Mental Health* research development, our aim was to increase the visibility of our project and our new collaboration, as well as the visibility of mental health in general, an under-represented discipline in global health [45].

Lesson 2: Benefitting from political commitment to mental health

Tunisia is a country politically invested in improving its mental health system, specifically by furthering the transition from institutional to primary and community-based settings. This vested interest has not only been seen in the drafting and adoption of the *2013 National Strategy for the Promotion of Mental Health* [6] but in important developments around this strategy. First, the Ministry of Health created the *Committee for Mental Health Promotion* to lead activities related to the strategy's implementation. Interestingly, the Ministry appointed Dr. Wahid Melki as its Director, a chief psychiatrist at *Razi Hospital*, the only operating mental health hospital in the country [6,17,18], but also a PCP by training. His early career as a PCP allowed him to truly grasp the challenges behind, but also the necessity of, offering effective mental health care in primary care settings. Therefore, his vested interest has been to work on building PCPs' mental health capacities in primary care settings and to encourage the organizations in which they work to support this endeavor also. Second, the Ministry of Health revamped the university curricula by drafting and passing a decree for the inclusion of a mandatory two-month mental health internship in post-graduate medical school, previously optional for future family physicians [46]. The first graduating class under the new curricula is planned for 2019.

The drafting of the mental health strategy and Tunisia's interest in further developing PCPs' mental health capacities were not independent of contextual events but aligned with a process to involve Tunisian citizens in identifying potential tracks for country-wide health system reform [10]. Such a process was locally known as *le dialogue sociétal* [the societal dialogue], where Tunisian citizens participated in focus groups to identify health care system challenges [10]. After verbatim analysis, eight reform tracks were established, one of which was to strengthen health system capacity by creating proximity health services [10]. This reorganization aimed to: 1) promote the use of multidisciplinary teams in primary care settings; 2) valorize general medical practice; and 3) further equip primary care practitioners in effective patient management. This reform track was also discussed extensively as a way of meeting the untreated mental health needs in Tunisia [6], specifically by developing an already existent resource (i.e., PCPs) engaged in mental health care but with apparent deficits [6,14-16].

Our program worked amidst this political enthusiasm, or what the field of *Global Mental Health* calls "political commitment to mental health system development" (i.e., *"the organized intentions and actions of key decision-makers in a society, especially political leaders, to respond effectively to the mental health needs of the population"* [47]). "Special attention" to mental health capacity-building in the country thus offered a unique way to forge and foster partnerships with a communal goal: the training of already graduated PCPs in effective mental health care using the *mhGAP-IG* [*23*] and the program's evaluation. Given this momentum and the mental health champions among our partners (i.e., members of the Ministry of Health), funding for the implementation of the *mhGAP-IG* training was covered by the *WHO* office in Tunisia, fostering local ownership of its implementation. In addition, findings show that benefitting from this

political commitment to mental health could increase the use of research in policy by creating *"a receptive policy environment [for] the 'right research at the right time'"* [48].

Lesson 3: Piloting the program to "build back better"

"Building back better" is a term used by the *WHO* for mental health care after emergencies [49]. In this paper, we use the term to refer to suggested improvements after piloting an intervention.

Given widespread untreated mental health symptoms in LMICs, the *Global Mental Health* movement aims to scale up evidence-based mental health interventions, particularly those that are feasible and effective at promoting the integration of mental health within primary and community-based settings [20-22]. Scaling up is defined as *"efforts to increase the impact of innovations successfully tested in pilot or experimental projects so as to benefit more people and to foster policy and programme development on a lasting basis"* [50]. At the heart of this definition is the piloting of interventions within contexts that are considering innovation scale-up to better understand if they are feasible, effective, and sustainable.

Several steps were taken to pilot the *mhGAP-IG* in Tunisia. First, given that the *WHO* encourages the adaptation of the *mhGAP-IG* training to local contexts before implementation [23,26], our team allocated four months (i.e., September 2015 to January 2016) to its adaptation to the local primary healthcare reality of the Greater Tunis area. Our team published the adaptation details [17], which filled a gap in the *Global Mental Health* literature [29], to facilitate replication and/or help other LMICs undergo such a process. In brief, the adaptation process ensured that: 1) training modules from the *mhGAP-IG* were chosen to meet pressing local needs and contextually

adapted; 2) a training schedule was tailored to the availability of PCPs to encourage their participation; 3) a support network of "tutors" was developed (i.e., PCPs well-versed in mental health care and in charge of continuing medical education in the Greater Tunis area) to help trainees during and after training, which was especially important given specialists' heavy time constraints; 4) role plays were translated into Tunisian Arabic to mirror real-world consultations; and 5) gaps in mental health services within primary and community-based settings were identified [17].

Our team believes that a strength of the adaptation process during this pilot phase was the creation of a support network for trainees, using an already existing yet available resource (i.e., "tutors") in primary care settings. Given the *WHO*'s emphasis on ongoing supervision when offering the *mhGAP-IG* training [23,26], but also Tunisia's inability to mobilize mental health personnel to provide such support, our team developed a realistic way of supporting trainees that could be piloted and easily reproduced on an ongoing basis should the program be scaled up. Of note, mobilizing an already existing yet available resource to provide support to trainees was similarly highlighted as a major strength during one of the first *mhGAP-IG* training demonstrations on clinical utility in Nigeria [51]. It is worth noting, however, that our team had limited contact with "tutors" post-training. Therefore, despite their role as "tutors" to trained PCPs, it is difficult to know how they explicitly conducted their assigned tasks post-training and to what extent they had an influence on the training program's expected outcomes.

Second, the adapted training program was assessed using an RCT. Pilot results suggest that the adapted program can increase mental health knowledge and self-efficacy, while decreas-

ing referrals and negative mental health attitudes among PCPs in the Greater Tunis area of Tunisia. However, our findings reveal no impact on the importance PCPs allocate to mental health practice. While the goal of our pilot trial was not to generalize results to all PCPs working in Tunisia, but rather to see whether the training program worked in the Greater Tunis area, these results do hint at possible outcomes should the training program be offered to public sector PCPs working in other areas of Tunisia who would agree to participate in a mental health training. Regardless, an RCT design is unable to provide a plausible explanation for these findings. Hence, qualitative methods become necessary to better understand the context in which the intervention was implemented [27,52-54]. Implementation analysis is thus a priority in the *Global Mental Health* field, since it helps identify practical challenges that decision-makers could address to further encourage the implementation of programs that support the use of non-specialists such as PCPs in mental health care and that promote the integration of mental health into primary care settings [20-22,27,52-54].

Eighteen Tunisian trainees interviewed identified several barriers when describing contextual factors influencing the *mhGAP-IG* training's expected outcomes [19]. These include: 1) *structural factors* (e.g. restrictions that challenge PCPs' prescription of certain medications, stigma against substance use and misuse, the political favoritism of physical illnesses, and the non-systematic implementation of continuing mental health training for PCPs); 2) *organizational factors* (e.g. logistical issues for the provision of care, such as the lack and uneven distribution of certain medications, and the difficulty of collaborating with medical personnel untrained in mental health care); 3) *provider factors* (e.g. PCPs' limited mental health experience and their need to be self-motivated to provide care to patients consulting for mental health issues); 4) *patient factors*

(e.g. patients' often negative beliefs about the health system and healthcare professionals, as well as their limited motivation to seek care); and 5) *innovation factors* (e.g. limits to the clinical utility of the training curriculum and issues with scheduling, potentially explaining drop-out). Interestingly, some of the contextual factors highlighted by trainees also mirror the gaps identified during the adaptation process [17]. These include: lack and uneven distribution of psychotropic medications across healthcare clinics in the Greater Tunis area, stigma against substance use and substance misuse, as well as deficits in continuing mental health training for PCPs [17].

Besides potentially affecting the integration of mental health into primary and community-based settings and influencing PCPs' involvement in the field of mental health, such contextual barriers are important to consider for two additional reasons. First, they may potentially reproduce or perpetuate, over the long-term, certain gaps uncovered prior to training in PCPs' mental health knowledge (i.e. lower scores on content related to substance use disorders and suicide/self-harm), attitudes (i.e. beliefs about the dangerousness of people with mental health issues), and self-efficacy (i.e. lower scores on confidence in capabilities to detect, treat, and manage what PCPs deem more complex mental health conditions, such as substance use disorders, suicide/self-harm, and psychosis) [15]. Second, contextual factors, identified by 18 interviewed PCPs, might challenge the training program's scale-up to other regions of Tunisia. Our sample of interviewed PCPs consisted of those working in the public sector from one area of Tunisia. However, we believe that our findings are useful for informing program scale-up. Specifically, PCPs working in the public sector of the Greater Tunis area experience similar barriers to effective mental health care as in other Tunisian regions. Nonetheless, while considering scaling up such a training

program, it would be useful to develop and implement initiatives to tackle contextual factors that may challenge the attainment of its expected results.

Another promising feat of piloting an intervention is the ability to test the feasibility of implementing its specific modules, research methodology, and tools. First, when preparatory work was in progress prior to the implementation of the *mhGAP*-based training in the Greater Tunis area, some of the program's crucial elements were unavailable to the research team. For example, while rates of anxiety disorders have increased since the 2010-2011 Tunisian Revolution and remain a concern, at the time of adaptation and pilot implementation, the accompanying training material (i.e., PowerPoints, facilitator guides, and participant guides) for the module on conditions related specifically to stress [55] was not available in the language in which medical training is provided. This unavailability was an implementation barrier to a much-needed module [17].

Second, by tailoring the standard training content and program to local primary care realities of the Greater Tunis area of Tunisia, systemic gaps were uncovered in resources for mental health treatment suggested by the *mhGAP-IG* [23]. These include deficits in community-based mental health services for people living with mental illness, such as little investment in subsidized housing and the unavailability of supported housing and supported employment initiatives [17]. In addition, while many standard modules of the *mhGAP-IG* include therapeutic interventions as part of the management skills to be developed by trainees (i.e., behavioural activation, interpersonal therapy, cognitive-behavioural therapy, contingency management therapy, family counselling/therapy, interpersonal psychotherapy, and motivational enhancement therapy),

trainings in such therapies in Tunisia are reserved for psychosocial care providers, such as psychologists or psychiatrists [17]. As a result, psychotherapy is very rarely conducted by PCPs in Tunisia. These uncovered deficits may be addressed by the promotion of treatments that use resources currently available in Tunisia (albeit distributed unevenly across the country), namely psychotropic medications. This reality in Tunisia [6,17] and in other LMICs [11] might challenge the *WHO*'s vision of the *mhGAP-IG*'s self-sufficiency as a package offering a diverse set of complementary and necessary interventions for mental illness [23,24,26].

Last, one of the most surprising discoveries made during the pilot testing of the *mhGAP-IG* in the Greater Tunis area was the number of challenges PCPs had when asked to report their mental health statistics. PCPs reported these by filling out a mental health practice questionnaire based on the *Mental, Neurological and Substance Use Patient Visit Summary* developed by the *WHO* to accompany the *mhGAP-IG* training and included in the original research protocol [38]. Interestingly, these mental health statistical issues were explained by a complementary methodology: trainees acknowledged that while the Tunisian Ministry of Health has been encouraging PCPs to record mental health statistics per primary healthcare clinic, they also experienced limited follow-up by administrators, which has consequently jeopardized the institutionalization of proper record-keeping [19]. Information from trainees on such a challenging part of the methodology helped us gain a clear understanding of why it proved problematic. In addition, administering questionnaires allowed us to provide some measure of reliability for these scales, based on our sample from the Greater Tunis area. Interestingly, while the attitudes questionnaire used in our trial (i.e. the *Mental Illness: Clinicians' Attitudes (MICA)*

Scale (version 4.0) [15,56,57]) had acceptable internal consistency in a previous study [56], it did not show results that were as promising in our sample [15].

Our pilot results, generated by diverse and complementary methodologies [52,53], may thus be used to "build back better" should the program be scaled up. Insight from our pilot program may be used to improve: 1) the training program itself, by rendering it more clinically useful and relevant; 2) the implementation of the training program, by ensuring that material accompanying certain modules is available; 3) the research program, by brainstorming on the tools best suited to collect data; 4) the mental health system, by addressing gaps in available resources and organizational barriers to effective mental health care and collaboration; and 5) mental health policies, by addressing restrictions on PCPs' prescription abilities and stigma against substance use and misuse.

Lesson 4: Sharing research findings

Priority for the dissemination of results has traditionally been through written reports, publications, and conference presentations [58,59]. Such mediums are important for the dissemination of findings in the field of *Global Mental Health*, especially given evidence of the limited representation of mental health at international global health conferences [60] and in the global health literature [32,35].

To share findings from this program, our team aimed to: 1) produce several publications in both English and French, the medical language in Tunisia; 2) participate in various research conferences; and 3) further develop individual research capacities by encouraging the

involvement of local collaborators in the writing and publication process [34]. For example, many of our Tunisian collaborators contributed to literature reviews, especially sections pertaining to information about the Tunisian healthcare system, the results and discussion sections, and manuscript revisions, all to ensure that information adequately represented contextual realities. Such involvement also aimed to build research capacity in the country [6] and, more generally, in the EMR, the *WHO* region in which Tunisia is represented. Records show that research initiatives in the EMR are disproportionately low in comparison to the disease burden [12,61,62].

Despite the dissemination of research findings through more traditional mediums, knowledge-to-action gaps in the *Global Mental Health* field continue to persist [62]. Therefore, discussions of strategies for ensuring greater knowledge uptake to improve mental health practices, services, and policies beyond these traditional realms are of international focus [64,65]. Findings reveal that knowledge translation (KT) strategies, which aim to move beyond the diffusion of findings uniquely to the promotion of exchanges on such findings with key stakeholder groups [53,59], have been shown to be effective in improving mental health practices and policies [64]. Our team attempted to uphold the principles of KT by relying on a feasible strategy: the organization of a dissemination session in Tunisia. The session regrouped PCPs who participated in the training program and accompanying research, trainer-psychiatrists, PCPs in charge of continuing medical education in the Greater Tunis area (i.e., "tutors"), members of the Ministry of Health, members of the *WHO* office in Tunisia, and directors of the governorates of the Greater Tunis area, in order to provide opportunities for exchange on preliminary findings from the program. Besides feedback on findings, this session resulted in the creation of key recommendations on ways to further PCPs' involvement in mental health care, including those

identified by the research, while others moved beyond it. Recommendations were regrouped into a report and sent to all trainees for additional comments, prior to being used as a reference by the mental health champions in our research team during discussions with the Ministry of Health on future mental health priorities for the country.

