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Development and randomized controlled trial evaluation of "Safeguard Your Smile" an oral health literacy intervention promoting oral hygiene self-care behavior among Punjabi immigrants

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Development and randomized controlled trial evaluation of “Safeguard Your Smile” an oral health literacy intervention promoting oral hygiene self-care behavior among Punjabi immigrants

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a été évaluée par un jury composé des personnes suivantes :

Dre. Florina Moldovan	Président rapporteur
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RÉSUMÉ

Contexte: Les résultats de plusieurs recherches mettent en évidence dans la population immigrante, une prévalence élevée des maladies bucco-dentaires, une faible accessibilité aux soins bucco-dentaires ainsi qu'un faible niveau de connaissances en matière d'hygiène bucco-dentaire, par rapport aux citoyens nés au Canada. L'amélioration des connaissances et des habiletés en matière d'hygiène bucco-dentaire, constitue un moyen efficace pour réduire les inégalités dans le domaine de la santé bucco-dentaire. La rareté des études, ainsi que la présence de nombreuses lacunes méthodologiques dans le domaine de la littératie en santé bucco-dentaire, notamment au sein de la population immigrante, a conduit à réaliser cette nouvelle étude.

Objectifs : Le but de ce projet était de développer et évaluer l'impact d'une intervention sur les compétences en matière de santé bucco-dentaire pour promouvoir des attitudes positives en matière d'hygiène bucco-dentaire chez les immigrants Punjabi. Quatre études séparées ont été menées pour atteindre les quatre objectifs suivant : i) Faire une revue de la littérature pour identifier et synthétiser les données et les lacunes de connaissances actuelles dans le domaine des connaissances et habiletés en matière de santé bucco-dentaire; ii) Développer du matériel éducatif (roman-photo) culturellement et linguistiquement approprié pour les immigrants Punjabi en utilisant une approche communautaire participative; iii) Développer une intervention de littératie sur les compétences en matière de santé bucco-dentaire, fondée théoriquement, pour la promotion des compétences en matière de santé bucco-dentaire chez les immigrants Punjabi; iv) Évaluer l'efficacité de l'intervention de littératie en santé orale sur les compétences en

matière de santé bucco-dentaire de promotion des comportements personnels de bonne hygiène bucco-dentaire chez les immigrants Punjabi.

Résultats : Les principaux résultats de nos quatre études se répartissent de la façon suivante : 1) Les résultats de la première étude mettent l'emphase sur le besoin de développer de nouveaux outils d'évaluation afin de mesurer les niveaux de connaissance et d'habileté en matière d'hygiène bucco-dentaire et soulignent la rareté des interventions pour la santé bucco-dentaire. De plus, il a été confirmé que des compétences en matière de santé bucco-dentaires limitées sont positivement et significativement liées à de plus faibles connaissances bucco-dentaires et des indicateurs de santé bucco-dentaires plus faibles. En outre, nous avons constaté un déficit d'études sur les interventions parmi les populations vulnérables, en particulier chez les immigrants. 2) Dans la deuxième étude les réunions de groupe de discussion ont révélé quatre thèmes identifiant les perceptions sur les comportements personnels en matière d'hygiène bucco-dentaire chez les immigrants Punjabi : i) manque de compréhension sur les facteurs de risques et sur les connaissances reliées aux comportements personnels en matière d'hygiène bucco-dentaire; ii) manque d'habilités et de routines reliées aux pratiques personnelles d'hygiène bucco-dentaire; iii) manque de compréhension de l'importance de la prévention; et iv) les barrières perçues pour accéder à la santé bucco-dentaire. Les résultats de cette étude ont été utilisés pour développer du matériel éducatif (roman-photo) pour les immigrants Punjabi.

3) La troisième étude a permis de développer une intervention de littératie en santé orale fondée théoriquement sur les comportements personnels d'hygiène bucco-dentaire en utilisant la méthode « *Behaviour Change Wheel* (BCW) » (la roue du changement de comportement). En

utilisant la méthode BCW, nous avons d'abord identifié les barrières et les facilitateurs et les relier aux fonctions d'intervention, des catégories de politiques et techniques par les de changement de comportement spécifique identifié parmi la gamme d'options fournies par la méthode BCW. 4) Dans la quatrième étude une analyse « Linear Mixed Model pour Repeated Measures (LMMRM) » à deux niveaux comparant les groupes d'intervention et contrôle avant et après l'intervention, a montré que les participants qui ont reçu l'intervention « Sauvegarde Ton Sourire » ont eu une amélioration significative de leur routine de brossage et d'utilisation de la soie dentaire, de leurs indices de plaques dentaire et gingivaux, et de leurs compétences en matière de santé bucco-dentaires.

Conclusions: L'approche novatrice de la présente étude qui a pour but de développer et d'évaluer une intervention communautaire fondée sur une base théorique, pour la promotion des compétences en matière de santé bucco-dentaire chez les immigrants Punjabi, a abordé son déficit et proposé un modèle d'intervention qui peut être adapté à d'autres communautés ayant un faible niveau de connaissance et de pratique quotidienne en matière d'hygiène bucco-dentaire, afin réduire les inégalités de santé bucco-dentaire.

Mots-clés : La littératie en santé orale, comportement personnel en matière d'hygiène bucco-dentaire, intervention, immigrants Punjabi.

ABSTRACT

Background: Research shows that immigrants have higher rates of oral diseases, poorer access to dental care services and lower levels of health literacy than their Canadian-born peers. Recently, oral health literacy has emerged as a potential pathway to reduce oral health disparities. Existent scarcity and methodological shortcomings of studies on oral health literacy interventions particularly among immigrants lent urgency to our present research study.

Objectives: The overarching goal of present research study was to develop and evaluate the effectiveness of an oral health literacy intervention aimed to promote positive oral hygiene self-care behavior among Punjabi immigrants. To achieve this goal, we conducted four separate studies having following objectives: i) To conduct a scoping review to identify and synthesize the current evidence and knowledge gaps on the topic of oral health literacy. ii) To develop a culturally and linguistically appropriate educational material (photonovel) for Punjabi immigrants using a community based participatory approach. iii) To develop a theoretically grounded oral health literacy intervention aimed to improve oral hygiene self-care behavior among Punjabi immigrants. iv) To evaluate the effectiveness of the developed oral health literacy intervention aimed to promote positive oral hygiene self-care behavior among Punjabi immigrants.

Results: The main findings of our four investigations were: 1) Findings of the first study affirmed a need to develop new assessment tools to capture all dimensions of oral health literacy and highlighted scarcity of oral health literacy interventions among vulnerable populations particularly among immigrants. Also, it affirmed that low oral health literacy is positively and

significantly related to poor oral health knowledge, poor oral health behaviour and poor oral health outcomes. 2) In the second study, the focus group meetings revealed four themes identifying following perceptions held by Punjabi immigrants regarding oral hygiene self-care: i) lack of understanding about oral hygiene self-care related knowledge and risk factors; ii) lack of oral hygiene self-care related adequate skills and routine; iii) lack of emphasis on prevention by oral health care providers; and iv) perceived barriers to access dental health. Findings of the focus group discussions were used to develop an educational material (photonovel) for Punjabi immigrants.

3) The third study developed a theoretically grounded oral health literacy intervention aimed to improve oral hygiene self-care behavior by employing "Behaviour Change Wheel" (BCW) method. Using the BCW method, we first identified various barriers and enablers and linked those with specific intervention functions, policy categories and behavior change techniques identified from the range of options provided by the BCW. Six intervention functions (education, training, modeling, restriction, environmental restructuring and enablement) were subsequently mapped to two policy categories (communication and service provision) since they met the APEASE criteria. 4) In the fourth study, linear mixed model analysis for repeated measures comparing the intervention and control groups at pre-and post-intervention reported that participants who received "Safeguard Your Smile" intervention showed significant improvement in their adequately brushing and flossing routine and in their plaque and gingival indices and oral health literacy than control group participants.

Conclusions: The novel attempt of the present research study of developing and evaluating a theoretically grounded and community based oral health literacy intervention among Punjabi immigrants has addressed a deficit in this field and proposed a model of oral health literacy intervention that could be adapted among other low oral health literate communities to reduce the oral health disparities.

Keywords: Oral health literacy, oral hygiene self-care behavior, intervention, Punjabi immigrants.

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LIST OF ABBREVIATIONS

ADA	American Dental Association
BCW	Behaviour Change Wheel
BCT	Behaviour Change Technique
CPHA	Canadian Public Health Association
GI	Gingival Index
HL	Health Literacy
IALSS	International Literacy and Skills Survey
IOM	Institute of Medicine
LMMRM	Linear Mixed Model for Repeated Measures
OHL	Oral Health Literacy
PI	Plaque Index
SWAM	Sikh Women Association of Montreal
SYS	Safeguard Your Smile
TDF	Theoretical Domain Framework
TS-REALD	Two Stage Rapid Estimate of Adult Literacy in Dentistry
US	United States of America
UNESCO	United Nations of Educational, Scientific and Cultural Organization
WOCF	Worst Outcome Carried Forward
WHO	World Health Organization

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This thesis is dedicated to my parents, my husband and my children

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Introduction

CHAPTER 1: INTRODUCTION

Oral health literacy has recently emerged as an important determinant of oral health [1, 2] and a potential pathway to reduce oral health disparities [3-5]. Oral health literacy refers to the "degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make oral health related decisions" [6]. Simply put, oral health literacy refers to one's ability to obtain, understand and use a set of oral health related knowledge, skills and adequate behavior to maintain a good oral health. The present thesis illustrates the development and evaluation of an oral health literacy intervention aimed to promote oral hygiene self-care behavior among Punjabi immigrants. Chapter 1 first introduces reader to the background and context in which the present study is set, then presents our research goal, specific objectives and an overview of the structure of the present thesis.

1.1 Oral health status of Canadian immigrants

Good oral health is integral to general health and is vital for one's overall quality of life and well-being [7]. Despite overall improvements in oral health status of Canadians, preventable oral diseases such as dental caries and gum diseases remain concentrated among vulnerable populations [8]. Thirty two percent Canadians lack any type of dental insurance and by including low income individuals the percentage of people with no insurance augments to 50% [9]. Thus, the private system nature of Canadian oral health care services in part adds to oral health disparities [10].

According to Canada's 2011 census, there are 6.8 million recent immigrants in Canada representing almost 20% of the total population [11]. In 2006, Canada's three major cities Toronto, Montreal and Vancouver were home to 68.9% of the recent immigrants [12]. It has been reported that immigrants experience gradual deterioration in their health status [13, 14] in part due to barriers such as financial , cultural, linguistic and low health literacy [15] to access health care services [16]. Locker et al. who studied oral health inequalities in Canada determined that there is higher need of dental treatment among foreign born as compared to Canadian adolescents [16]. Despite having higher rates of oral diseases still, research shows that less use of oral health care services is common among immigrants primarily due to financial barriers [17].

Recently, Ghiabi et al. who studied oral health status of Canadian immigrants confirmed that oral disease rates are much higher in immigrants and refugees as compared to native Canadians [17]. Their results reported that almost 53% immigrants had untreated dental decay, 89% had mild gingivitis and almost 73% had mild to moderate periodontitis as compared to 32% Canadians [17]. Calvasina et al. reported that Brazilian immigrants living in Canada face challenges to access and navigate the Canadian dental care system due to low income, language barriers and lack of self-efficacy and knowledge about the dental system [18]. Brodeur et al. conducted a survey on 5,795 Quebec's immigrant women and found that recent immigrant women use less preventive services as compared to long term immigrants and non-immigrants and this difference was in part due to financial and cultural barriers [19]. Bedos et al. affirmed that low income adults in Quebec consult dentist less often for preventive care and wait longer

when they have a dental problem [20]. Another study demonstrated that 52.1% of Chinese elders did not visit dentist in past one year and the Chinese immigrants living in Quebec have less dentist visits as compared to Chinese immigrants living in British Columbia [21].

Evidence from western Canada showed that older Punjabi immigrants have difficulty accessing dentist and they manage their oral diseases with either home remedies, emergency room visit or during their visit to India [22]. Marshall et al. reported that Punjabi and Chinese populations have expressed their unmet needs of general health and dental care services due to economic reasons, unfamiliarity with the Canadian health system and due to low health literacy [23].

1. 2 Health literacy of Canadian immigrants

Evidence from Canadian health literacy literature reports, that certain population groups such as immigrants, aboriginals, seniors and people with low English or French proficiency have low health literacy [24]. The Canadian council of learning has defined health literacy as "person's ability to access, understand, evaluate and communicate information in a way to promote, maintain and improve health in a variety of settings across the life course". The fundamental idea behind health literacy is that greater is one's knowledge, understanding and skills of self-managing one's health, better is one's health [25].

Results of International Adult Literacy and Skills Survey (IALSS) showed that approximately 60% immigrants fall below level 3 in prose literacy as compared to 37% of Canadians [26]. Prose literacy refers to knowledge and skills needed to understand and use information from texts including editorials, news, stories, brochures and instruction manuals. According to the Instititut de la statistique du Quebec, 55% of Quebec adults fall below level 3 prose literacy threshold that inhibits their health information seeking ability and brings poor health outcomes [27]. Studies show that low health literacy is associated with barriers to access health care, poor treatment adherence, high rates of hospitalization [28] and poor health outcomes [29]. Health literacy refers not only to the abilities of individuals, but also to the communication practices of health information providers [24]. Noteworthy, the complexity of current verbal and written health communications practices is challenging for low health literate immigrants who may not always understand the information communicated [30].

The Canadian Public health Association (CPHA) recommends that improvements in health literacy in which immigrants are particularly disadvantaged is critical to bring positive health outcomes and to reduce health disparities [31]. Nutbeam proposed that improvements in health literacy involves helping people to gain knowledge, skills and develop motivation and confidence to act on knowledge through more personal form of communication and community based participatory approaches [32].