Interestingly, when discussing the dissemination session, one of our Tunisian partners shared: *"In my years involved in mental health research, this is the first attempt to regroup study participants and share with them the preliminary findings they helped produce."* This statement was shocking to many of our Canadian collaborators, seeing as KT *"has been adopted in Canada because translation of research is embedded in the mandate of the Canadian Institutes of Health Research (the federal agency for the funding of health research)"* [59]. Therefore, encouraging and facilitating a culture of KT in *Global Mental Health* research is of utmost importance. Such development may be facilitated through targeted grants—for example, the one our research team received to disseminate results in the country in which the findings were collected [66]—or by making KT strategies mandatory upon the receipt of grants that fund *Global Mental Health* research.

Conclusion

The adaptation, implementation, and evaluation of a program based on the *mhGAP-IG (version 1.0)* [23] in the Greater Tunis area of Tunisia generated important lessons learned, supported by evidence in the field of *Global Mental Health*. Our hope is that such experiential knowledge may be of use to other countries also interested in addressing high levels of untreated mental health symptoms by developing, implementing, and evaluating programs that aim to build: 1) non-

specialists' mental health competencies; and 2) the capacity of health systems to further integrate mental health into primary care. Both endeavors are priorities in *Global Mental Health*.

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Ethics
Research approval was obtained from the *Université de Montréal* (Québec, Canada) (#15-117-CERES-D) and *Razi Hospital* (Manouba, Tunisia).

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Authorship contributions
JS, FC1, NL, WM, FC2, and MP were involved in the conception of the study in which this manuscript is inscribed. JS developed the idea for this "lessons learned" manuscript. JS also collected, analysed, was involved in the interpretation of the data referred to in this paper, wrote the first draft of the manuscript, and made/integrated suggested corrections to subsequent versions. FC1, NL, MR, and FC2 provided input on statistical analyses conducted and were involved in the interpretation of the data. IG, NB, SB, LB, SBHG, BMM, AR, ZS, and EZ were instrumental in tailoring the developed training program and content to reflect the primary care realities of the Greater Tunis area of Tunisia. ML was instrumental in the development of the training program structure for the Greater Tunis area of Tunisia. FC2, IG, and NB provided input on contextual information about the Greater Tunis area of Tunisia. All authors read and approved the manuscript.

Competing interests
Dr. Marc Laporta works for the *Montréal World Health Organization (WHO)-Pan American Health Organization (PAHO) Collaborating Center for Research and Training in Mental Health* (*Douglas Mental Health University Institute*). All other authors declare no conflicts of interests. The authors completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf

(available upon request from the corresponding author), and declare no further conflicts of interest.

List of abbreviations
WHO: World Health Organization
CC: Collaborating Center
PCPs: primary care physicians
mhGAP: Mental Health Gap Action Programme
IG: Intervention Guide
EMR: Eastern Mediterranean Region
LMICs: low- and middle-income countries
HIC: High income country
IRSPUM: Institut de recherche en santé publique de l'Université de Montréal
KT: Knowledge translation

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5.4. Dissertation limitations

While Article 6 (Section 5.3.2) in this dissertation provides an overview of the study's practical and research contributions, including its pertinence to the field of *Global Mental Health*, the project was not without limitations. Training (Section 5.4.1) and research (Section 5.4.2) limitations are outlined below.

5.4.1. Training limitations

The *mhGAP-IG* training, in both its versions (*WHO,* 2010; 2016), fills an important gap in the *Global Mental Health* field. As highlighted in the dissertation, it comprises a standard guide developed to target the alarming burden caused by mental health conditions in LMICs. Specifically, the *mhGAP-IG* regroups available evidence from such countries that non-specialists may use, once adapted to local contexts, to detect, treat, and manage mental health conditions in non-specialized settings (Eaton et al., 2014; Gureje & Stein, 2014; Keynejad et al., 2018; *WHO*, 2010; 2016). Despite its international acclamation and implementation, it is not without critique.

Authors have suggested that despite including mental health care delivery as an integrated package (i.e., treatment and management by involving pharmacotherapy, therapies, family psychoeducation, and community-based mental health resources such as supported housing and supported employment), the *mhGAP-IG*, as implemented in many LMICs, may be quite biomedical. First, the literature thoroughly documents the limited community-based resources used to promote the recovery and social inclusion of people living with mental illness in LMICs (Patel et al., 2018; *WHO*, 2013; *WHO*, 2018a). These deficits might interfere with the *WHO*'s vision of offering the *mhGAP-IG* as a package that includes a diverse set of complementary and

necessary treatments for mental illness. For example, by tailoring the standard training content and program to local primary care realities of the Greater Tunis area of Tunisia, systemic gaps were uncovered in resources suggested by the *mhGAP-IG* for mental health treatment. These include deficits in community-based mental health services for people living with mental illness, such as little investment in subsidized housing and the unavailability of supported housing and supported employment initiatives (Spagnolo et al. 2018b). In addition, while many standard modules of the *mhGAP-IG* include therapeutic interventions (i.e. behavioural activation, interpersonal therapy, cognitive-behavioural therapy, contingency management therapy, family counselling/therapy, interpersonal psychotherapy or motivational enhancement therapy) as part of the management skills to be developed by trainees, trainings in such therapies in Tunisia are reserved for psychosocial care providers, such as psychologists or psychiatrists (Spagnolo et al., 2018b). Thus, psychotherapy is very rarely conducted by PCPs in Tunisia. Hence, these deficits in resources may promote treatments using resources available in Tunisia (albeit unevenly across the country), namely psychotropic medications. Second, as White and Sashidharan (2014) suggest, despite the inclusion of treatments beyond pharmacotherapy, *"the first line treatment recommended in many of the mhGAP-IG templates for intervention is psychotropic medication"* (p. 415). Authors suggest that medication, when considered as a first-line treatment in standard training guides such as the *mhGAP-IG*, may reduce the inclusion of other supports (i.e., supported housing, supported employment, and therapies) essential to the recovery of people living with mental illness, if available (Hayes et al., 2018; Kinoshita et al., 2013; Piat et al., 2018a; Piat et al., 2018b; White & Sashidharan, 2014). In addition, it is important to note that an over-reliance on medication for patients, especially over the long term, is problematic; there is evidence showing that prolonged use of antipsychotics, mood stabilizers, and some antidepressants may contribute

to increased risk of cardiometabolic diseases (Abosi et al., 2018; Weinmann & Read, 2009; *WHO*, 2018d). These risks are important to consider given that they are evaluated as the main contributor to excess mortality in people living with severe mental illness (*WHO*, 2018d).

Of note, when preparatory work was in progress prior to the implementation of the *mhGAP*-based training in the Greater Tunis area of Tunisia, many of its crucial elements were unavailable to the research team. While rates of anxiety disorders have increased after the 2010-2011 Tunisian Revolution and remain concerning, at the time of adaptation, the accompanying training material (i.e. PowerPoints) for the module on conditions specifically related to stress (*WHO* and *UNHCR*, 2013) was not available in the country's working languages: French and Tunisian Arabic. This unavailability was a major implementation barrier to a much-needed module in the country. However, anxiety disorders were covered indirectly by the depression module of the standard *mhGAP-IG* (*version 1.0*) (*WHO*, 2010).

5.4.2. Research limitations

The study also carried certain methodological limitations. First, the study's goal was not to generalize results to all PCPs working in Tunisia, but to see if the training program worked in the Greater Tunis area of Tunisia before considering larger-scale implementation. Hence, we cannot ascertain if our results are generalizable to all PCPs in Tunisia. However, given the similarity between the Greater Tunis area to other governorates in Tunisia, we assume that: 1) mental health competencies and gaps highlighted in Article 3 (Section 4.4) (Spagnolo et al., 2018a) might be similar to those of public sector PCPs working in other areas of Tunisia who would agree to participate in a mental health training; and 2) the training might have similar short- and long-term

impact on the competencies of public sector PCPs working in other areas of Tunisia who would agree to participate in a mental health training, as highlighted in Article 4 (Section 4.5). In addition, in Article 5 (Section 4.6) (Spagnolo et al., 2018c), which aimed to explore contextual factors from the Greater Tunis area that interacted with the training program to influence expected outcomes, the interviews conducted with 18 trained PCPs working in the public sector may have hinted at how contextual factors in the rest of Tunisia could affect the training program and its expected effects. In other words, while implementing the training in different areas of Tunisia and interviewing trained PCPs from those areas could result in additional contextual factors interacting with the program to influence its expected outcomes, we nonetheless believe that our findings are quite comprehensive, useful, and therefore transferrable; PCPs in the Greater Tunis area experience similar barriers to effective mental health care as in other regions. However, it is worthy of note that, given the exclusion from the study of PCPs with less than five years of clinical experience and those working in other structures than primary care settings (suggestions made by members of the Ministry of Health involved in the study and governorate directors of the Greater Tunis area of Tunisia), findings from this research cannot be generalized to PCPs with these characteristics.

Second, results in Article 3 (Section 4.4) and 4 (Section 4.5) are based on self-reports, not observed behaviour or reviews of patient records. Therefore, self-reports for practice characteristics should be considered an approximation. Future research avenues may include collecting such information by consulting patient records. However, we believe that self-reported information of such variables was appropriate especially since research uncovered challenges with mental health statistics and record-keeping in the Greater Tunis area (Spagnolo et al., 2018c).

Also, studies show that the self-reports of practice behaviours produce reliable information when measuring the effectiveness of a training program of PCPs' practice (Curry & Purkis, 1986).

Third, responses may have been driven by social desirability, especially at post-test after exposure to the training program (Grimm, 2010). Specifically, after the implementation of the training program, PCPs might have been influenced by the organizers' expectations of improvements in mental health attitudes, self-efficacy, and practice. However, social desirability bias might not be as worrisome of an issue in this research, especially for mental health attitudes. First, the goal of the mental health training based on the *mhGAP-IG* was to sensitize participants to their negative beliefs about mental health care and to their negative views of people living with mental illness. In this regard, if the training encouraged participants to recognize these negative beliefs and thus improve their answers on the questionnaires after participation, it seems as though it accomplished its goal. Second, the honesty reported by PCPs on questions with sensitive topics, such as the dangerousness of people with mental health problems and the public's need for protection from people with mental illness (Article 3, Section 4.4), seems to indicate authenticity and not a desire to please the training's organizers.

Fourth, while all scales were pre-tested prior to administration (Friedman et al., 2010; Spagnolo et al., 2018a), scales used to assess knowledge and self-efficacy were not previously validated using psychometric properties. However, we believe a strength of this dissertation is the provision of some measures of reliability for these scales, which were based on our sample from the Greater Tunis area and, which proved to be acceptable (Article 3, Section 4.4). In addition, it is important to note that while the *MICA-4* had acceptable internal consistency in a previous study

(Gabbidon et al., 2013), it did not show results that were as promising in our sample. We therefore aimed to improve internal consistency by reporting solely on eleven items from the original scale, which limited our ability to compare the overall score with other studies using all sixteen questions (Spagnolo et al., 2018a).

Fifth, the exploratory trial focused on the short-term and the long-term evaluation of the training's impact on mental health competencies and practice (Article 4, Section 4.5). Given that both groups of participating PCPs received the training at different times, the long-term evaluation did not have a control group to which the training's effects could be compared. While this design proved useful for accessibility and political reasons, it made it difficult to associate sustained effects to the training program. In addition, it may have thus been useful to include, as part of the study protocol, 1) interviews with trained PCPs 18 months post-training in order to understand, from their perspective, the contextual factors that interacted with the training program to influence its effects at that time, and 2) interviews with tutors in order to understand, from their perspective, how they are explicitly conducting their supportive role post-training. This information might have been pertinent for further understanding the quantitative results' evolution.

Sixth, results from the RCT show two issues related to internal validity worthy of mention (Dumville et al., 2006). The first issue is that Groups 1 and 2 were not comparable for the following characteristics: the governorates in which PCPs work and the number of people consulting for psychosis (or schizophrenia) per week (Article 4, Section 4.5). While results should be interpreted considering these imbalances, it is worth noting that differences between group baseline characteristics are more common in smaller samples, specifically those under 200

participants such as ours (Friedman et al., 2010). However, considering our smaller sample size, randomization, for the most part, proved successful (Friedman et al., 2010). The second issue is that completers and non-completers differed on certain socio-demographic and practice characteristics, and these characteristics seemed to influence the effect of the training on two mental health competencies: the importance PCPs allocated to mental health practice per week and weekly referrals to specialized services (Article 4, Section 4.5). For example, the majority of non-completers were more highly experienced PCPs. However, analyses found a negative relationship between experience as a PCP and importance allocated to mental health in practice per week. Hence, had these non-completers remained in the study, the effect of the training on the importance PCPs allocate to mental health practice per week might have been less than what was identified in the trial. It is worth mentioning that there seemed to be no relationship between the importance PCPs allocated to mental health practice per week and other mental health competencies assessed in the trial, such as mental health knowledge, attitudes, perceived self-efficacy, and weekly referrals to specialized services. In addition, non-completers in Group 1 and Group 2 (the control measure) had distinctive characteristics related to weekly referrals to specialized services. Specifically, non-completers in Group 1 were generally less likely to refer patients to specialized services, but those in Group 2 (the control measure) were generally more likely to refer patients to specialized services. However, analyses found a positive relationship between weekly referrals to specialized services pre- and post-training. Hence, had the non-completers in Group 1 and Group 2 (the control measure) remained in the study, the effect of the training on weekly referrals to specialized services in our trial might have been greater. This potential attrition bias (Dumville et al., 2006) might help explain why we did not observe a differential effect between Group 1 and Group 2 (the control measure) on weekly referrals to

specialized services over the short term using the *pretest-posttest control group design*, but did observe an effect over the short-term for Group 2 using the *one-group pretest-posttest design* and over the long-term using the *repeated measures design*.

Last, it is important to mention that PCPs in Tunisia see patients that also consult traditional forms of care (*tradithérapies* in French) (Ellouze et al., 2005; Bouhlel et al., 2013). However, information on these traditional aspects of care and cultural representations of mental illness were not themes that emerged in this dissertation. We believe that one of the reasons these themes did not emerge, despite PCPs being exposed to *tradithérapies* through their patients, is because the objective of this dissertation was to explore the impact of the training program on PCPs' competencies through their own perspectives. Had patients and their carers been involved in the study, perhaps these traditional aspects of care and cultural representations of mental illness would have been made explicit.

5.5. Future directions

5.5.1. Practice recommendations

Recommendations for future practice directions listed in this section of the dissertation have been inspired by the recommendations of both trained and interviewed PCPs (Article 5, Section 4.6) (Spagnolo et al., 2018c) and by discussions with members of the Ministry of Health involved in the implementation of the *mhGAP*-based training in the Greater Tunis area of Tunisia. These have also been informed by literature from the *Global Mental Health* field.