1. 3 "Oral health literacy, a pathway to reduce oral health disparities"

Oral health literacy concept unites health literacy and oral health and recent studies have indicated it as a potential pathway to reduce oral health disparities [3-5]. Over the last decade, there has been increased interest in oral health literacy research with most of the research centered in the US and Australia [33, 34]. Atchinson et al reported that immigrants have lower oral health literacy as compared to non-immigrants [35]. Studies have shown that low oral health literacy is associated with: i) poor oral health knowledge [36-38], ii) poor oral health behaviors [34, 39, 40], iii) less dental services utilization [41, 42] and iv) poor oral health status [43-47]. Ueno et al. demonstrated a significant relationship between the low level of oral health literacy and poor oral health behaviors and poor oral hygiene status [39].

Dental plaque (sticky bacteria containing layer) is the primary etiological agent of oral diseases such as dental caries and periodontal diseases [48, 49]. Periodontal diseases such as gingivitis, if not managed at an early stage may lead to a cascade of events such as periodontitis, dental caries, tooth loss or even contribute to risk of systemic diseases such as diabetes, cardio-vascular disease, bacterial pneumonia and low birth weight [50]. Oral diseases are preventable as well as treatable. Preventive interventions are increasingly becoming a focus of dental Public Health and much efforts concentrate on behavioral and lifestyle changes. It is widely accepted that positive self-care behaviors play a central role in maintenance of oral health and prevention of disease [51]. Prevention and management of oral diseases are critically dependent upon one's daily oral hygiene self-care behavior, healthy dietary intake, refrain from tobacco use and

regular dental check-ups [52] . In general, the elementary oral hygiene self-care behavior which is a cornerstone of preventing oral diseases is practiced inadequately [53].

Eliminating oral health disparities has become a national public health priority in most western countries [54]. Concerned about the prevalence of low oral health literacy among vulnerable groups in the US, several landmark documents such as Surgeon General's report [55], the National Institute of Dental and Craniofacial Research's report [56], other two reports by the National Academy of Medicine and American Dental Association's health dentistry action plan [57-59] have recommended that community wide effective oral health literacy interventions are needed to create public awareness about causes and preventive measures of oral diseases [60].

The benefit of oral health literacy is that it empowers people by providing them with adequate knowledge, understanding and skills so that they can make informed choices to adopt healthy behaviors and prevent oral diseases [47]. Evidences from the US and the Australia have suggested that community based oral health literacy interventions have a potential to reduce risk factors for oral diseases among vulnerable populations such as aboriginals [33] and seniors [34].

Although, the field of oral health literacy has advanced in other developed countries yet, minimal oral health literacy related research [18, 61, 62] has been conducted in Canada. In 2015, we conducted a scoping review that has underscored a scarcity of oral health literacy

interventions among vulnerable populations [63]. Specifically, the scarcity of research related to oral health literacy interventions among immigrants lent urgency to our present research.

1. 4 Research goal

The overarching goal of the present study was to develop and evaluate an oral health literacy intervention aimed to promote positive oral hygiene self-care behavior among adult Punjabi immigrants.

1. 5 Specific objectives

Oral health literacy empowers people by providing them with oral health related adequate knowledge, understanding and skills so that they can make informed choices to adopt healthy behaviors and prevent oral diseases [47]. We aimed to develop an oral health literacy intervention for Punjabi immigrants to target all the three elements i.e. knowledge, skills and behavior of oral health literacy. To accomplish this overarching goal, we set four following specific objectives:

i) To conduct a scoping review to identify and synthesize current evidence and knowledge gaps on the topic of oral health literacy.

ii) To develop a culturally and linguistically appropriate educational material (photonovel) to enhance oral hygiene self-care related knowledge and skills among Punjabi immigrants.

iii) To develop a theoretically grounded oral health literacy intervention aimed to improve oral hygiene self-care behavior among Punjabi immigrants

iv) To evaluate the effectiveness of the developed oral health literacy intervention aimed to promote positive oral hygiene self-care behavior among Punjabi immigrants.

1. 6 Structure of the present thesis

The present manuscript based thesis is structured as follows:

Chapter 1 presents background and context in which the present study is set, our research goal, specific objectives and an overview of the structure of the present thesis.

Chapter 2 includes literature review, findings of our scoping review and is followed by a summary, contribution to knowledge and role of the doctoral candidate in the present study.

Chapter 3 presents the four manuscripts describing the four separate studies that were conducted to address the four specific objectives of this research study.

Chapter 4 discusses the research findings and describes limitations and strengths and proposes recommendations for future research.

Chapter 5 draws conclusions of the present research.

The **bibliography** section comprises of all the references cited in this thesis.

Tables and figures are presented together with their corresponding text otherwise are included in appendices section of this thesis.

The **appendices** contain all the relevant documents associated with this study.

The **annexure** contains authorization of co-authors and my publications of my other research involvements during my PhD.

2

Literature review

CHAPTER 2: LITERATURE REVIEW

This chapter presents a review of literature and is sub-divided into following sections:

i) the first section outlines the concept of health literacy including its origin, definitions, dimensions, assessment tools and interventions and describes photonovel; ii) in the second section, concept of oral health literacy including its origin, definition, conceptual framework, assessment tools and interventions are presented; iii) the third section discusses the challenges involved in theory selection for developing an intervention and describes how to design an effective behavioral intervention using the Behavioral Change Wheel (BCW) i.e. a systematic method of designing a behavioral intervention and iv) the fourth section outlines a brief overview on number of immigrants in Canada and their access to oral health care in Canada and specifically in Montreal, Quebec and what was the rationale behind choosing Punjabi immigrants as the target population for this research study. Lastly, this chapter finishes with a summary, contribution to knowledge and role of the doctoral candidate in the present study.

2. 1 Health literacy

2.1.1 Origin of health literacy

The roots of health literacy trace back to health education concept of health promotion since it first appeared in literature in 1974 in relation to health education in a school setting [64]. After

a gap of almost two decades, a series of groundbreaking reports released in the US [65], the Canada [66] and the UK [67] brought the concept of health literacy to surface and during last decade, research on health literacy has received wide support at an international level and expanded exponentially [68].

Nutbeam contended that health education programs focus primarily on transmission of information without taking into consideration the influence of individual's beliefs and subjective norms [69]. He further argued that transmission of health related education or information does not guarantee that it is well understood and will for sure be used to promote one's health [69]. Peerson et al. provided an example supporting this argument that, "how can simple transmission of education be effective for someone who knows the risks of "binge drink" but chooses to ignore them?" [70].

Various other critics have also raised concerns regarding the limitations of health educational programs in promoting health. To quote a few, Croucher et al. stated that predominant approach of health education is of "expert led" nature with little attempts involved in finding out what do people need exactly [71]. Blinkhorn argued that health education is mainly disease centered rather than patient centered [72]. Furthermore, Sheiham and Watt expressed concerns about the "simplistic and outdated approach" of health education that failed to integrate the complexities of human behavior and the broad socio-economic and environmental determinants of behavioral change [73]. Kickbush proposed that this divide between health and education can be addressed by the concept of health literacy and by moving beyond the individual focus [74].