First, participants recommended that future training programs based on the *mhGAP-IG* be more clinically useful. Specifically, interviewed PCPs suggested: 1) including more information on treatments for substance use disorders and general pharmacology, specifically with regards to side effects and interactions between medications; 2) providing information on therapy with patients, specifically cognitive-behavioural therapy, given the limited availability of such training in Tunisia (Spagnolo et al., 2018b); and 3) prioritizing modules pertaining to youth mental health in order to facilitate their responsibilities in schools. In addition, many interviewed PCPs were unsatisfied with the logistics of the training program, which leaves room for improving future ones. Specifically, interviewed participants suggested: 1) elongating the training and adding more sessions to cover additional topics; 2) finding an alternative schedule to avoid feeling "rushed"; and 3) providing accompanying training documents that are written succinctly, with easy take-home messages from the theoretical presentations, group discussions, and role plays (Spagnolo et al., 2018c).

Second, participating PCPs interviewed specified they often felt unsupported by other healthcare professionals at the primary healthcare clinic (i.e., nurses and paramedics), given their limited knowledge about mental health. For example, many participants mentioned that nurses commonly questioned PCPs' authority to provide mental health treatment or heard untrained medical staff in effective mental health care using inappropriate, stigmatizing terms to refer to mental health patients (Article 5, Section 4.6) (Spagnolo et al., 2018c). This information suggests the need to train personnel beyond PCPs in order to: 1) further equip the mental health competencies and skills of other healthcare personnel in direct contact with PCPs; and 2) create a culture where the role of PCPs in mental health delivery is acknowledged and supported. Such

findings have also been highlighted by authors working in LMICs as essential to the success of task-sharing models (Hoeft et al., 2018; Kakuma et al., 2011; Kakuma et al., 2014; Mendenhall et al., 2014).

Third, participating PCPs worried that continuing mental health training programs, such as the one offered using the *mhGAP-IG* (*version 1.0*), might not be sustained (Article 5, Section 4.6) (Spagnolo et al., 2018c). Hence, this dissertation aims to highlight the necessity of offering additional training programs and/or refresher courses to PCPs (and other non-specialists) (Mendenhall et al., 2014; Padmanathan et al., 2013), especially as new evidence on effective treatment and management techniques become available in *Global Mental Health* (Dua et al., 2011; Patel et al., 2018; Wainberg et al., 2017; *WHO*, 2013; *WHO*, 2016).

Last, discussions with members of the Ministry of Health highlight the need for such training in other areas of Tunisia. Hence, discussions on the program's scalability by involving other stakeholder groups in the country becomes important. The contextual factors identified using Type I and Type III implementation analysis (Champagne et al., 2011), namely, those factors affecting implementation (i.e., through the tailoring of the program) and those that might interact with the implemented training program in the Greater Tunis area to influence its expected outcomes, may be embedded in these discussions (Article 5, Section 4.6) (Spagnolo et al., 2018c). Such information could offer decision-makers from other governorates practical recommendations to ensure that the training program's implementation is supported and tailored to local realities and that it attains its expected outcomes in other areas of the country as well

(Article 4, Section 4.5). However, discussions around the training program's scale-up should include the fact that no impact evaluation on patient outcomes has been conducted (Section 5.5.2).

5.5.2. Research recommendations

While this dissertation answers its research questions (Chapter 1, Section 1.3) using a sample of PCPs from the Greater Tunis area of Tunisia, several research recommendations should be made. First, it might be valuable for future research to consider the inclusion of patient outcomes when implementing and evaluating the *mhGAP-IG* in Tunisia using a similar methodology to the one employed in this dissertation. In addition to the information generated from this dissertation, the impact of the training program on patient outcomes might highlight crucial information that may be used by decision-makers when discussing the program's scale-up. While studies identified by Keynejad and colleagues' (2018) systematic review of the *mhGAP*-based training highlight that patient outcomes are assessed (Grelotti et al., 2015; Jordans et al., 2016; Khoja et al., 2016; Musyimi et al., 2017a; Musyimi et al., 2017b; Musyimi et al., 2018; Sheikh et al., 2017), it appears that only two of the identified 33 peer-reviewed articles employ an experimental design with a control group to conduct such an evaluation (Khoja et al., 2016; Sheikh et al., 2017). Of note, the systematic review (Keynejad et al., 2018) did identify two study protocols that outlined the assessment of an *mhGAP*-based training based on patient outcomes using an RCT (Halon et al., 2016; Siriwardhana et al., 2013). Therefore, research on patient outcomes specifically using an experimental design with a control group, such as an RCT design, would also serve to complement and add to the existing literature on the *mhGAP-IG* (Keynejad et al., 2018). It is also worth noting that the inclusion of patients (and even their carers) in future research on the *mhGAP-IG* in Tunisia might highlight the more traditional forms of mental health care and cultural understandings of

mental illness. This information is important to uncover in Tunisia, given that patients often consult both traditional forms of mental health care and more biomedical services offered, for example, by psychiatrists and PCPs (Ellouze et al., 2005; Bouhel et al., 2013). Such information could influence the use of the *mhGAP-IG* in PCPs' practice.

Second, in this dissertation, we explored some psychometric properties of the *MICA-4* scale (Gabbidon et al., 2013; The Indigo, 2018) (Article 3, Section 4.4) (Spagnolo et al., 2018a). Further research is needed to assess whether possible sub-scales (i.e., views of mental illness and the health/social care field, knowledge of mental illness, disclosure of mental illness, distinguishing mental and physical health care, and patient care for people with mental illness) are identifiable in our sample and comparable to the ones identified by the authors of the scale (Gabbidon et al., 2013).

Third, another potentially useful research track is the assessment of the training's impact on the mental health competencies and practice of trainer-psychiatrists and PCPs in charge of continuing medical education ("tutors"), who are key stakeholder groups involved in the implementation of the training program in Tunisia. While trainer-psychiatrists and tutors have increased levels of mental health knowledge and skills in comparison with participating PCPs in our sample, they may be subject to unfavourable attitudes towards mental illness. For example, as explored in this dissertation, it is not uncommon for PCPs (in our case "tutors") to hold negative views towards mental health and illness (Adewuya et al., 2007; Alfredsson et al., 2017; Jie et al., 2014; Kapungwe et al., 2011; Liu et al., 2008; Ungar et al., 2016; Van Boekel et al., 2013). In addition, it is also not uncommon for mental health personnel (in our case "trainer-psychiatrists")

to hold the same views as the general public on the need for social distance from people living with mental illness (Lauber et al., 2004). Such negative attitudes are important to address when implementing mental health training programs that target non-specialists, since they may: 1) hinder the success of task-sharing models by encouraging reluctance to take on mental health care delivery (Mendenhall et al., 2014); 2) discourage patients from seeking mental health care (Clement et al., 2015; Corrigan et al., 2014); and 3) decrease the quality of implemented interventions (Knaak et al., 2017; Sartorius, 2007; Thornicroft, 2008).

Last, given the study's exploratory nature, further research is needed to explore: 1) the associations among the socio-demographic and practice characteristics and PCPs' competencies (Article 3, Section 4.4) (Spagnolo et al., 2018a); and 2) potentially synergistic relationships between mental health knowledge, attitudes, self-efficacy, and self-reported practice (Article 4, Section 4.5).

GENERAL CONCLUSION

Tunisia has seen a rise in mental health problems, substance use disorders, and self-harm/suicide, causing a growing mental health treatment gap. However, access to effective mental health care in the country remains challenging. For example, PCPs, the most relied upon non-specialists to detect, treat, and manage mental health conditions, often lack mental health competencies and skills, and mental health personnel are unevenly distributed within the country. Hence, political investment has been centered on further training PCPs in effective mental health care. This dissertation aimed to implement and evaluate an *mhGAP*-based training (*version 1.0*) offered to PCPs working in primary healthcare clinics in the Greater Tunis area of Tunisia. A training program based on the *mhGAP-IG* has been extensively used in LMICs to help address the alarming mental health treatment gap, specifically by training non-specialists in effective mental health detection, treatment, and management.

The dissertation's results show the *mhGAP-IG* training program's usefulness in increasing the mental health knowledge, attitudes, and self-efficacy scores immediately after training. When comparing results pre- and 18 months post-training, these scores were maintained. In addition, 18 months post-training, PCPs reported a decrease in the number of referrals to specialized services in comparison to pre-training. However, these findings should be interpreted given the training program's interaction with contextual factors that either hindered or facilitated the attainment of its expected outcomes, as identified by PCPs. Hence, in order to ensure PCPs' effective (and sustained) involvement in mental health care, contextual barriers interacting with the implemented training, as identified in this dissertation, should be considered in parallel to the implementation of training programs. Findings may also be used by decision-makers of other LMICs interested in

implementing an *mhGAP*-based training who face similar challenges in further involving non-specialists in effective mental health care delivery at the level of primary care.

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APPENDICES

Appendix 1: Other mental health resources

1.1 Invited story

In 2016, the *Department of Mental Health and Substance Abuse* of the *World Health Organization* (*WHO*) Headquarters in Geneva, Switzerland, invited the candidate, on behalf of the research team and collaborators, to write a story for the *mhGAP newsletter* on the *mhGAP* training and program in Tunisia. The newsletter is quarterly and currently being disseminated online on the *WHO* website and to more than 4000 emails globally.

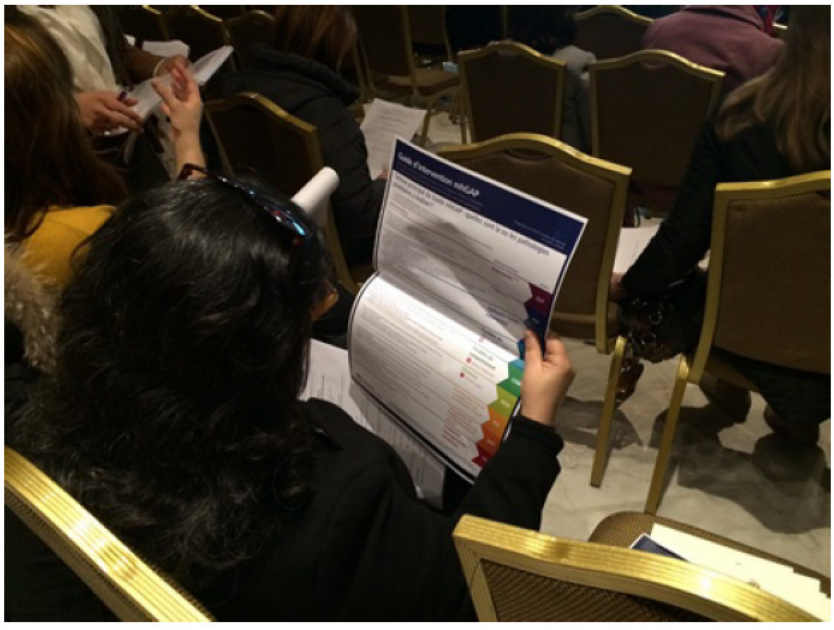
Spagnolo, J., Champagne, F., Leduc, N., Guisset, A.-L., Melki, W., Charfi, F., Laporta, M., Guesmi, I., Bram, N., Trabelsi, S., Piat, M., Saeed, K., & Sabatinelli, G. (2016, May). *Building general practitioner capacity in Tunisia by implementing the mhGAP.* WHO mhGAP Newsletter, Geneva, Switzerland.
Available online at: http://www.who.int/mental_health/mhgap/mhgap_tunisia/en/

World Health Organization

Mental health

Building general practitioner capacity in Tunisia by implementing the mhGAP

Tunisia currently faces significant mental health system challenges. While youth suicide and mental illness are on the rise, there is a dearth of mental health services across the country. It is estimated that more than one third of consultations with general practitioners (GPs) working in the Greater Tunis Area are mental health-related. Yet, the majority of GPs are not trained to effectively detect, treat and manage mental illness. Most people seeking mental health care, therefore, turn to the only standing and already overcrowded mental hospital in the country, Razi Hospital in Tunis, or to limited psychiatric units across the regional hospitals.



WHO G. Sabatinelli

To address the high mental health treatment gap, the Tunisian Ministry of Health, in collaboration with the WHO Country Office for Tunisia, the WHO Regional Office for the Eastern Mediterranean, the School of Public Health at the University of Montreal, Canada, and the Montreal WHO-PAHO (Pan American Health Organization) Collaborating Centre for Research and Training in Mental Health, launched the implementation of the mhGAP programme in the Greater Tunis Area.

As a first activity, 45 general practitioners working in the Greater Tunis Area were trained in February-March 2016 on early recognition and management of mental disorders including depression, schizophrenia, problems related to alcohol and drug use, as well as self-harm/suicide. A second group of 47 GPs was trained in March-April 2016.

Since the trainings, participating GPs already feel more comfortable communicating with and treating people consulting for mental illness. Many participants like using the guide that accompanies the training in their daily practice because, they say, it is user-friendly and practical.

"...I also acknowledged a shift in the way they view mental health. After the training, my colleagues began detecting mental health problems in the people affected by mental health conditions that they have been following for years."

One trainer

These positive changes have also been acknowledged by trainers. One trainer shared: "During the training, I noticed that the GPs were very motivated to learn about mental health and enthusiastic about participating in the training. I also acknowledged a shift in the way they view mental health. After the training, my colleagues began detecting mental health problems in the people affected by mental health conditions that they have been following for years."

Evaluation of the impact of the training will be conducted using a randomized controlled trial design. It will target the change in the knowledge and attitudes of GPs about mental illness, and self-efficacy in detecting, treating and managing mental health problems at the community level.

Implementing the mhGAP in the Greater Tunis Area is a first attempt to bridge the treatment gap in Tunisia by integrating accessible and evidence-based care for mental disorders into primary health care. This integration can serve as a model for the mhGAP's implementation in other low- and middle-income countries (LMICs), and especially in French-speaking countries.

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1.2. Dissemination session

The candidate, her doctoral supervisors, the *WHO* office in Tunisia, and the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide* (working at the level of the Ministry of Health in Tunisia) organized a dissemination session in Tunis on 22 September 2017, where preliminary research findings from the exploratory trial were shared (Article 4, Section 4.5), including preliminary codes, sub-themes, themes, and supporting examples form the Type III implementation analysis (Article 5, Section 4.6).

The Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide* invited all 112 PCPs of the larger trial, trainer-psychiatrists, PCPs responsible for continuing medical education in the Greater Tunis area ("tutors"), and governorate directors. In total, 61 participants were present at the dissemination session, including the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide*. This session helped validate preliminary findings and generate discussions around their key themes, which in turn became the basis for recommendations on ways to ensure effective mental health care delivery in primary care settings. These recommendations, drafted in collaboration with the different stakeholder groups present at the session, were the basis of a report written by the candidate and validated by the Presidents of the *Committee for Mental Health Promotion* and *Technical Committee Against Suicide* before being sent to all session attendees. This report is provided below.

Financial support for the dissemination session was provided by *Regroupement Stratégique en Santé Mondiale du Réseau de recherche en santé des populations du Québec (RRSPQ).*

Santé mentale globale :
Accroître la capacité d'intégrer la santé mentale dans les soins primaires en Tunisie

Un projet en collaboration avec l'École de santé publique de l'Université de Montréal (Québec, Canada), l'Organisation mondiale de la Santé bureau de la Tunisie, le Ministère de la Santé en Tunisie et le Centre collaborateur OMS-OPS pour la recherche et la formation en santé mentale (Québec, Canada).

Programme de formation des médecins généralistes du Grand Tunis à l'aide du *mhGAP* : diffusion des résultats

*

Vendredi, le 22 septembre 2017 - 9h à 13h30

Tunis (Hôtel Africa)

*

Accueil des participants (9h – 9h30)

Introduction et objectifs de la matinée (9h30 – 9h45)

Dr Wahid Melki : L'objectif de la formation en santé mentale qui a été offerte aux médecins généralistes de février à avril 2016 était de promouvoir le développement des nouvelles compétences des médecins généralistes qui ont souvent de la difficulté à détecter, traiter et gérer les problématiques de santé mentale en première ligne. L'objectif de cette journée de diffusion est de présenter les résultats de l'évaluation qui a accompagné la formation en santé mentale, afin d'avoir vos réactions. La journée de diffusion se conclura en vous laissant l'opportunité de faire des propositions permettant d'améliorer l'état de pratique en santé mentale. Dr Fatma Charfi et moi-même partagerons finalement quelques recommandations.

Monsieur Benoit Mathivet : Une vision de l'*OMS* est de soutenir l'intégration de la santé mentale en soins primaires, afin d'enrichir le *package* de soins offerts à la population tunisienne.

Les résultats, partie 1 (9h45h – 11h) – Jessica Spagnolo

- Mise en contexte (10 minutes)
- Impact de la formation (40 minutes)
- Discussion (25 minutes)

Une formation basée sur le *mhGAP* a été offerte dans 90 pays, avec l'aide de l'OMS. L'objectif de cette formation est d'accroître les compétences des non-spécialistes en santé mentale, ceci afin de créer des services de proximité en santé mentale. L'OMS a créé cette formation afin d'adresser l'écart de traitement (c'est-à-dire ceux qui ont besoin de traitement, mais qui n'en reçoivent pas) très élevé (voir de 76 à 85%) dans plusieurs pays classifiés en tant que pays à revenu faible ou intermédiaire. Malheureusement, cet écart ne peut actuellement être comblé en se fiant seulement aux ressources spécialisées.

La Tunisie est l'un des premiers pays francophones à mettre en œuvre une formation en santé mentale basée sur le *mhGAP*, et celle-ci est accompagnée d'une des plus rigoureuses évaluations, employant une étude randomisée.
Cent-douze médecins généralistes participants ont été randomisés soit au groupe 1 (formation février-mars 2016) ou au groupe 2 (formation mars-avril 2016). Ces médecins ont rempli des questionnaires portant sur les connaissances en santé mentale, les attitudes envers la santé mentale et la profession de la santé mentale, ainsi que l'auto-efficacité en détection, traitement et gestion des problèmes de santé mentale en soins primaires pré- et post-formation.

Les résultats préliminaires sont positifs et prometteurs. Post-formation, nous avons remarqué une amélioration du score moyen global sur l'échelle de connaissances, une diminution du score moyen global sur l'échelle des attitudes (stipulant une baisse d'attitudes négatives envers la santé mentale et la profession de la santé mentale), ainsi qu'une amélioration du score moyen global sur l'échelle de l'auto-efficacité (stipulant plus de confiance en détection, traitement et gestion).

Cependant, quelques lacunes méritent une discussion. Malgré les changements positifs au niveau des scores moyens globaux, les médecins généralistes participants éprouvent toujours, malgré la mise en œuvre de la formation, des difficultés avec les questions de connaissances en psychose, toxicomanie, traitement non-pharmacologique et gestion efficace des personnes ayant un problème de santé mentale en soins primaires. Concernant les attitudes, plusieurs médecins généralistes participants ont des attitudes moins positives post-formation sur des questions concernant la divulgation d'un problème en santé mentale à des amis ou collègues et la dangerosité des personnes ayant un problème de santé mentale. Après la formation, les médecins généralistes participants manquent toujours de confiance dans leurs habilités de détecter des problèmes de psychose ; prescrire des psychotropes pour des problèmes de psychose ou toxicomanie ; gérer une personne ayant une psychose en soins primaires, et impliquer d'autres professionnels de la santé dans un plan de soin clinique.

<u>Réactions des médecins :</u>

Les médecins généralistes participants éprouvent toujours une difficulté à bien gérer les problématiques de toxicomanie et psychose en 1e ligne. Selon eux, ces problématiques sont trop sévères pour être prises en charge en centres de soins de bases et nécessitent un encadrement plus spécialisé.

Plusieurs médecins ont exprimé que les lacunes en confiance peuvent être expliquées par le fait qu'ils n'ont pas le temps de bien prendre en charge les personnes présentant des problèmes de santé mentale en soins primaires. Aussi, ils ne savent pas s'ils peuvent prescrire les psychotropes nécessaires pour traiter de façon adéquate une personne se présentant avec un problème de santé mentale, à cause d'une règlementation ministérielle mise en place sur la prescription.

Pause-santé (11h - 11h30)

Les résultats, partie 2 (11h30–12h30) – Jessica Spagnolo

- Analyses qualitatives (40 minutes)
- Discussion (20 minutes)

Cette partie de la présentation vise à donner un aperçu des facteurs qui peuvent influencer l'utilisation de la formation, ainsi que les résultats attendus. Ceux-ci ont été discutés en entretiens individuels ou de groupes avec 18 médecins généralistes participants, et ont été regroupés en 3 thèmes : 1) l'utilité clinique de la formation, 2) l'appréciation de la formation, et 3) le climat de la mise en œuvre.

Thème 1 : L'utilité clinique de la formation
Ce qui peut influencer positivement les résultats attendus : les modules choisis pour la formation répondent aux besoins cliniques des médecins et aux besoins sociaux actuels.

Ce qui peut influencer négativement les résultats attendus : les modules ne répondent pas aux besoins cliniques (ex : manque de cours sur les enfants et adolescents) et manque d'information sur les conduites à tenir.

Thème 2 : L'appréciation de la formation
Ce qui peut influencer positivement les résultats attendus : les médecins généralistes participants ont bien apprécié tout ce qui est interactif (ex.: discussion de cas cliniques et jeux de rôles), car ceux-ci sont des éléments nouveaux en formation pour la santé mentale. Aussi, les médecins généralistes participants ont bien aimé les documents fournis (ex : le guide), car ils sont instructifs et faciles à utiliser.

Ce qui peut influencer négativement les résultats attendus : Les médecins généralistes participants ont moins aimé l'emphase sur la partie théorique (ex. : cours trop chargé, trop d'information que les médecins pouvaient trouver eux-mêmes).

Thème 3 : Le climat de la mise en œuvre
Ce qui peut influencer positivement les résultats attendus : les soutiens pour la pratique clinique, telle la reconnaissance de la santé mentale par la valorisation des médecins formés ; la collaboration entre collègues en centres de soins de bases.

Ce qui peut influencer négativement les résultats attendus : les lois sur la prescription des psychotropes et la gestion des problèmes de toxicomanie; les barrières concernant la continuité des soins, telles le choix limité sur l'établissement de soins ainsi que la rotation des médecins dans les dispensaires ; la stigmatisation de l'hôpital en santé mentale et certaines problématiques en santé mentale ; les lacunes en formation en santé mentale de base des médecins généralistes (ex. : manque d'emphase sur la prescription de psychotropes et stage pratique); et les aspects logistiques, tels le manque de psychotropes dans les dispensaires et espaces privés pour la pratique en santé mentale.

Suggestions, propositions et orientations (12h30 – 13h30)

	Suggestions et propositions des médecins généralistes	Orientations
CHANTIER 1 : Formation en santé mentale pour les médecins généralistes	1. Offrir des stages cliniques en psychiatrie.	Organiser, avec l'aide des directeurs régionaux, des stages cliniques en psychiatrie à *Razi* pour les médecins généralistes qui ont participé à une formation en santé mentale. Trouver une procédure, avec l'aide des directeurs régionaux, d'institutionnaliser les stages en psychiatrie pour tous les médecins généralistes.
	2. Assurer la continuité des formations en santé mentale.	Mettre en œuvre, avec l'assistance de l'OMS et les directeurs régionaux, d'autres formations basées sur le *mhGAP* dans le Grand Tunis, mais aussi ailleurs en Tunisie (ceci, surtout pour les médecins généralistes qui n'auront pas suivi la réforme des études médicales). Offrir des cours « flash » ou de mises à jour pour les médecins généralistes qui ont assisté à la formation *mhGAP*. Discuter avec la direction centrale et les directeurs régionaux de la possibilité de créer un groupe de coordination afin de poursuivre le programme de formation basée sur le *mhGAP* de manière systématique et standardisée.
	3. Organiser des staffs avec des spécialistes.	Organiser, avec l'aide des directeurs régionaux, des staffs regroupant les médecins généralistes et les spécialistes pour discuter spécifiquement des cas cliniques en santé mentale.
CHANTIER 2 : La prescription de psychotropes	1. Changer la législation concernant la restriction de la prescription des psychotropes.	Revoir, avec la direction centrale, cette législation, afin d'offrir la possibilité aux médecins généralistes de prescrire les psychotropes disponibles dans les dispensaires. Ceci permettra ainsi de valoriser le cachet du médecin généraliste.
CHANTIER 3 : Les données médicales en santé mentale	1. Trouver une méthode afin de faire un recueil de données statistiques en santé mentale.	Travailler avec la direction centrale afin de mettre plus d'emphase sur les statistiques en santé mentale dans les dispensaires. Ceci permettra aussi d'avoir des informations sur la prévalence et l'incidence, par centre, et encouragera un nombre adéquat de psychotropes par dispensaire.
	2. Informatiser les dossiers médicaux.	Travailler avec le Ministère sur le dossier médical électronique du patient en santé mentale.
CHANTIER 4 : La sécurité dans les dispensaires	1. Minimiser les vols de psychotropes dans les dispensaires.	Travailler avec les directeurs régionaux afin de trouver des moyens pour mieux gérer les psychotropes dans les dispensaires (p. ex., : coffre-fort, caméra), ceci afin de minimiser les vols dans certaines zones chaudes, et aussi de rassurer les médecins généralistes.
CHANTIER 5 : Le parcours de soins du patient	1. Faciliter l'accès aux soins des patients qui consultent pour des problèmes de santé mentale.	Travailler avec la direction centrale et les directeurs régionaux sur l'offre de soins en santé mentale (p. ex., : assurer des consultations en santé mentale dans certains hôpitaux de circonscription ; assurer d'avoir le nombre adéquat de ressources humaines pour la santé mentale).

		Travailler avec la direction centrale et les directeurs régionaux afin d'assurer que 1) les médecins généralistes puissent prescrire les psychotropes, même en première consultation et 2) les médecins généralistes puissent prescrire plus de 15 jours de psychotropes à la fois. Pour les personnes qui n'ont pas de soutien, encourager des discussions avec les directeurs régionaux sur la création de services qui permettent de distribuer les psychotropes dans la communauté (ex. : programme à *Razi*).
	2. Faciliter la continuité de soins entre Razi et les centres de soins de base (et vice versa).	Créer et distribuer aux médecins généralistes la liste des psychiatres à Razi et leurs numéros afin de pouvoir faciliter la prise d'avis et les références (au besoin), et aussi promouvoir un suivi. Se décider, avec l'aide de la direction centrale et les directeurs régionaux, sur un moyen afin de faciliter la référence à Razi, surtout pour les médecins généralistes qui ont participé à une formation en santé mentale, car son objectif est d'assurer que le médecin puisse au moins faire un premier travail de dépistage.

Pour plus d'information sur les propositions, suggestions et orientations, s'il-vous-plaît, n'hésitez pas à communiquer avec :

Dr Wahid Melki
Psychiatre et président du Comité technique de promotion de la santé mentale au ministère de la santé (Tunisie)
[redacted]

Dr Fatma Charfi
Pédopsychiatre et coordinatrice du Comité de lutte contre le suicide (Tunisie)
[redacted]

Pour plus d'information sur les résultats de l'évaluation de la formation basée sur le *mhGAP*, s'il-vous-plaît, n'hésitez pas à communiquer avec :

Jessica Spagnolo, MSW, Ph.D.(c)
Candidate au doctorat
École de santé publique, IRSPUM, de l'Université de Montréal (Québec, Canada)
jessica.maria-violanda.spagnolo@umontreal.ca

Appendix 2: Ethics certificates

2.1. Original ethics approval by Université de Montréal

Université de Montréal

Comité d'éthique de la recherche en santé

3 novembre 2015

Objet: Approbation éthique – « Santé mentale globale: Accroître la capacité d'intégrer la santé mentale dans les soins primaires en Tunisie »

Mme Jessica Maria-Violanda Spagnolo,

Le Comité d'éthique de la recherche en santé (CERES) a étudié le projet de recherche susmentionné et a délivré le certificat d'éthique demandé suite à la satisfaction des exigences précédemment émises. Vous trouverez ci-joint une copie numérisée de votre certificat; copie également envoyée à votre directeur/directrice de recherche et à la technicienne en gestion de dossiers étudiants (TGDE) de votre département.

Notez qu'il y apparaît une mention relative à un suivi annuel et que le certificat comporte une date de fin de validité. En effet, afin de répondre aux exigences éthiques en vigueur au Canada et à l'Université de Montréal, nous devons exercer un suivi annuel auprès des chercheurs et étudiants-chercheurs.

De manière à rendre ce processus le plus simple possible et afin d'en tirer pour tous le plus grand profit, nous avons élaboré un court questionnaire qui vous permettra à la fois de satisfaire aux exigences du suivi et de nous faire part de vos commentaires et de vos besoins en matière d'éthique en cours de recherche. Ce questionnaire de suivi devra être rempli annuellement jusqu'à la fin du projet et pourra nous être retourné par courriel. La validité de l'approbation éthique est conditionnelle à ce suivi. Sur réception du dernier rapport de suivi en fin de projet, votre dossier sera clos.

Il est entendu que cela ne modifie en rien l'obligation pour le chercheur, tel qu'indiqué sur le certificat d'éthique, de signaler au CERES tout incident grave dès qu'il survient ou de lui faire part de tout changement anticipé au protocole de recherche.