The concept of health literacy concept was initially challenged with statements such as, "new wine in old bottles" [75]. Nutbeam explained that health literacy is more than health education since it encompasses comprehension and ability to judge, sift and apply the information in the context of one's life [69]. He stated that the health literacy concept is like "putting new oil into old lanterns" since it broadened the scope of health education by incorporating skills, motivation, competence and behavioral factors and participatory approach along with knowledge to address structural inequalities [25]. Nutbeam further proposed that health literacy being a key outcome of health education should be situated within the broader field of health promotion [76]. He argued that the interactive and critical levels of health literacy associate health literacy with health promotion through their self-efficacy and empowerment concepts [76].

2.1.2 Definitions of health literacy

First definition of health literacy was proposed by Nutbeam i.e. "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health"[77]. The most commonly cited definition of health literacy provided by Ratzan and Parker is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions"[78]. A systematic review by Sorensen et al. has synthesized 17 different definitions of health literacy and defined it as [79]: "Health literacy is linked to literacy and entails people's knowledge, motivation and competence to access,

understand, appraise and apply health-related information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion setting to maintain or improve quality of life during the life course"[79].

2.1.3 Dimensions of health literacy

Health literacy is considered as a multidimensional concept [79]. Zarcadoolas et al. viewed health literacy not only from patient's perspective but also as an issue for health providers and the public [80]. Lee et al. identified four dimensions of health literacy i) health related knowledge ii) health related behavior iii) preventive care and physician visit and iv) compliance with medication [81]. Nutbeam perceived health literacy as a broader concept having three following dimensions [82] : 1) Functional: includes basic reading and writing skills required in health context. 2) Interactive: includes social skills and cognitive abilities required to interact in the health care environment. 3) Critical: the ability to critically analyze and act on information to make appropriate health related decisions to have better control over one's personal health.

2.1.4 How is health literacy assessed?

The two most frequently used health literacy assessment tools are i) the Rapid Estimate of Adult Literacy in Medicine (REALM) [83] and ii) the Test of Functional Health Literacy in Adults (TOFHLA) [84]. The REALM is a reading test of 66 medical words that patients read aloud and score one point for each word pronounced correctly but with this tool comprehension of words

is not tested [83]. TOFHLA has 67 items and requires patients to fill in missing words in passages and tests comprehension of words [84]. Modified and shorter version of the REALM and TOFHLA such as the nine-item S-TOFHLA were developed. Recently, the six-question Newest Vital Sign instrument was developed that incorporated elements of comprehension and numeracy to read from nutrition label [85] .

Chew et al. introduced three questions to rapidly identify patients with inadequate health literacy [86]. McCormack et al. developed 25 items Health Literacy Skills Instrument (HLSI). The skills include ability to read and understand text, numeracy, oral literacy (to listen effectively)[87]. Despite of their potential to assess word recognition and basic reading and numeracy skills current health literacy assessment tools failed to capture the full complexity of one's health literacy level. Improved measures that can be used to monitor health literacy overtime and capture the full complexity of one's health literacy level are required [88].

2.1.5 Health literacy interventions among immigrants

Nutbeam proposed that improvements in health literacy involve helping people to gain knowledge, skills and develop motivation and confidence to act on knowledge through more personal form of communication and community based outreach [32]. The WHO's report entitled "Health literacy the solid facts" recommends to develop and employ specific "migrant-friendly strategies" and to engage immigrants, individuals and communities through cultural mediators in planning and implementing of health literacy improving efforts [89]. Furthermore,

use of plain language is emphasized and use of audio-visual aids such as images, photographs, graphic illustrations etc. is encouraged [89].

2.1.6 Bridging the gap through photonovel

It is reported that a significant gap exists between the reading skills of low health literate patients and the health related educational materials provided by health care professionals [90, 91]. In other words, if one can't comprehend the provided health information one can't make preventive and oral health promoting decisions. The most common way to bridge this gap is to use written or verbal health educational materials in a plain language with no jargons. In addition, the education materials shall preferably have self-explanatory images and their content shall be culturally and linguistically sensitive to the socio-cultural practices of the diverse population groups. A report on health literacy improving interventions has recommended that participatory educational methods are effective among low health literates to enhance knowledge about health issues [92]. In addition, an access to culturally and linguistically appropriate health related information targets critical health literacy of individuals and enables them to make informed health related choices and decisions [93].

Poureslami et al. used participatory approach, culturally relevant educational videos and a pictorial pamphlet to impact asthma patients' self-management among low health literate Punjabi, Mandarin, and Cantonese immigrants [94]. Their results showed that participatory

approach and use of culturally and linguistically appropriate materials are the effective means to improve health of ethno-cultural communities [94].

Amongst the few notable Canadian health literacy interventions, community participatory approach using educational tool called photonovel has been considered to be effective among immigrant women having low health literacy [93]. Photonovel was used to educate participants about how to promote their health by making healthy food choices and to adopt exercise routine. The study concluded that participatory approach, photonovel and social network components of the intervention were the key factors that encouraged women in making healthy food choices and to adopt exercise routine [93]. In addition, an access to culturally and linguistically appropriate health related information targets critical health literacy of individuals and enables them to make informed health related choices and decisions [93]. McGinnis et al. effectively used photonovel to educate community members of Tampa Bay area in Florida about prostate cancer [95].

Photonovel resembles a comic book but instead of drawings it contains photographs of real people and has limited text balloons and has been considered as an effective method to convey health related messages among low health literates [93, 95]. Photonovel is based on Paulo Freire's theory which posits that critical consciousness develops through dialogue and participatory action [96]. When people develop critical consciousness, they apply their critical thinking skills to analyze information critically, increase awareness, and participate actively in using information to make informed decisions that allows for greater self-efficacy and

empowerment [97]. The UNESCO's (United Nations of Educational, Scientific and Cultural Organization) document provides a comprehensive stepwise process of how to create and publish a photonovel [98]. Another document by Nimmon et al. provided 10 easy steps to create photonovels [99] According to Nimmon et al. collaborative photonovel development can be done in 10 steps.: i) forming a group; ii) naming a problem; iii) considering the audience; iv) writing a story; v) developing characters and costumes; vi) taking photographs; vii) preparing the dialogue; viii) using digital technology; ix) seeking audience feedback; and x) publishing the photonovel. Overall, the materials needed are relatively easy to procure and the production photonovel is simple [99].

Till date several studies have demonstrated that oral diseases are prevalent amongst Canadian immigrants [16] due to limited awareness about preventive and oral health promoting measures [100, 101]. Although photonovel related to hepatitis B screening [102], tuberculosis [103], nutrition knowledge [104] had been developed yet there is scarcity of research studies related to development and evaluation of photonovel related to oral hygiene self-care.

2. 2 Oral health literacy

2.2.1 Origin of oral health literacy

Health literacy has been explored in different disciplines such as health communications [105] and public health literacy for lawyers [106]. Likewise, there has been growing interest amongst

oral health researchers and practitioners to study the relationship between health literacy and oral health that lead to emergence of the concept of Oral Health Literacy (OHL).

During the last 10 years, research in oral health literacy has grown and evolved. Landmark documents such as the US' surgeon general report concluded that oral diseases are a "silent epidemic" i.e. prevalent amongst vulnerable population and requires interventions to prevent oral diseases [107]. The workshop report published by the US' National Academy of Medicine previous named the Institute of Medicine (IOM) galvanized researchers' interest towards oral health literacy [108] . This report recommended that efforts aimed to improve oral health literacy shall include community wide public education on causes and prevention of oral diseases and how to access oral health care.

The conceptualization of oral health literacy is marked by a report prepared in 2004 by the workforce sponsored by the National Institute of Dental and Craniofacial Research who proposed a research agenda for oral health literacy [109]. Then the American Dental Association published "health literacy in dentistry national action plan" that included strategic plan to improve oral health literacy [110].

Recent research reported that improvement in low oral health literacy is an essential element for better oral health outcomes as well as to reduce oral health disparities [4] The US's National Academy of Medicine held a round table in 2012 and focused on intersection between health literacy and oral health literacy. Kleinman stated that in general public lacks understanding of

how to prevent and manage oral diseases and proposed that, "a comprehensive plan to address oral health literacy through research, education, services and policy is required" [108]. She further added that oral health literacy shares the same principles as general health literacy yet it is focused primarily on addressing oral health problems.

2.2.2 Definition of oral health literacy

Healthy People 2010 (a US document of health related national goals), has defined oral health literacy as the "degree to which individuals have the capacity to obtain, process, and understand the basic health information and services needed to make oral health related decisions"[111]. Oral health literacy concept unites oral health and health literacy and embraces the basic principles of general health literacy.

2.2.3 Conceptual framework of oral health literacy

As shown in the Appendix A, oral health literacy exists within the context of culture and society, health and education system and all these factors contribute to oral health outcomes and costs. Thus, it is proposed that culture and society, health and education systems are the potential sites of oral health literacy interventions and accounting for these elements could bring good oral health outcomes and costs at the individual and population levels [2, 65].

2.2.4 Oral health literacy assessment tools and oral health literacy interventions

In 2015, we conducted a scoping review entitled, " Oral health literacy: findings of a scoping review" that identified and synthesized all the published evidence on the topic of oral health literacy [63]. The following section of the literature review includes a description of the two parts from our scoping review: 1) how is oral health literacy assessed? 2) What interventions are developed for vulnerable populations having low oral health literacy [63]?

1) How is oral health literacy assessed?

Amongst the 13 publications on oral health literacy measurement tools, 7 studies presented tools (REALD-30, REALD-99, REALM-D, TS-REALD, REALMD-20, OHLA-S and HKREALD-30) [35, 112-117] were the modified versions of health literacy tool known as the Rapid Estimate of Adult Literacy in Medicine (REALM) [118]. The REALD-30 was the first oral health literacy assessment tool that uses 30 words from the ADA's glossary of dental terminology arranged in a specific order of increasing difficulty based on number of syllables, word length and combination of sounds. Each correct word recognized and pronounced scores one point with 0 as lowest and 30 as highest scores [113]. Low REALD-30 (<13 out of 30) scores mean poor oral health related quality of life [119].

Four other assessment tools (TOFHLiD, OHLI, CMOHK and HKOHLAT-P) [61, 120-122] were modeled after the Test of Functional Health Literacy in Adults (TOFHLA) [84]. They

consist of i) reading passages employed to test understanding of given instructions and ii) numerical ability test to evaluate understanding of prescriptions details associated with dental treatments. It was unclear whether the tools modelled after TOFHLA were designed to be used in any health care settings. Additionally, one publication [123] reported on the development and validation of a questionnaire used to measure oral health literacy. Recently, a new tool called Health literacy in dentistry (HeLD) is developed to measure oral health literacy among rural Australian aboriginals. It is a 29 items scale and is modified version of health literacy management (HeLM) scale [124]. In all, 10 studies reported assessment tools developed for English speaking adult populations, predominantly North Americans, 3 studies [116, 117, 122] reported tools for Spanish and Cantonese populations.

In general, current oral health literacy measurement tools have focused on word recognition, pronunciation, computational tasks (e.g. tests patient's ability to know numerical instructions on appointment slips or prescription vials), with the purpose of assessing reading ability of the common dental words [61, 123]. In addition, no study has established what adequate threshold level of oral health literacy is required to effectively navigate through today's complex oral health care system [125]. Furthermore, despite of their potential to assess word recognition and basic reading skills current tools have failed to capture the full complexity of one's oral health literacy level [126, 127].

The principal findings of our scoping review affirmed that although current oral health literacy assessment tools may have some applicability in a clinical setting yet they fail to capture all

dimensions of oral health literacy such as oral health knowledge and comprehension, cultural and conceptual knowledge, critical thinking skills, etc. This finding supports results from a previous studies that current tools do not offer accurate assessment of oral health literacy level [61, 123, 126-128] as they cannot differentiate between (a) lack of background knowledge in oral health related domains, (b) lack of familiarity with language and types of materials used, or (c) cultural differences in approaches to oral health care [129].

Oral health literacy is a multidimensional concept, its precise measurement is crucial to design effective health educational materials and in order to develop interventions aimed to improve low oral health literacy [39]. In our scoping review, we also found that no gold standard of what threshold level of oral health literacy is required to navigate through today's complex oral health system exists. Furthermore, we observed a trend of using the REALD-30 assessment tool whereas the tools such as the TOFHLiD that measure functional oral health literacy had been relatively used less. One reason for this could be that REALD-30 takes only 5-10 minutes to administer whereas the TOFHLiD takes 30 minutes and some of the contents of the latter such as Medicaid rights are not applicable in countries other than the US. However, we cannot determine which one between REALD-30 and TOFHLiD is a better tool since they measure different capacities and have different threshold levels to determine limited oral health literacy.

Interestingly, we noticed that even studies that used the same tool i.e. REALD-30 have reported varied cut-off points of low oral health literacy. For example, Jones et al. reported a clinical threshold of 21 valid responses out of 30 items [37] and Vann et al. and Divaris et al. reported

a threshold of 13 valid responses out of 30 items [38]. Furthermore, no study has established what adequate threshold level of oral health literacy is required to effectively navigate through the oral health care system [125]. We believe that to conduct a comparative analysis of the current assessment tools, it is imperative to establish a gold standard of what cut-off point represents adequate oral health literacy level required to effectively navigate in today's oral health care system.

2) What interventions are developed for vulnerable populations having low oral health literacy?