Nous vous prions d'agréer, Madame, l'expression de nos sentiments les meilleurs,

Dominique Langelier, présidente
Comité d'éthique de la recherche en santé (CERES)
Université de Montréal

DL/GP/gp
c.c. Gestion des certificats, BRDV
François Champagne, professeur titulaire, École de santé publique - Département d'administration de la santé
Nicole Leduc, professeure titulaire, École de santé publique - Département d'administration de la santé
TGDE - PhD Santé publique
p.j. Certificat #15-117-CERES-D

adresse postale
C.P. 6128, succ. Centre-ville
Montréal QC H3C 3J7

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4e étage, bur. 430-11
Montréal QC H3T 1P1

Téléphone : 514-343-6111 poste 2604
ceres@umontreal.ca
www.ceres.umontreal.ca

Université de Montréal

N° de certificat
15-117-CERES-D

Comité d'éthique de la recherche en santé

CERTIFICAT D'APPROBATION ÉTHIQUE

Le Comité d'éthique de la recherche en santé (CERES), selon les procédures en vigueur, en vertu des documents qui lui ont été fournis, a examiné le projet de recherche suivant et conclu qu'il respecte les règles d'éthique énoncées dans la Politique sur la recherche avec des êtres humains *de l'Université de Montréal.*

Projet	
Titre du projet	**Santé mentale globale: Accroître la capacité d'intégrer la santé mentale dans les soins primaires en Tunisie**
Étudiante requérante	**Jessica Maria-Violanda Spagnolo** [redacted] Candidate au Ph. D. en santé publique, option organisation des soins, École de santé publique - Département d'administration de la santé
Sous la direction de	François Champagne, professeur titulaire, École de santé publique - Département d'administration de la santé, Université de Montréal & Nicole Leduc, professeure titulaire, École de santé publique - Département d'administration de la santé, Université de Montréal.
Autres membres de l'équipe:	Co-directrice: Myra Piat (Institut universitaire en santé mentale Douglas)
Financement	
Organisme	Non financé
Programme	
Titre de l'octroi si différent	
Numéro d'octroi	
Chercheur principal	
No de compte	

MODALITÉS D'APPLICATION

Tout changement anticipé au protocole de recherche doit être communiqué au CERES qui en évaluera l'impact au chapitre de l'éthique.

Toute interruption prématurée du projet ou tout incident grave doit être immédiatement signalé au CERES

Selon les règles universitaires en vigueur, un suivi annuel est minimalement exigé pour maintenir la validité de la présente approbation éthique, et ce, jusqu'à la fin du projet. Le questionnaire de suivi est disponible sur la page web du CERES.

[redacted]

Dominique Langelier, présidente
Comité d'éthique de la recherche en santé
Université de Montréal

3 novembre 2015
Date de délivrance

1er septembre 2017
Date de fin de validité

adresse postale
C.P. 6128, succ. Centre-ville
Montréal QC H3C 3J7

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2.2. Ethics renewal by Université de Montréal

Université de Montréal

Comité d'éthique de la recherche en santé

30 mai 2017

Objet: Certificat d'approbation éthique - 1er renouvellement – « Santé mentale globale: Accroître la capacité d'intégrer la santé mentale dans les soins primaires en Tunisie »

Mme Jessica Maria-Violanda Spagnolo,

Le Comité d'éthique de la recherche en santé (CERES) a étudié votre demande de renouvellement pour le projet de recherche susmentionné et a délivré le certificat d'éthique demandé suite à la satisfaction des exigences qui prévalent. Vous trouverez ci-joint une copie numérisée de votre certificat; copie également envoyée à votre directeur/directrice de recherche et à la technicienne en gestion de dossiers étudiants (TGDE) de votre département.

Notez qu'il y apparaît une mention relative à un suivi annuel et que le certificat comporte une date de fin de validité. En effet, afin de répondre aux exigences éthiques en vigueur au Canada et à l'Université de Montréal, nous devons exercer un suivi annuel auprès des chercheurs et étudiants-chercheurs.

De manière à rendre ce processus le plus simple possible et afin d'en tirer pour tous le plus grand profit, nous avons élaboré un court questionnaire qui vous permettra à la fois de satisfaire aux exigences du suivi et de nous faire part de vos commentaires et de vos besoins en matière d'éthique en cours de recherche. Ce questionnaire de suivi devra être rempli annuellement jusqu'à la fin du projet et pourra nous être retourné par courriel. La validité de l'approbation éthique est conditionnelle à ce suivi. Sur réception du dernier rapport de suivi en fin de projet, votre dossier sera clos.

Il est entendu que cela ne modifie en rien l'obligation pour le chercheur, tel qu'indiqué sur le certificat d'éthique, de signaler au CERES tout incident grave dès qu'il survient ou de lui faire part de tout changement anticipé au protocole de recherche.

Nous vous prions d'agréer, Madame, l'expression de nos sentiments les meilleurs,

Guillaume Paré
Conseiller en éthique de la recherche.
Comité d'éthique de la recherche en santé (CERES)
Université de Montréal

c.c. Gestion des certificats, BRDV
François Champagne, professeur titulaire, École de santé publique - Département d'administration de la santé
Nicole Leduc, professeure titulaire, École de santé publique - Département d'administration de la santé
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2.3. Ethics approval by Razi Hospital

REPUBLIQUE TUNISIENNE

MINISTERE DE LA SANTE - HOPITAL RAZI, LA MANOUBA

La Manouba le 11/01/2016

Attestation

Je soussigné Professeur Rym Ghachem, présidente du comité d'éthique de l'hôpital Razi atteste par la présente que le travail de recherche intitulé **« Santé mentale globale: Accroître la capacité d'intégrer la santé mentale dans les soins primaires en Tunisie »** ; dans le cadre du projet de Doctorat de l'étudiante **Jessica Spagnolo**, dirigé par Monsieur François Champagne et Madame Nicole Leduc de l'Institut de recherche en santé publique de l'Université de Montréal et par le Docteur Wahid MELKI, chef de service de psychiatrie à l'hôpital Razi de la Manouba, Professeur à la faculté de médecine de Tunis de l'Université El-Manar de Tunis; ne pose pas de contraintes d'ordre éthique.

Signature

[redacted]

Appendix 3: Research material

3.1. Example of training agendas distributed prior to training

mhGAP COURS 1: Introduction et principes généraux de soins

*

Mardi, le 9 février 2016 - 13h à 17h15
Grand Hôtel, Menzah 7

*

Présenté par Dr Marc Laporta
Directeur du Centre collaborateur OMS-OPS de Montréal pour la santé mentale

Accueil des participants 13h

Questionnaires Temps 0 13h - 13h30

Mots de bienvenue 13h30 - 13h45

Dr Guido Sabatinelli (*Représentant OMS, bureau de la Tunisie*)

Jessica Spagnolo (*Candidate au doctorat, Université de Montréal*)

Ouverture du cours 13h45 - 14h

Dr Shekhar Saxena (*Directeur du Département de la santé mentale et de l'abus de substances, OMS Genève*)

Présentation des modules 14h - 16h

Introduction au guide d'intervention mhGAP

Principes généraux de soins en santé mentale

Pause-café *16h - 16h25*

Mots de bienvenue 16h25 - 16h30

Dr Wahid Melki (*Président du Comité pour la promotion de la santé mentale, Ministère de la Santé*)

Application pratique 16h30 - 17h15

Deux (2) jeux de rôle (45 minutes)

mhGAP COURS 2 : Dépression

*

Mardi, le 16 février 2016 - 14h à 17h30
Grand Hôtel, Menzah 7

*

Présenté par Dr Imen Gasmi

Accueil des participants 13h45 - 14h

Introduction et objectifs 14h - 14h20

Actions clés 14h20 - 15h

Établir la communication et la confiance (5 minutes)

Faire l'évaluation (35 minutes)

Jeu de rôle n°1 15h - 15h40
(En petits groupes)

Pause-café *15h40 - 15h50*

Actions clés (suite) 15h50 - 16h50

Planifier et commencer la prise en charge (45 minutes)

Établir des liens avec d'autres services et sources de soutien (5 minutes)

Faire le suivi (10 minutes)

Jeu de rôle n°2 16h50 - 17h30
(En petits groupes)

mhGAP COURS 3: Psychose

*

Mardi, le 23 février 2016 - 14h à 17h30
Grand Hôtel, Menzah 7

*

Présenté par Dr Imen Gasmi et Dr Sonda Trabelsi

Accueil des participants 13h45 - 14h

Introduction et objectifs 14h - 14h40

Actions clés 14h40 - 15h20

Établir la communication et la confiance (5 minutes)

Faire l'évaluation (35 minutes)

Vidéo 15h20 - 15h35

Questions/ Discussion (5 minutes)

Jeu de rôle n°1 15h35 - 15h50
(En petits groupes)

Pause-café *15h50 - 16h*

Actions clés (suite) 16h - 17h05

Planifier et commencer la prise en charge (30 minutes)

Établir des liens avec d'autres services et sources de soutien (5 minutes)

Faire le suivi (30 minutes)

Jeu de rôle n°2 17h05 - 17h30

mhGAP COURS 4: Conduites auto-agressives/suicidaires

*

Mardi, le 1 mars 2016 - 14h à 17h30
Grand Hôtel, Menzah 7

*

Présenté par Dr Trabelsi Sonda

Accueil des participants 13h45 - 14h

Introduction et objectifs 14h - 14h15

Traitement médical d'urgence 14h15 - 14h30

Actions clés 14h30 - 15h40

Établir la communication et la confiance (10 minutes)

Faire l'évaluation (60 minutes)

Vidéo 15h40 - 16h15

Questions/ Discussion (10 minutes)

Pause-café *16h15 - 16h25*

Jeu de rôle n°1 16h25 - 16h50
(En petits groupes)

Actions clés (suite) **16h50 - 17h20**

Planifier et commencer la prise en charge (15 minutes)

Établir des liens avec d'autres services et sources de soutien (5 minutes)

Faire le suivi (10 minutes)

mhGAP COURS 5 : Consommation de drogues et d'alcool et troubles liés à leur consommation

*

Mardi, le 8 mars 2016 - 14h à 17h30
Grand Hôtel, Menzah 7

*

Présenté par Dr Nesrine Bram

Accueil des participants 13h45 - 14h

Introduction et objectifs 14h - 14h30

Actions clés 14h30 - 15h15

Établir la communication et la confiance (5 minutes)

Faire l'évaluation (40 minutes)

Jeux de rôles 15h15 - 15h55
Deux (2) jeux de rôles sur l'évaluation (2 x 20 minutes)
(En petits groupes)

Pause-café 15h55 - 16h05

Actions clés (suite) 16h05 - 16h50

Planifier et commencer la prise en charge (30 minutes)

Établir des liens avec d'autres services et sources de soutien (5 minutes)

Faire le suivi (10 minutes)

Jeux de rôle 16h50 - 17h30
Deux (2) jeux de rôle (2 x 20 minutes)
(En petits groupes)

mhGAP SUPERVISION

*

Mardi, le 15 mars 2016 - 14h à 16h30
Bureau de l'*OMS* Tunisie, Cité El Kadhra

*

Accueil des participants	13h45 - 14h
Présentation des cas cliniques	14h - 15h

Les médecins généralistes auront la chance de présenter un cas clinique en santé mentale.

Jeu de rôle n°1	15h - 15h30
Jeu de rôle n°2	15h30 - 16h
Questionnaires post-formation et présentation des attestations	16h - 16h30

*

Pour ceux ou celles qui aimeraient participer à un entretien de groupe afin de discuter de leur expérience avec la formation en santé mentale, s'il-vous-plaît communiquer avec :

Jessica Spagnolo

[redacted]

jessica.maria-violanda.spagnolo@umontreal.ca

Merci de votre participation !

3.2. Questionnaires

Informations sociodémographiques et prise en charge globale en santé mentale

Cette section du questionnaire vise à recueillir des informations sociodémographiques et des informations sur la prise en charge globale des problèmes de santé mentale dans votre pratique.

Ces données demeureront confidentielles.

1. Quelle est votre date de naissance? (date : JJ/MM/AAAA)

2. Quel est votre âge?

3. Quel est votre sexe?

☐ Homme ☐ Femme

4. Quel est votre pays de naissance?

5. Si votre pays de naissance est autre que la Tunisie, svp précisez depuis combien d'années vous vivez en Tunisie.

6. Quelle est votre langue maternelle?

7. En quelle année avez-vous obtenu votre permis de pratique de médecine générale? (date : JJ/MM/AAAA)

8. Où avez-vous réalisé vos études de médecine?

9. Depuis combien d'années exercez-vous comme médecin généraliste?

10. Travaillez-vous dans le :

☐ Secteur public ☐ Secteur privé

11. Travaillez-vous à :

☐ Temps partiel ☐ Temps plein

12. Combien d'heures travaillez-vous par semaine?

13. Où travaillez-vous?

14. Au cours d'une semaine, combien de patients rencontrez-vous?

15. De ces patients, quel est le pourcentage (%) présentant des problèmes de santé mentale?

16. Parmi les patients présentant des problèmes de santé mentale, quel pourcentage (%) se présente :

Avec rendez-vous

Sans rendez-vous

17. En une semaine, quel pourcentage (%) de votre temps dédiez-vous à la santé mentale?

18. Parmi les patients présentant des problèmes de santé mentale, quel pourcentage (%) présente :

(Si un patient a plus qu'un trouble, le total sera plus que 100%).

Un trouble anxieux?

Un trouble dépressif?

Un trouble de la personnalité?

Un trouble de l'adaptation?

L'automutilation/le suicide?

Un trouble d'abus de substances (alcool)?

Un trouble d'abus de substances (drogues)?

Un trouble de psychose (ex. : la schizophrénie)?

Autres? (s'il-vous-plaît précisez le problème)

19. Pour les patients présentant des problèmes de santé mentale, quelle(s) activité(s) entreprenez-vous et pour quel pourcentage (%) de ces patients?

(S'il y a plusieurs activités pour certains patients, le total sera plus que 100%).

Suivi médicamenté?

Thérapie de soutien (ex. : écoute active, soutien, etc.)

Psychothérapie (ex. : traitement psychologique)

Psychoéducation (ex. : conseils, etc.)

Référenecs à des services plus spécialisés?

Si oui aux références, à qui référez-vous?

Autres? (s'il-vous-plaît précisez l'activité)

20. En moyenne, combien de fois par année rencontrez-vous vos patients présentant des problèmes de santé mentale?

21. Avez-vous reçu des formations en santé mentale au cours des 12 derniers mois?

☐ Oui ☐ Non

22. Si oui, s'il-vous-plait précisez :

Le nombre de jours

Le nombre total d'heures

23. Avez-vous bénéficié d'une supervision après une formation en santé mentale?

☐ Oui ☐ Non

24. Si oui, s'il-vous-plait précisez :

Le nombre de jours

Le nombre total d'heures

Les connaissances

Cette section du questionnaire vise à recueillir des informations sur vos connaissances en santé mentale, spécifiqueent liées aux modules de la formation.

Pour chaque question, merci de répondre avec une seule réponse.

Ces données demeureront confidentielles.

1. Les personnes présentant un problème de santé mentale ne peuvent généralement pas prendre des décisions concernant leur santé.