We found only 3 studies on oral health literacy interventions that are briefly described below:
i) Helen Mills developed oral health literacy intervention for aboriginal adults [130]. Her study's purpose was to determine if series of educational sessions can improve oral health literacy related outcome measures i) oral health knowledge, ii) self-efficacy and iii) sense of fatalism. An intervention study design with incorporated qualitative and quantitative components was used on a sample of 15 aboriginal adults. Data were collected through pre-and post-questionnaires and oral health literacy was measured using the TS- REALD tool. Their results reported that program was effective in improving oral health knowledge and self-efficacy but since this study had a very small sample size, therefore their results cannot be generalized [130].

ii) Hjertstedt et al. investigated the impact of community based educational intervention on oral health literacy and oral hygiene of older adults[34]. This study used pre-post study design among

67 older primarily Caucasian adults. The intervention consisted of five 2-hour long visits at the apartment of the participant. Participants received patient education pertaining to oral health and importance and methods of oral hygiene, benefits of fluoride, side-effects of medications, role of saliva in oral health and aspects of nutrition. Oral health literacy was assessed using the REALD 30 and plaque index was measured using O'Leary, Drake and Naylor at the baseline and at endpoint. This study concluded that community based educational intervention involving multiple interactions can significantly and positively impact the oral health literacy as well as oral hygiene status among older adults [34].

iii) Parker et al. has published a study protocol of a randomized control trial among Australian aboriginals [131]. They hypothesized that it is possible to enhance oral health literacy through interventions attuned to socio-cultural context of the communities [131]. They plan to use clustered randomized control (N=400) trial having a delayed intervention study design. Forty clusters will be formed based on family and social groups. Clusters will be randomized into immediate intervention (n=20 clusters) or control (n=20 clusters) delayed intervention group by using a computer generated permuted block randomization sequence. The intervention group will receive intervention at the onset of trial and the control intervention group will receive after 12 months. Their intervention consists of five oral health educational workshops and data will be collected through a self-reported questionnaire at baseline, at 12 months and at 24 months. The primary outcome measure will be oral health literacy and secondary outcome measures include oral health knowledge, oral health self-care, use of dental services, oral health-related self-efficacy and oral health-related fatalism [131].

Till date, there are scarce number of studies on interventions among vulnerable populations having low oral health literacy. Noteworthy, the existing studies on oral health literacy interventions were potentially successful in improving oral health related knowledge among vulnerable populations but evidence lacks if these interventions were successful in bringing sustainable oral health behavioral change. Moreover, the theoretical underpinning of all the above mentioned oral health literacy interventions was not clear.

To sum up, in addition to emphasizing a need for precise oral health literacy measurement tools our scoping review outlined a need of oral health literacy interventions among low oral health literate populations particularly among immigrants [63].

2.3 How to design an effective behavioral change intervention?

Hawe and Potvin stated that "the ever growing burden of disease demands that we design effective interventions and put them into practice" [132]. The key words, "design effective interventions" entail a question, "How to design an effective intervention?" One of the objectives of my research was to develop a theoretically grounded oral health literacy intervention to promote positive oral hygiene self-care behavior among Punjabi immigrants. Therefore, I reviewed literature to gain knowledge about, "how to design an effective and theoretically grounded behavioral change intervention?"

2.3.1 Sub-optimal application of behavioral change theories in studies

Evidence suggests that preventive and health behavior changing interventions that are guided by a relevant theory tend to bring effective behavioral changes [133] by targeting underlying mechanisms that facilitate the pathway between intervention and behavioral outcomes [134]. However, despite of advantages of theory generally, behavioral change interventions are scantily based on theories. Noteworthy, a recent meta-analysis reported that only 22.5% studies had explicitly used theories of behavior change and even the studies that used a theory, the application of the theory had been sub-optimal [135].

A study of health behaviour change interventions delivered in primary schools for preventing dental caries suggested a critical need of better approaches in intervention designed to support sustainable behaviour change [136] . Renz et al. has conducted a systematic review to determine the impact of oral hygiene adherence interventions in adults based on psychological models. In total, they reviewed 456 articles of randomized control trials and their results revealed that only four studies were based on the behavioral theories. They underscored other issues as well such as the low quality of trials and sub-optimal application of the theory in all the four studies. Thus, Renz et al. concluded that "there is need for greater methodological rigor in the design of trials in this area" [137].

2.3.2 How a theory selection is done generally?

Glanz et al. have reported that the Health Belief Model, the Social Cognitive theory, the Theory of Planned behavior and the Transtheoretical theory are the most widely used health behavior theories [138]. However, the question arises which one out of these four theories is the best theory? It has been reported that in the absence of any guidance for selecting an appropriate theory and given that the literature on health behavior theory is full of pros and cons about most of the individual level theories, it is difficult to say which theory is the best for a behavioral change intervention [139]

Weinstein stated that, "despite of a large empirical literature, there is still no consensus that certain models of health behavior are more accurate than others, that certain variables are more influential than others, or that certain behaviors or situations are understood better than others. Furthermore, Weinstein and others have pointed that many of the constructs used by health behavioral theories are quite similar and simply different terminology is used. Moreover, the specifications of theory based interventions was generally poor with insufficient details to replicate the employed methodology [139-141]. Another debatable issue that is widely discussed in the health behavior theory literature is that whether a single theory that effectively worked in one behavior is applicable across multiple behaviors [139]? Thus, the field of health behavior change lacks any guidance on how to select an appropriate theory to design a behavioral change intervention [139, 142].

Generally, theory selection is based on researcher's personal preference, ongoing trend or the ISLIAGTT principle (a term given by Martin Eccles, Emeritus Professor of clinical evidence, at the University of Newcastle) [143]. The letters ISLIAGTT are acronym for "It Seems like a Good Idea at That Time" [143]. It has been acknowledged that choosing a relevant theory can be challenging, principally when various theories have similar or overlapping constructs [144]. Furthermore, there is no basis to determine which among the several theories predicts behavior or behavior change most precisely [139]. There is a consensus view among behavior theorists that while selecting a single theory from a plethora of theories, it is highly likely that another relevant theory may be missed. In addition, to apply all the complex constructs of theories in a coherent manner can be challenging [140] for intervention designers to bring a desired behavioral change [139, 144].

2.3.3 Common theories employed in behavioral change interventions

Numerous behavioral change theories exist as Michie et al. have identified 83 behavior change theories in a cross disciplinary review [145]. To date, various behavior change frameworks exist, some highlighted that behavior is primarily driven by self-efficacy [146], while others have underscored intentions [147] and yet few have placed greater emphasis on one's social environment [148].

Reviewing literature specifically on oral hygiene self-care behavior change interventions revealed that the majority of oral health related intervention studies have employed either Bandura's Social Cognitive Theory (SCT) [146] or the Theory of Planned Behavior (TPB) [147] approach to behavior change with periodontal patients. But neither the SCT and nor the TPB theory address the significant roles of impulsivity, habit, associative learning and emotional processing [149]. Another theory, the transtheoretical model of behavior change, also known as Stages of Change (SOC) model has also been widely used in literature. However, it is reported that although the SOC model may be effective in deliberate behavior such as exercise yet it has limited applicability in simplistic and automatic behaviors such as seatbelt use [141].

Oral hygiene self-care behavior is considered as habitual or a routine behavior [150] and a theory addressing habit and associative learning would be more appropriate in the context of oral hygiene routine behavior. Thus, the SCT, the TPB and the SOC model focus primarily on conscious decision making and planning processes and neglect the "automatic motivation" and "associative learning" notions of habit developments.

A systematic review of psychological approaches to behavior change for improved plaque control in periodontal management revealed that behavioral change interventions based on the use of goal setting, self-monitoring and planning are effective [151]. A recent attempt in the field of psychology has synthesized the key components of 19 theoretical frameworks into an integrative theoretical framework called the Behavior Change Wheel (BCW) [152].