- [ ] Vrai
- [ ] Faux

2. Les personnes vivant avec une maladie mentale sont mieux soignées en services de psychiatrie.

- [ ] Vrai
- [ ] Faux

3. Toutes les personnes ayant un trouble dépressif doivent être traitées avec des antidépresseurs.

- [ ] Vrai
- [ ] Faux

4. Fournir des brefs conseils aux personnes qui ont des problèmes d'alcool est efficace.

- [ ] Vrai
- [ ] Faux

5. Les maladies mentales sont courantes chez les enfants et les adolescents.

- [ ] Vrai
- [ ] Faux

6. Une dépression chronique sévère chez une mère peut conduire à un retard de développement chez ses enfants.

- [ ] Vrai
- [ ] Faux

7. En ce qui concerne la gestion de la psychose aiguë:

- [ ] Des médicaments par injection seront nécessaires pour la plupart des cas.
- [ ] La personne doit être suivie à intervalles fréquents.
- [ ] La personne doit toujours être retenue (par exemple, enchaînée).

8. Parler des pensées suicidaires augmente la probabilité de suicide.

- [ ] Vrai
- [ ] Faux

9. Lequel des énoncés suivants concernant la dépression est le bon?

- [ ] La dépression présente des douleurs et de la fatigue physique.
- [ ] La dépression se présente souvent avec des délires et des hallucinations.
- [ ] La dépression se présente souvent avec de la confusion.

10. En ce qui concerne les antidépresseurs, quel énoncé est le bon :

- [ ] Le traitement doit être poursuivi même si la personne présente soudainement des symptômes maniaques.
- [ ] Le traitement doit être poursuivi pendant 2-3 mois.
- [ ] Le traitement doit généralement être offert si la dépression affecte le fonctionnement quotidien de la personne.

11. Lequel des messages suivants doit être fourni à une personne vivant avec une dépression?

- [ ] Essayer de réduire votre activité physique autant que possible.
- [ ] Essayer de participer à des activités sociales autant que possible.
- [ ] Essayer de dormir autant que possible.

12. En ce qui concerne la consommation d'alcool, lequel des énoncés est le bon :

- [ ] Si les gens boivent de l'alcool tous les jours, ils sont dépendants de l'alcool.
- [ ] La consommation d'alcool ne provoque pas des convulsions.
- [ ] Les gens peuvent avoir un problème d'alcool, même s'ils boivent une seule fois par mois.

13. En ce qui concerne les troubles de l'usage de drogues, lequel des énoncés suivants est le bon :

- [ ] L'emprisonnement est l'intervention la plus efficace.
- [ ] Les mères qui consomment de la drogue ne devraient pas allaiter.
- [ ] Discutr avec la personne de leurs idées sur les avantages perçus et les potentiels de l'usage de drogues est utie.

14. En ce qui concerne le traitement pharmacologique pour les personnes vivant avec des maladies mentales, lequel des énoncés suivants est le bon :

- ☐ Vous n'avez généralement pas besoin d'obtenir le consentement de la personne parce qu'elle ne comprend pas.
- ☐ Les antidépresseurs ne devraient être donnés aux adolescents qu'après avoir essayé un traitement psychosocial.
- ☐ Une fois que les mises en chantier d'un traitement antipsychotique sont faites, la personne doit continuer à prendre le médicament toute sa vie.

15. Après une tentative de suicide:

- ☐ Laisser la personne seule dans une pièce séparée et calme.
- ☐ Éviter les visites de la famille et les amis.
- ☐ Retirer tout ce qui pourrait servir à une conduite auto-agressive.

16. Une femme de 22 ans dit qu'elle entend des voix que personne autre ne peut entendre et est convaincue que quelqu'un veut lui faire du mal. Lequel des troubles suivants est le plus susceptible:

- ☐ Psychose
- ☐ Dépression
- ☐ Manie

Échelle de mesure des attitudes des cliniciens

Cette section du questionnaire vise à recueillir des informations sur vos attitudes en santé mentale. Pour chaque question, merci de répondre avec une seule réponse.

Ces données demeureront confidentielles.

Références:

Mental Illness: Clinicians' Attitudes Scale MICA-4. Copyright 2010. Health Service and Population Research Department, Institute of Psychiatry, King's College London. Contact: Professor Graham Thornicroft. Email: graham.thornicroft@kcl.ac.uk

Kassam, A., Glozier, N., Leese, M., Henderson, C., & Thornicroft, G. (2010). Development and responsiveness of a scale to measure clinicians' attitudes to people with mental illness (medical student version). Acta Psychiatrica Scandinavica, 122(2), 153-161.

1. J'apprends davantage sur la santé mentale uniquement lorsque je dois le faire, et cela ne m'intéresse pas de lire des informations supplémentaires sur ce sujet.

- ☐ Tout à fait d'accord.
- ☐ D'accord.
- ☐ Assez d'accord.
- ☐ Plutôt pas d'accord.
- ☐ Pas d'accord.
- ☐ Pas du tout d'accord.

2. Les personnes atteintes de maladie mentale sévère ne peuvent jamais récupérer suffisamment pour avoir une bonne qualité de vie.

- ☐ Tout à fait d'accord.
- ☐ D'accord.
- ☐ Assez d'accord.
- ☐ Plutôt pas d'accord.
- ☐ Pas d'accord.
- ☐ Pas du tout d'accord.

3. Travailler dans le domaine de la santé mentale est aussi respectable que les autres champs du secteur de la santé.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

4. Si j'avais une maladie mentale, je ne l'avouerais jamais à aucun de mes AMIS AMIS par peur d'être traité(e) différemment.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

5. Les personnes atteintes de pathologie mentale sévère sont plus souvent dangereuses que non dangereuses.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

6. Les professionnels de la santé connaissent mieux la vie personnelle des personnes traitées pour maladie mentale que leurs amis ou les membres de leur famille.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

7. Si j'avais une maladie mentale, je ne l'avouerais jamais à aucun de mes COLLÈGUES par peur d'être traité(e) différemment.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

8. Être un professionnel de la santé travaillant dans le domaine de la santé mentale n'est PAS comme être un vrai professionnel de la santé.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

9. Si un de mes supérieurs me chargeait de traiter les personnes atteintes de maladie mentale de manière irrespectueuse, je ne suivrais PAS ses instructions.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

10. Je suis aussi à l'aise pour parler à une personne ayant une maladie mentale qu'à une personne ayant une maladie somatique.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

11. Il est important que tout professionnel de santé prenant en charge une personne ayant une maladie mentale évalue également son état de santé physique.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

12. La population n'a PAS besoin d'être protégée des personnes ayant une maladie mentale sévère.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

13. Si une personne ayant une maladie mentale se plaignait de symptômes physiques (douleur thoracique, par exemple), je les attribuerais à sa maladie mentale.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

14. On ne devrait pas s'attendre à ce que les médecins généralistes réalisent une évaluation approfondie pour les patients présentant des symptômes psychiatriques, car ils peuvent être adressés aux psychiatres.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

15. Il pourrait m'arriver d'utiliser les termes « fou », « dingue », « cinglé », etc. pour décrire les personnes ayant une maladie mentale que je vois dans mon travail.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

16. 57. Si un(e) collègue me disait avoir présenté une maladie mentale, je voudrais continuer à travailler avec lui/elle.

- [ ] Tout à fait d'accord.
- [ ] D'accord.
- [ ] Assez d'accord.
- [ ] Plutôt pas d'accord.
- [ ] Pas d'accord.
- [ ] Pas du tout d'accord.

Votre confiance dans la DÉTECTION d'un problème de santé mentale

Cette section du questionnaire vise à évaluer votre degré de confiance en lien avec la détection des problèmes de santé mentale, spécifiqueent liées aux modules de la formation.

Pour chaque question, merci de répondre avec une seule réponse.

Ces données demeureront confidentielles.

1. Je me sens confiant(e) dans la détection de la dépression.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

2. Je me sens confiant(e) dans la détection des troubles reliés à l'anxiété.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

3. Je me sens confiant(e) dans la détection des problèmes de consommation d'alcool.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

4. Je me sens confiant(e) dans la détection des problèmes de consomation de drogures.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

5. Je me sens confiant(e) dans la détection des problèmes d'automutilation ou de suicide.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

6. Je me sens confiant(e) dans la détection des troubles reliés à la psychose (ex.: schizophrénie).

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

7. Je me sens confiant(e) dans ma capacité à recueillir de l'information nécessaire pour détecter un problème de santé mentale.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

8. Je me sens confiant(e) pour l'utilisation des techniques/ outils afin de détecter une maladie mentale.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

9. Je me sens confiant(e) pour poser un diagnostic en santé mentale chez mes patients.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

10. Je me sens confiant(e) pour expliquer un diagnostic en santé mentale à mes patients.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

11. S'il-vous-plaît, indiquer ici vos commentaires ou suggestions sur cette section du questionnaire.

Votre confiance dans le TRAITEMENT d'un problème de santé mentale

Cette section du questionnaire vise à évaluer votre degré de confiance en lien avec le traitement des problèmes de santé mentale, spécifiqueent liées aux modules de la formation.

Pour chaque question, merci de répondre avec une seule réponse.

Ces données demeureront confidentielles.

1. Je me sens confiant(e) dans le traitement pharmacologique de la dépression.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

2. Je me sens confiant(e) pour réaliser une thérapie de soutien (ex.: soutien, écoute active...) avec mes patients vivant avec la dépression.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

3. Je me sens confiant(e) pour faire la psychoéducation de mes patients vivant avec la dépression.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

4. Je me sens confiant(e) dans le traitement pharmacologique des troubles reliés à l'anxiété.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

5. Je me sens confiant(e) pour réaliser une thérapie de soutien (ex.: soutien, écoute active...) avec mes patients vivant avec des problèmes reliés à l'anxiété.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

6. Je me sens confiant(e) pour faire la psychoéducation de mes patients vivant avec des problèmes reliés à l'anxité.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

7. Je me sens confiant(e) dans le traitement pharmacologique relié aux troubles de consommation d'alcool.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

8. Je me sens confiant(e) pour réaliser une thérapie de soutien (ex.: soutien, écoute active...) avec mes patients ayant des troubles liés à la consommation d'alcool.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

9. Je me sens confiant(e) pour faire la psychoéducation de mes patients ayant des troubles liés à la consommation d'alcool.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

10. Je me sens confiant(e) dans le traitement pharmacologique lié aux troubles de consommation de drogues.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

11. Je me sens confiant(e) pour réaliser une thérapie de soutien (ex.: soutien, écoute active...) avec mes patients ayant des troubles liés à la consommation de drogues.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

12. Je me sens confiant(e) pour faire la psychoéducation de mes patients ayant des troubles liés à la consommation de drogues.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

13. Je me sens confiant(e) de prodiguer des soins en cas de conduite auto-agressive.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

14. Je me sens confiant€ de prodiguer des soins en cas de suicide.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

15. Je me sens confiant(e) dans le traitement pharmacologique relié aux troubles de psychose (ex. : schizophrénie).

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

16. Je me sens confiant(e) pour rélaiser la thérapie de soutien (ex. : soutien, écoute active…) avec mes patients vivant avec des troubles de psychose (ex. : schizophrénie).

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

17. Je me sens confiant€ pour faire la psychoéducation de mes patients vivant avec des troubles de psychose (ex. : schizophrénie).

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

18. S'il-vous-plaît, indiquer ici vos commentaires ou suggestions sur cette section du questionnaire.

Votre confiance dans la GESTION d'un problème de santé mentale.

Cette section du questionnaire vise à évaluer votre degré de confiance en lien avec la gestion des problèmes de santé mentale, spécifiqueent liées aux modules de la formation.

Pour chaque question, merci de répondre avec une seule réponse.

Ces données demeureront confidentielles.

1. Je me sens confiant(e) pour développer un plan de gestion de base pour mes patients vivant avec la dépression

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

2. Je me sens confiant(e) pour développer un plan de gestion de base pour mes patients vivant avec des troubles reliés à l'anxiété.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

3. Je me sens confiant(e) pour développer un plan de gestion de base pour mes patients ayant un trouble lié à la consommation d'alcool.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

4. Je me sens confiant(e) pour développer un plan de gestion de base pour mes patients ayant des troubles liés à la consommation de drogues.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

5. Je me sens confiant(e) pour développer un plan de gestion de base pour mes patients vivant avec des troubles de psychose (ex. : schizophrénie).

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

6. Je me sens confiant(e) pour impliquer d'autres professionnels dans le processus de gestion, au besoin.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

7. Je me sens confiant(e) pour référer mon patient, au bseoin.

- [ ] Fortement en désaccord.
- [ ] Plutôt en désaccord.
- [ ] Neutre.
- [ ] Plutôt en accord.
- [ ] Fortement en accord.

8. Je me sens confiant(e) pour impliquer les membres de la famille / amis dans le processus de gestion, au besoin.

- ☐ Fortement en désaccord.
- ☐ Plutôt en désaccord.
- ☐ Neutre.
- ☐ Plutôt en accord.
- ☐ Fortement en accord.

9. S'il-vous-plaît, indiquer ici vos commentaires et suggestions sur cette section du questionnaire.

Santé mentale globale:

Accroître la capacité d'intégrer la santé mentale dans les soins primaires en Tunisie

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PARTIE 3: CLIENTÈLE EN SANTÉ MENTALE DURANT LE MOIS PRÉCÈDENT

Mois/Année : _____/_____

Centre de santé : _____

Délégation/Région :_____

 # total de personnes vues durant cette période (incluant consultation pour conditions physiques et santé mentale): _____

	# total de cas	Nouveaux cas	Suivi régulier	# de cas référés	Sexe		Âge	
					Homme	Femme	- 18	+ 18
Troubles dépressifs	**N =**	N =	N =	N =	N =	N =	N =	N =
Troubles reliés à l'anxiété	**N =**	N =	N =	N =	N =	N =	N =	N =
Troubles dépressifs et anxieux	**N =**	N =	N =	N =	N =	N =	N =	N =
Troubles de la personalité	**N =**	N =	N =	N =	N =	N =	N =	N =
Troubles de l'adaptation	**N =**	N =	N =	N =	N =	N =	N =	N =
Automutilation/ Suicide	**N =**	N =	N =	N =	N =	N =	N =	N =
Troubles d'abus de substance (alcool)	**N =**	N =	N =	N =	N =	N =	N =	N =
Troubles d'abus de substance (drogues)	**N =**	N =	N =	N =	N =	N =	N =	N =
Troubles d'abus de substance et l'un ou l'autre des diagnostics précédents	**N =**	N =	N =	N =	N =	N =	N =	N =
Toubles de psychose	**N =**	N =	N =	N =	N =	N =	N =	N =
Autres conditions en santé mentale? Svp spécifier. **-** **-**	**N =**	N =	N =	N =	N =	N =	N =	N =
TOTAL	**N =**	N =	N =	N =	N =	N =	N =	N =

Merci de votre participation.

Appendix 4: CV

Jessica Spagnolo

BSW, MSW, PhD

e-mail jessica.maria-violanda.spagnolo@umontreal.ca

phone [redacted]

EDUCATION

PhD, Public Health 2013-2019
Université de Montréal (Québec, Canada)
Thesis: Global Mental Health: Building System Capacity for the Integration of Mental Health in Primary Care in Tunisia
Supervisors: François Champagne, PhD and Nicole Leduc, PhD

MSW, Social Work, Health and Social Care, Non-Thesis 2011-2013
McGill University (Montréal, Québec, Canada)
Supervisor: Karen Hetherington
Final Project: Influences of the Global North on Community Mental Health: Assessing Mental Health Care in a Jamaican Homeless Shelter

BSW, Social Work 2008-2011
McGill University (Montréal, Québec, Canada)

LICENSURE

Licensed Social Worker, Permit #SPAJ14/09/120TS 2014-present
Ordre des travailleurs sociaux et des thérapeutes conjugaux et familiaux du Québec

WORK EXPERIENCE

Non-academic

Junior Consultant 2015-2016
World Health Organization, Tunisia office (Tunis, Tunisia)

- Collaborated with national partners (ex.: members of the Ministry of Health) working in the field of mental health to ensure the launch of the 2016-2017 mental health programme

Trip Director (Summer Youth Programs) 2012-2016
Westcoast Connection (Montréal, Québec, Canada)

- Trip Director for programs to Hawaii (USA) and Costa Rica
- Trip Leader for programs to California (USA); Alberta and BC (Canada)
- Supervised staff members (between 3 and 4)
- Ensured the safety of trip members (between 22 and 24)
- Collaborated with local community service partners (ex., Habitat for Humanity, Boys and Girls Club, Eco Maui, and the Costa Rica Humanitarian Foundation) to develop community service programs for youth aged 14 to 18
- Managed the trip budget

Caseworker (Intern), Mental Health Programs 2010-2012
CLSC Parc-Extension (Youth Mental Health)

Clinique Bois-de-Boulogne (Adult Mental Health)
(Montréal, Québec, Canada)

- Youth Program: worked with youth living with mental health problems and their families (i.e., play therapy sessions, connecting them to community resources); developed an after-school program for youth aged 3 to 12; and wrote psychosocial reports and presented cases at weekly team meetings
- Adult Program: worked with adults living with mental health problems (i.e., individual therapy sessions, connecting them to community resources – including housing); and wrote psychosocial reports and presented cases at weekly team meetings

Addictions Prevention Youth Worker 2009-2011

De-Zone Youth Center (Montréal, Québec, Canada)

- Developed and implemented an addiction prevention program for youth aged 12 to 17
- Participated in community advocacy on behalf of the center
- Developed partnerships with local community resources (such as AJOI) and high schools
- Developed, implemented, and animated a weekly cooking class centered on healthy eating, for youth aged 12 to 17
- Coordinated volunteers

Academic

Research Intern 2016-2018

Centre de recherche du Centre Hospitalier de l'Université de Montréal
(Québec, Canada)

- Developed proposals for 2 scoping reviews (use of technology in global mental health)
- Participated in knowledge dissemination activities (abstract writing and presentations at local conferences)

Graduate Research Assistant 2014-2017

Montréal WHO-PAHO Collaborating Center for Research and Training in Mental Health (Québec, Canada)

- Developed study protocols to include service users, their caregivers, and service providers in the revision of the *International Classification of Diseases (ICD-11)* (in collaboration with the *WHO Collaborating Center* in Lille, France)
- Participated in knowledge dissemination activities (presentations at local and international conferences, abstract and report writing)

Research Assistant 2009-2016

Douglas Mental Health University Institute (Montréal, Québec, Canada)

- Involved in research projects centered on program implementation and evaluation (ex.: implementation and evaluation of an anorexia nervosa program offered to healthcare professionals across Québec, evaluation

of autonomous housing across Canada, and evaluation of a peer support program for those living with mental illness in Québec)
- Collected and analyzed qualitative and quantitative data (data collection in Montréal, Québec, and St-John's, Newfoundland)
- Participated in knowledge dissemination activities (organization of Advisory Committee meetings with local and national partners, presentations at local conferences, and writing of final reports)

Research Assistant 2013-2014
Center for Research on Children and Families, McGill University
(Montréal, Québec, Canada)
- Collected and analyzed data on the implementation and evaluation of housing/shelter services for the homeless living in Montréal (Québec, Canada)
- Participated in knowledge dissemination activities (writing of final reports)

Teaching

Teaching Assistant *(Contemporary issues of global health)* 2018-2019
Teaching Assistant *(Health planning and evaluation)* 2018-2019
Teaching Assistant (Health and Technology) 2018-2019
Teaching Assistant (*Health economics*) 2014-2015

AWARDS & HONOURS

Scholarships/Research Support Awards

Doctoral Awards
Fonds de recherche du Québec en Santé (FRQS) ($75,073) 2016-2018
Doctoral award

MITACS Globalink ($7,000) 2016
Doctoral award, grant to support data collection in Tunisia

Institut de recherche en santé publique ($15,000) 2016
Université de Montréal (Québec, Canada)
Team grant

School of Public Health, Université de Montréal (Québec, Canada) ($9,000) 2013
Academic Excellence Scholarship

Master's Awards
*Faculty of Arts, McGill University (*Montréal, Québec, Canada) ($10,000) 2011-2012
McCall MacBain Fellowship

Bachelor's Awards 2010-2011
Faculty of Arts, McGill University (Montréal, Québec, Canada) ($1,500)
Clifford Wong School of Social Work Scholarship

Dissemination/Travel Awards

Institut de recherche en santé publique ($1,000), publication award — Dec. 2018
Université de Montréal (Québec, Canada)

Fountain House, New York, New York, USA ($750) — Nov. 2018

Institut de recherche en santé publique ($1000), publication award — May 2018
Université de Montréal (Québec, Canada)

Faculté des études supérieures et postdoctorales ($500) — Mar. 2018
Université de Montréal (Québec, Canada)

Institut de recherche en santé publique ($1,400), dissemination award — Nov. 2017
Université de Montréal (Québec, Canada)

Institut de recherche en santé publique ($1,000), publication award — Nov. 2017
Université de Montréal (Québec, Canada)

Leacross Foundation, Chelsea, Québec, Canada ($400) — Oct. 2017

Institut de recherche en santé publique ($1,000), publication award — May 2017
Université de Montréal (Québec, Canada)

Institut de recherche en santé publique ($1,400), dissemination award — Apr. 2017
Université de Montréal (Québec, Canada)

Santé mondiale, réseau de recherche en santé des populations du Québec ($3,000) — Feb. 2017
Dissemination of doctoral research results in Tunis, Tunisia

Fonds d'aide aux projets d'études (FAPE) ($600) — Nov. 2015
Université de Montréal (Québec, Canada)

Institut de recherche en santé publique ($1400), dissemination award — May 2015
Université de Montréal (Québec, Canada)

Faculté des études supérieures et postdoctorales ($1,000) — May 2014
Université de Montréal (Québec, Canada)

PICAI Italian Language School (Montréal, Québec, Canada) ($2,500) — Jun. 2004

Honours

Finalist, Lancet Poster Competition — Mar. 2018
9th Annual Consortium of Universities for Global Health

Second place, Jury Award for best poster presentation ($100) — Feb. 2017
School of Public Health, Université de Montréal (Québec, Canada)

Winner, best oral presentation — Jan. 2017
Beyond Sciences Initiatives (Toronto, Ontario, Canada)

Winner, Jury Award for best scientific poster presentation ($100) — Feb. 2015
School of Public Health, Université de Montréal (Québec, Canada)

A. Ross Seaman Award ($500) — May 2010
YMCA of Québec (Canada)

PUBLICATIONS
Referred - published

1. SPAGNOLO, J., Chapagne, F., Leduc, N., Melki, W., Bram, N., Guesmi, I., Rivard, M., Bannour, S., Bouabid, L., Hassine Ganzoui, S.N.H., Mongi, B.M., Riahi, A., Saoud, Z., Zine, E., Piat, M., Laporta, & Charfi, F. (2019). A program to further integrate mental health into primary care: Lessons learned from a pilot trial in Tunisia. *Journal of Global Health Reports, 3(e2019022): doi: 10.29392/joghr.3.e2019022.*

2. SPAGNOLO, J., Chapagne, F., Leduc, N., Melki W, Piat, M., Laporta, Bram, N, Guesmi I, & Charfi, F. (2018). "We find what we look for, and we look for what we know": Factors interacting with a mental health training program to influence its expected outcomes in Tunisia. *BMC Public Health,* 18(1398): doi: 10.1186/s12889-018-6261-4

3. SPAGNOLO, J., Chapagne, F., Leduc, N., Rivard, M., Piat, M., Laporta, M., Melki, W., & Charfi, F. (2018). Mental health knowledge, attitudes and self-efficacy among primary care physicians working in the Greater Tunis area of Tunisia. *International Journal of Mental Health, 12*(63): doi: 10.1186/s13033-018-0243-x.

4. SPAGNOLO, J., Champagne, F., Leduc, N., Melki, W., Guesmi, I., Bram, N., Piat, M., Laporta, M., & Charfi, F. (2018). Tailoring a training based on the mhGAP-IG to Tunisia: Process and relevant adaptations. *Global Mental Health, 5*, e17. doi: 10.1017/gmh.2018.8.

5. SPAGNOLO, J., Champagne, F., Leduc, N., & Melki, W. (2018). *Mixed-Methods Research in Primary Care: Experiences from a Mental Health Trial in Tunisia.* International Journal of Qualitative Methods, 17: 30.

6. SPAGNOLO, J., Champagne, F., Leduc, N., Piat, M., Guisset, A.-L., Melki, W., Charfi, F., Guesmi, I., Bram, N., & Laporta, M. (2017). Factors Affecting the Implementation of a Mental Health Training Program in Tunisia: Perspectives of Trainers and Tutors. *Annals of Global Health, 83*(1), 144.

7. SPAGNOLO, J., Champagne, F., Leduc, N., Piat, M., Melki, W., Charfi, F., & Laporta, M. (2017). Building system capacity for the integration of mental health at the level of primary care in Tunisia: a study protocol in global mental health. *BMC Health Services Research, 17*(38): doi: 10.1186/s12913-017-1992-y.

8. Tremblay, A.-M., **SPAGNOLO, J**., De Allegri, M., & Ridde, V. (2016). Does Performance-Based Financing Increase Value for Money in Low- and Middle- Income Countries? A Systematic Review. *Health Economics Review, 6*(30), 1-18.

9. **SPAGNOLO, J.** (2014). Improving First Line Mental Health Services in Canada: Addressing Two Challenges of the Deinstitutionalization Movement. *Healthcare Quarterly, 17*(4), 41-45.

Referred – in press, accepted, under review

1. **SPAGNOLO, J.,** Chapagne, F., Leduc, N., Melki, W., Rivard, M., Piat, M., Laporta, M., Bram, N., Guesmi, I., & Charfi, F. (accepted, April 2019). Building capacity in mental health care in low- and middle-income countries by training primary care physicians using the mhGAP: a randomized controlled trial. *Health Policy and Planning.*

Referred - invited story, magazine articles (for professional orders), blogs

1. **SPAGNOLO, J.**, Champagne, F., Leduc, N., Guisset, A.-L., Melki, W., Charfi, F., Laporta, M., Guesmi, I., Bram, N., Trabelsi, S., Piat, M., Saeed, K., & Sabatinelli, G. (2016). Building general practitioner capacity in Tunisia by implementing the mhGAP. *WHO mhGAP Newsletter,* Geneva, Switzerland. Available online at: http://www.who.int/mental_health/mhgap/mhgap_tunisia/en/

2. **SPAGNOLO, J.** (2015). Le rôle des travailleurs sociaux dans la promotion du rétablissement en santé mentale: L'intégration de multiples déterminants de la santé. *Bulletin des travailleurs sociaux et des thérapeutes conjugaux et familiaux du Québec, 127*. Available online at: http://www.otstcfq.org/docs/default-source/bulletins/otstcfq-bulletin-127-automne-2015.pdf

3. **SPAGNOLO, J.,** & Turcotte-Tremblay, A.-M. (2016). Global Mental Health: Under-Represented at International Global Health Conferences? *Health Systems Global (HSG) 2016 Blog*, Vancouver, British Columbia, Canada. Available online at: http://healthsystemsresearch.org/hsr2016/is-global-mental-health-under-represented-at-internationally-acclaimed-global-health-conferences/

4. **SPAGNOLO, J.** (2016). Mental Health Recovery in Different Contexts: Lessons from the Field. *McGill Perspectives on Global Health,* Montreal, Quebec, Canada. Available online at: http://www.perspectivesmcgill.com/photo-essays/2016/8/12/mental-health-recovery-in-different-contexts-lessons-learned-from-the-field?rq=spagnolo

5. **SPAGNOLO, J.** (2015). Jumping on the Global Mental Health Bandwagon? Injustices Preventing the Reduction of the Mental Health Treatment Gap. *Juxtaposition Global Health Magazine* Toronto, Ontario, Canada. Available online at: http://juxtamagazine.org/2015/10/26/jumping-on-the-global-mental-health-bandwagon-injustices-preventing-the-reduction-of-the-mental-health-treatment-gap/

Non-Referred

1. **SPAGNOLO, J.** (2016). *Mental Health Research Activities 2015-2016*. (Internal Report, 8 p.).

2. Piat, M., **SPAGNOLO, J.**, & Thibodeau-Gervais, S. (2014). *Projet d'implantation et d'évaluation de l'impact du modèle de pairs-aidant auprès d'une clientèle en santé mentale dans le cadre du rétablissement*. (Research Report, 45 p.).

3. Mott, S., **SPAGNOLO, J.,** Moore, M., & Rothwell, D. (2013). Escale Program: Focus Group Findings. (Research Report, 203 p.): https://www.mcgill.ca/socialdevelopment/files/socialdevelopment/escale_focus_group_report_final_version_june_10_2013.pdf

4. **SPAGNOLO, J.** (2012). Assessing Mental Health Care in a Jamaican Homeless Shelter. (Internal Report, 42 p.).

CONFERENCE PRESENTATIONS

Oral Presentations

1. **SPAGNOLO, J.,** Champagne, F., Leduc, N., Melki, W., Charfi, F., Piat, M., & Laporta, M. (2018, May 29). *Developing a research project using the mhGAP-IG training and tools: an example from Tunisia.* Summer Program in Social and Cultural Psychiatry. McGill University, Montréal, Québec, Canada.

2. Lal, S., Doutrelant, S., Pearson, A., **SPAGNOLO, J.,** Starcevic, D., & Bray, C. (2018, May 9). *Utilisation des nouvelles technologies dans les soins de santé mentale pour les jeunes : prêts, pas prêts?* Journées annuelles en santé mentale (JASM), Montréal, Québec, Canada.

3. **SPAGNOLO, J.,** & Lal, S. (2017, November 21). *Le rôle de la technologie en santé mentale globale.* CRCHUM : Séminiares Axe Évaluation, Systèmes de soins et services. Montréal, Québec, Canada.

4. **SPAGNOLO, J.,** Champagne, F., Leduc, N., Melki, W., Charfi. F., Guisset, A.-L., Rivard, M., Piat, M., & Laporta, M. (29 October 2017). *Effectiveness of a mental health training program offered to general practitioners working in Tunisia: a randomized controlled trial.* 23nd Canadian Conference on Global Health, Ottawa, Canada.

5. **SPAGNOLO, J.,** Champagne, F., Leduc, N., Piat, M., Melki, W., Charfi, F., & Laporta, M. (2017, October 5-7). *Building Mental Health Capacity in Tunisia: Is a Training Program Offered to General Practitioners Sufficient?* European Network for Mental Health Service Evaluation (ENMESH): Conceptualizing, Measuring and influencing Context in Mental Health Care: From the Individual to Society, Groningen, the Netherlands.

6. **SPAGNOLO, J.,** Champagne, F., Leduc, N., Piat, M., Guisset, A.-L., Melki, W., Charfi, F., Guesmi, I, Bram, N., & Laporta, M. (2017, 16-19 February). *Building Mental Health Capacity in Tunisia by Training General Practitioners: Preliminary Results.* International Health Policy Conference 2017, London, UK.

7. **SPAGNOLO, J.,** Ishimo, M.-C., Champagne, F., Leduc, N., Farand, L., Guisset, A.-L., Melki, W., & Charfi, F., Ben Hamida, A., Piat, M., & Laporta, M. (2017, January 28). *Reforms of the Tunisian*

Healthcare System: Examples from the Field in Primary Care. Beyond Sciences Initiative: 2nd Annual International Remote Conference, virtual participation.

8. SPAGNOLO, J., Champagne, F., Leduc, N., Piat, M., Guisset, A.-L., Melki, W., Charfi, F., & Laporta, M. (2017, January 25). *Santé mentale globale : Accroître la capacité d'intégrer la santé mentale dans les soins primaires en Tunisie.* Les séminaires de l'Institut de recherche de santé publique (IRSPUM) de l'Université de Montréal, Montréal, Québec, Canada.

9. Bram, N., Charfi, F., SPAGNOLO, J., Guesmi, I., Champagne, F., Leduc, N., Trabelsi, S., & Melki, W. (2016, December 4). *Promotion in Mental Health: The Role of a Training Program on General Practitioners, Tunisian Experience.* 4th Africa and Middle East Congress on Addiction (AMECA), Monastir, Tunisia.

10. SPAGNOLO, J., Champagne, F., Leduc, N., Piat, M., Guisset, A.-L., Melki, W., Charfi, F., Laporta, M., Gasmi, I., Trabelsi, S., Bram, N. Saeed, K., Sabatinelli, G. (2016, April 22-23). *Comment améliorer l'accès aux soins en santé mentale dans le Grand Tunis? Une initiative en formation innovante.* 2e édition de la Journée Tunisienne en Organisation Hospitalière. Tunis, Tunisia.

11. SPAGNOLO, J., Champagne, F., Leduc, N., & Piat, M. (2015, November 13*). Enjeux en santé mentale dans les pays à faible et moyen revenu : Accroître la capacité de prise en charge des problèmes de santé mentale dans ces pays.* 34ème Congrès Franco-Maghrébin de Psychiatrie. Hammamet, Tunisie.

12. SPAGNOLO, J., Kestel, D., Laporta, M., Yaffe, M., Cayetano, C., & Xue, J. (2015, November 6). *Integrating Mental Health into Primary Health Care in the Caribbean: A Demonstration Project in Two Caribbean Countries.* 22nd Canadian Conference on Global Health. Montréal, Québec, Canada.

13. Laporta, M., SPAGNOLO, J., Pelletier, J.F., & Marsilli, M. (2015, April 30). *Revising the International Classification of Diseases: Integrating Users' Input About Contextual Factors in Diagnosing Mental and Behavioral Disorders.* International Mental Health Congress - Mental Health for All: Connecting People and Sharing Experience. Lille, France.

14. Piat, M., Pearson, A., & SPAGNOLO, J. (2015, April 24). *Bridging the Knowledge-to-Action Gap in Primary Care for Eating Disorders: Healthcare Professionals' Perspectives and Experiences with an Eating Disorder Training Program.* The International Conference on Eating Disorders. The Academy of Eating Disorders. Boston, Massachusetts, USA.

15. Piat, M., SPAGNOLO, J., Thibodeau-Gervais, S., Deschamps, C., & St-Pierre, B. (2014, November 11) *Résultats d'un projet d'implantation et d'évaluation de l'impact du modèle pairs-aidants.* XVIIe colloque de l'AQRP - Santé mentale et monde contemporain : vivre de nouvelles solidarités. Montréal, Québec, Canada.

16. Laporta, M., Pelletier, J-F., Roelandt, J-L., Stona, A-C., Marsili, M, & SPAGNOLO, J. (2014, November 11). *La Classification internationale des maladies: apports des usagers sur les éléments contextuels dans le diagnostic.* XVIIe colloque de l'AQRP - Santé mentale et monde contemporain : vivre de nouvelles solidarités. Montréal, Québec, Canada.

17. Piat, M., Steiger, H., Israël, M., Lal, S., Pearson, A., & SPAGNOLO, J. (2014, September 17). *Implementing an Eating Disorders Training Program for Primary Health Care Professionals: The Canadian Experience.* XVI World Congress of Psychiatry: Focusing on Access, Quality and Humane Care. Madrid, Spain.

18. Piat, M., & SPAGNOLO, J. (2014, October 2). *Projet d'implantation et d'évaluation de l'impact du modèle pairs-aidants: Présentation du projet et des résultats.* Maison de la Culture Mercier. Montréal, Québec, Canada.

19. Pearson, A., SPAGNOLO, J., Freiwald, S., Lal, S., Lahaie, N., Steiger, H., Piat, M., & Israël, M. (2013, June 23). *Using Knowledge Translation for a Province-wide Collaborative Model of Care for People with Eating Disorders.* XIV Annual Canadian Collaborative Mental Health Care Conference. Montréal, Québec, Canada.

Poster Presentations

1. SPAGNOLO, J., Champagne, F., Leduc, N., Melki, W., Rivard, M., Piat, M., Laporta, M., Bram, N., Guesmi, I., & Charfi, F. (2018, November 8-9). *Using the mhGAP-IG to train primary care physicians in effective mental health care: Lessons learnt from a mixed-methods study in Tunisia.* Healthier, Longer Lives International Conference. New York, New York, USA.

2. SPAGNOLO, J., Melki, W., Charfi, F., Champagne, F., Leduc, N., Rivard, M., Guisset, A.-L., Piat, M., & Laporta, M. (2018, March 16). *Mental health knowledge among general practitioners working in primary care in the Greater Tunis area of Tunisia: a baseline portrait.* Consortium of Universities for Global Health, New York, New York, USA.

3. SPAGNOLO, J., Champagne, F., Leduc, N., Melki, W., Charfi, F., Guisset, A.-L., Rivard, M., Guesmi, I., Bram, N., Piat, M., & Laporta, M. (29 October 2017). *Implementing a mental health training in Tunisia: General practitioners' impressions of the program.* 23rd Canadian Conference on Global Health, Ottawa, Canada.

4. SPAGNOLO, J., Champagne, F., Leduc, N., & Melki. (2017, October 2017). *Mixed methods research in primary care: Experiences from a mental health trial in Tunisia.* 23rd Annual Qualitative Health Research Conference, Québec City, Québec, Canada.

5. SPAGNOLO, J., Champagne, F., Leduc, N., Piat, M., Guisset, A.-L., Melki, W., Charfi, F., Guesmi, I., Bram, N., & Laporta, M. (2017, April 7-9). *Factors Affecting the Implementation of a Mental Health Training Program in Tunisia: Perspectives of Trainers and Tutors.* The 8th Annual CUGH Conference: Healthy People, Healthy Ecosystems, Washington, D.C., USA.

6. SPAGNOLO, J., Champagne, F., Leduc, N., Piat, M., Melki, W., Charfi, F., Gasmi, I., Bram. N., & Laporta, M. (2017, 2 February). *Training General Practitioners in Mental Health: Preliminary Results on Knowledge about Mental Illness from a Trial in Tunisia.* Colloque annuel de l'AEESPUM, École de santé publique, Université de Montréal, Montréal, Québec, Canada.

7. SPAGNOLO, J., Champagne, F., Leduc, N., Piat, M., Guisset, A.-L., Melki, W., Charfi, F., Laporta, M., & Sabatinelli, G. (2016, November 14-18). *Assessing the Effectiveness of a Mental*

Health Training Program on General Practitioners' (GPs) Attitudes Towards Mental Illness in Tunisia. Fourth Global Symposium on Health Systems Research: Resilient and Responsive Health Systems for a Changing World, Vancouver, British Columbia, Canada.

8. SPAGNOLO, J. (2016, November 11). *Trainees' Participation in Mental Health Programs or Research Initiatives in Low- and Middle-Income Countries: Some Ethical Considerations.* Ethical Challenges and Issues in Global Health Research (hosted by Réseau de recherche en santé des populations du Québec), McGill University, Montréal, Québec, Canada.

9. SPAGNOLO, J., Champagne, F., Leduc, N., Guisset, A.-L., Melki, W., Charfi, F., Laporta, M., Guesmi, I., Bram, N., Piat, M., & Sabatinelli, G. (2016, November 1). *Implementing a Training based on the WHO mhGAP-IG in the Greater Tunis Area of Tunisia: Lessons Learned from the Field.* Global Health Poster Fair, McGill University, Montréal, Québec, Canada.

10. SPAGNOLO, J., Champagne, F., Leduc, N., & Piat, M. (2016, June 17-18). *Building General Practitioners' in Mental Health Care by Implementing Training Programs: A Systematic Review.* 17th Canadian Collaborative Mental Health Care Conference: Growing Ideas. Kelowna, British Columbia, Canada.

11. SPAGNOLO, J., Laporta, M., Wahid, M., Guisset, A.-L., Champagne, F., Leduc, N., Charfi, F., Guesmi, I., Trabelsi, S., Bram, N., Piat, M., & Sabatinelli, G. (2016, May 30). *The Tunisian Experience in Tailoring a Mental Health Training Program Offered to General Practitioners (GPs).* Advanced Study Institute on Psychiatry for a Small Planet: Ecosocial Approaches to Global Mental Health, McGill University, Montreal, Canada.

12. Laporta, M., SPAGNOLO, J., Cayetano, C., Standard Goldson, A., Kestel, D., Da Costa, G., & Léon, C.A. (2016, May 30). *Training in the mhGAP Intervention Guide in the Caribbean: Impact on Clinical Practice.* Advanced Study Institute on Psychiatry for a Small Planet: Ecosocial Approaches to Global Mental Health, McGill University, Montreal, Canada.

13. Faregh, N., SPAGNOLO, J., & Laporta, M. (2016, May 30). *Montreal WHO/PAHO Collaborating Center for Research and Training in Mental Health: Striving to Improve Access to Mental Health Care Around the World.* Advanced Study Institute on Psychiatry for a Small Planet: Ecosocial Approaches to Global Mental Health, McGill University, Montreal, Canada.

14. SPAGNOLO, J., Champagne, F., Leduc, N., Piat, M., Melki, W., Charfi, F., Guisset, A.-L., Sabatinelli, G., Gasmi, I., Trabelsi, S., Bram, N., & Laporta, M. (2016, May 10). *Contextualizing the World Health Organization (WHO)'s Mental Health Gap Action Programme (mhGAP) Training to General Practitioners (GPs) Working in Primary Care in the Greater Tunis Area of Tunisia.* Canadian Association for Health Services and Policy Research (CAHSPR). Toronto, Ontario, Canada.

15. SPAGNOLO, J., & Turcotte-Tremblay, A.-M. (2015, February 18). *The Efficiency of Performance-Based Financing in Low-and Middle- Income Countries: A Rapid Review.* Colloque annuel de l'AEESPUM: l'innovation en santé publique - opportunités, défis et perspectives. Montréal, Québec, Canada.

16. **SPAGNOLO, J.,** Champagne, F., Leduc, N., & Piat, M. (2015, November 6). *Building System Capacity in Primary Care: Are Mental Health Training Programs for General Practitioners (GPs) Effective?* 22nd Canadian Conference on Global Health. Montréal, Québec, Canada.

17. **SPAGNOLO, J.,** Champagne, F., Leduc, N., Piat, M., & Laporta, M. (2015, November 3). *Training General Practitioners to Treat, Detect and Manage Mental Health Problems at the Level of Primary Care in Tunisia: A Global Health Initiative.* Global Health Poster Fair, McGill University, Montréal, Québec, Canada.

18. **SPAGNOLO, J.,** Champagne, F., Leduc, N., & Piat, M. (2015, June 19). *Building System Capacity in Primary Care: A Review of Implemented and Evaluated Mental Health Training Programs for General Practitioners.* 16th Canadian Collaborative Mental Health Conference: Jump on the Bandwagon. Calgary, Alberta, Canada.

19. Turcotte-Tremblay, A.-M., **SPAGNOLO, J.,** De Allegri, M., & Ridde, V. (2015, May 26). *Evaluating the Evidence on the Efficiency of Performance-Based Financing in Lower Income Countries.* 36th Canadian Evaluation Society (CES) National Conference: Evaluation for the world we want. Montréal, Québec, Canada.

20. **SPAGNOLO, J.** (2015, February 18). *Experiences in a Jamaican homeless shelter for people with mental health problems.* Colloque annuel de l'AEESPUM. École de santé publique, Université de Montréal, Montréal, Québec, Canada.

PEER-REVIEWER

Journals
International Journal of Mental Health Systems (2017; 2018)
Revue Santé publique (2014)

Conferences
American Public Health Association (2018)

Guidelines
World Health Organization (2016; 2018)

Reports
World Health Organization and *Pan-American Health Organization* (2016)

SERVICE

Moderator — May 2016
Canadian Association for Health Services and Policy Research (Toronto, Canada)

Youth Leader — Aug. 2015
Extreme Youth Camp (St-Luke's Parish, Montréal, Québec, Canada)

Advocate 2013-2016
Montréal Walks for Mental Health (Québec, Canada)

Mental Health Consultant 2013-2015
STEPP 20/80 (Montréal, Québec, Canada)

Crisis Intervention Worker May-Jun. 2012
Portland Rehabilitation Management (Port Antonio, Portland, Jamaica)