2.3.4 Theoretical Framework-Behavior Change Wheel (BCW)

Recently, Mitchi et al. have developed a theoretical framework called the Behavior Change Wheel (BCW) (Refer to appendix B) by synthesizing the common features of relevant components of 19 widely used behavioral change theoretical frameworks drawn from a systematic review of wide range of literature [149]. The key advantage of the BCW is that it is a broad theoretical model that could be employed to design any behavioral intervention in any setting [149]. Asimakopoulou et al. has advocated the relevance and need to introduce the Behaviour Change Wheel (BCW) theoretical framework in dental public health for designing effective oral health related behavioral change interventions [153]. Furthermore, Lovelle et al. used the BCW in patient education in reducing cancer pain and recommended that the BCW can be used among people having low health literacy since their limited capability and opportunity factors can be addressed by targeting enablement and training interventions of the BCW[154].

2.3.5 Selection of theoretical framework BCW to design my intervention

The main features of the BCW (Appendix B) that influenced my choice for selecting the BCW theoretical framework to design my intervention are following: i) it is an integrative theory i.e. based on an overarching model of 19 widely used behavioral change theoretical frameworks drawn from a systematic review of wide range of literature ii) it provides an easy, systematic and practical method to follow in designing intervention iii) it is comprehensive iv) it can be employed to design diverse behavioral interventions in wide variety of setting [149] v) it

incorporates both individual (capability, motivation) as well as context (opportunity) coherently [155] vi) it provides a full range of interventions and policy options to consider to incorporate in one's intervention[149] and vii) it details explicit components of intervention that can be easily replicated and evaluated.

2.3.6 Origin and development process of the BCW

In 2005 Mitchi et al. developed the TDF (Theoretical Domain Framework) in collaboration with 32 behavioral theorists using a "six stage consensus approach"[144]. The aim of the TDF was to simplify and integrate the overlapping key theoretical constructs of various behaviour change theories. In 2005, the group identified 33 theories and 128 key theoretical constructs related to behavior change theories and synthesized them into a single framework called the TDF. They used a six-stage consensus approach i) to identify theories and ii) their key theoretical constructs relevant to behavior change, where a theoretical construct was defined as 'a concept specially devised to be part of a theory'. iii) Then they grouped these constructs into theoretical domains, where a theoretical domain was defined as 'a group of related theoretical constructs evaluating the importance of the theoretical domains'; iv) conducting an interdisciplinary evaluation and synthesis of the domains and constructs; v) validating the domain list; vi) and piloting interview questions relevant to the constructs and domains.

This resulted in 14 theoretical domains (knowledge; skills; memory, attention and decision processes; behavioral regulation; social/professional role and identity; beliefs about capabilities;

optimism; beliefs about consequences; intentions; goals; reinforcement; and emotion; environmental context and resources; and social influences) [156]. The theoretical domains and their component constructs are listed in table in Appendix C.

When the Behavior Change Wheel was developed (refer to Appendix B- the yellow ring represents the TDF), Michie et al. suggested that the TDF shall be used as an optional sub-step to elaborate on the COM-B components identified in the behavioral diagnosis step [143]. As shown in the Appendix C, Atkins et al. have provided a table linking COM-B to the TDF [155] that shows that a specific domain of the TDF relates to a particular COM-B component. Noteworthy, the TDF is viewed as an elaboration of the COM-B model [144] and is used as a variant of the COM-B model to gain deeper understanding of the behavior [143].

My purpose to elaborate on the TDF was to explain that the overlapping key constructs of 33 relevant theories are integrated in the TDF including the constructs of transtheoretical model are also integrated in the TDF model. As shown in Appendix E under the list of theories identified Transtheoretical model is listed under the heading of "Action theory"[144]. Thus, the BCW does not resemble any theory instead it is an integrative theoretical framework that has integrated the key constructs of the relevant theories and has created a useable method for intervention designers.

2.3.7 A systematic method to design a behavioral intervention- the BCW

As shown in the appendix D, the BCW elucidates a systematic way to follow three stages and eight steps to design a behavioral intervention [157]. First stage is to understand behavior by diagnosing what needs to change in terms of three sources of behavior i.e. 'capability', 'opportunity', and 'motivation'. Next stage is to use this information to identify from range of provided intervention functions, policy categories and behavior changing techniques [158] to arrive at a concrete strategy to bring the desired behavioral change. It is recommended to follow the APEASE criteria (Affordability, Practicability, Effectiveness and cost-effectiveness, Acceptability, Side-effects/ safety and Equity) while identifying appropriate intervention functions and policy categories. The APEASE criteria guides an intervention designer to make a judgement and thus choose appropriately what options of intervention functions and policy categories will be locally relevant/ likely to be feasible, and could be implemented as a cohesive intervention. [157]. As shown in Figure 1 below and in appendix B, the schematic of BCW has three rings and it works from inside out:

i) First ring is called (COM-B) that refers to its three components: 'Capability', 'Motivation', and 'Opportunity' (COM) that interact to generate Behaviour (B). The COM-B is the starting point to diagnose, "what aspects of COM need to change for the desired behavior to emerge. Further details about the COM are provided below:

Capability refers to mental capability (knowledge and skills) and physical capability (strength/stamina). Thus, there shall be capability to enact the desired behavior.

Opportunity is subdivided into physical opportunity (e.g. providing an access) and social opportunity (e.g. exposure to ideas in a cultural milieu) which can facilitate or enable the desired behavior.

Motivation refers to "brain processes that energize and direct behaviour e.g. goals and conscious decision making', 'habitual processes', 'emotional responding' and 'analytical decision-making". Motivation is subdivided into reflective motivation (evaluations and plans) and automatic motivation (emotions and impulses arising from associative learning) [149].

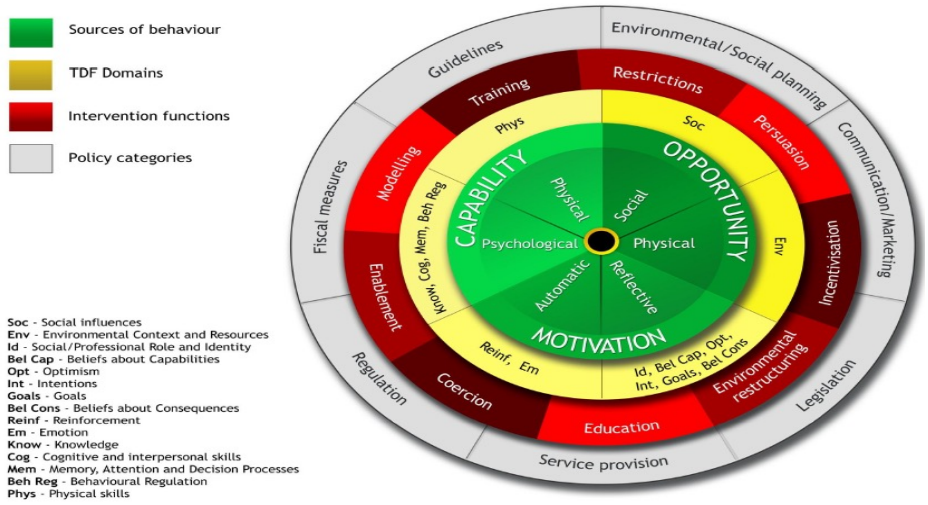

Figure 1: Behavior Change Wheel (Source Mitchi et al. 2014)

ii) Second ring of the BCW consists of nine intervention functions that provide intervention designers a wide range of behavior change intervention options to influence the three COM components [149]:

Education – increase knowledge or understanding

Persuasion–use communication to induce positive/negative feelings or stimulate action

Incentivisation – create expectation of reward

Coercion – create expectation of punishment or cost

Training – impart skills

Restriction – use rules to reduce the opportunity to engage in target behaviour (or to increase the target behaviour by reducing the opportunity to engage in competing behaviour)

Environmental restructuring – change the physical or social context

Modeling – provide examples for people to aspire to or imitate

Enablement – increase means/reduce barriers to increase capability (beyond education) or opportunity (beyond environmental restructuring).

iii) Third ring consists of seven categories of policy that facilitate implementation of the aforementioned nine intervention functions [149]:

Communication/marketing – use print, electronic, telephonic or broadcast media

Guidelines – create documents that recommend or mandate practice. This includes all changes to service provision

Fiscal – use the tax system to reduce or increase the financial cost

Regulation – establish rules or principles of behaviour or practice

Legislation – make or change laws

Environmental/social planning – design or control the physical or social environment

Service Provision – deliver a service.

Select appropriate Behavior Change Techniques (BCT)

After selecting appropriate intervention function and policy categories the next step is to select appropriate behavior change techniques from the taxonomy of Behaviour Change Techniques (BCTs) developed by Mitchi et al [158].

Previously, the BCW model has been used in initiatives such as to improve hand hygiene national campaign 'Clean your hands' among hospital staff and to reduce sedentary behavior in older adults[159]. And, in the context of oral hygiene self-care behavior which is a routine behavior[150] the BCW which is i) a comprehensive and integrated framework and ii) has only three constructs and iii) its motivation construct includes both reflective process (i.e. the self - conscious intentions or plans and the beliefs we hold) and automatic process (i.e. our wants, needs and impulses) seems to be appropriate to effectively influence oral hygiene self-care behavior.

2.4.1 Immigrants in Canada: a brief overview

Canada's 2011 census has enumerated there are about 6,775,800 immigrants in Canada representing almost 20.6% of the total population, the highest proportion among the G8 countries. Amongst immigrant populations particularly, South Asians are the fastest growing and the largest visible minority in Canada. South Asians refers to individuals whose ethnic origin is from India, Pakistan, Bangladesh and Sri Lanka. A total of 1,567,400 individuals identified themselves as South Asian and accounted for one-quarter (25.0%) of the total visible minority population and 4.8% of Canada's total population [160].

As of 2011, Ontario, followed by British Columbia, has the largest population of Canadians from South Asia with Alberta and Quebec being home to significant South Asian communities as well. Metropolitan areas with large communities include the Toronto (834,000), Vancouver (252,000), Calgary (85,000), Montreal (74,095) and Edmonton (61,000). It has been reported that Canadians from South Asia will grow to between 3.1 and 4.1 million by 2031 or 8.1% to 9.2% of the Canadian population overall. According to 2006 census there are 76,990 South Asians living in Quebec (52.2% males and 47.8% females).

Punjabi immigrants, are immigrants whose ancestry originates in the Punjab, a region in northern South Asia, which includes part Punjab states of India and Pakistan. According to Statistics Canada, in 2011 the number of Punjabi speaking people in Montreal was approximately 14,355 (global non-response rate was 19.7%) [161].

2.4.2 Access to oral health care for immigrants in Montreal

Although Canada has a universal health care system yet dental care for adults falls under private system. According to analysis of the Canadian Health Measures survey, there are major existent inequalities in oral disease and access to dental care across vulnerable groups such as those with low incomes, aboriginals, refugees and immigrants and people living in rural areas in Canada [8]. In fact, Canada provides less publicly funded dental healthcare programs i.e. only 6 per cent of total spending than the United States 7.9 per cent and internationally.

This report revealed that predominantly 95% of dental care is paid out-of-pocket or through private dental insurance and is delivered in private dental offices. The remaining 5% is covered through federal and provincial public health programs offered to meet the needs of vulnerable populations, with many falling through the cracks [8]. Although Canadian provinces and territories pay for in-hospital dental surgery, yet common issues such as cavities and non-surgical periodontal care is left to individuals to pay out of pocket or through private insurance. It has been estimated that 32% of Canadians do not have dental insurance, new immigrants, the elderly, people working in insecure jobs and for low wages [8]. People having no dental insurance avoid visiting a dentist due to high costs involved. In brief, the current private model of dentistry in Canada has failed to provide equitable access to all vulnerable population groups including immigrants.

Quebec has some public dental programs but only for children under 18 years of age. There is a patchwork of free or subsidized dental care that provides basic services to vulnerable population groups. For example, James Lund clinic housed at Welcome Mission Hall in Saint Henri neighborhood provides free basic care to vulnerable communities including immigrants. This clinic opens three days a week and serves approximately12 patients by referral per week [162]. In addition, the mobile clinic of McGill's Faculty of dentistry tours impoverished neighborhoods to provide few dental care to recent immigrants, refugees and people with disabilities (18-20 times per year) [163]. A subsidized dental clinic at Université de Montreal also provide services to adult Quebecers but it has limited capacity and accepts patients on first come first serve basis [164].

No doubt, such community outreach efforts are worth applauding however, they are not sufficient to bring about the profound change needed to eliminate the gross disparities in access to oral health care of vulnerable populations. Sadly, vulnerable Canadians including immigrants with difficulty accessing dental care are also those with the most dental pain, the greatest difficulty eating a healthy diet and the ones with the highest levels of gum disease, which in turn can increase their risk for general health problems, such as diabetes and cardiovascular disease. During my conversations at events of the SWAM and the social community gatherings, I remarked that majority of Punjabi immigrants were not aware of such available subsidized and free services.

2.4.3 Rationale for choice of Punjabi immigrants as target population for our study

The rationale for choice of Punjabi immigrants as the target population of our study is categorized broadly into three following categories: i) Epidemiology, ii) Feasibility and iii) Need expressed by the target population.

2.4.3.1 Epidemiology

In 2007, the findings of a US study done on 1500 immigrants residing in New York city has reported that that people's ethnicities and countries of origin can predispose them to tooth decay and periodontal diseases [165]. This study also revealed that immigrants from India, Puerto Rico, and Haiti are more likely to have periodontal disease while Hispanics are more likely to have dental cavities. Such differences are linked to early cultural influences of immigrant's country of origin[165]. For example, some ethnic groups may be more prone to dental decay since their traditional foods are high in refined carbohydrates, while other groups may be less susceptible to decay because refined carbohydrates are almost absent from their diets[165]. Studies from India have shown that there is high prevalence of periodontal diseases among Indian population[166, 167]. A study conducted in India particularly on Punjabi population has reported that 62.3% Punjabis had signs of periodontal disease [168].

Evidence from western Canada has indicated that Punjabi speaking immigrants have poor oral health status and poor access to dental care and information due to economic, cultural and

linguistic barriers and they manage their oral diseases either with home remedies, emergency room visit or during visit to India [22]. Another study by Marshall et al. pointed that Punjabi immigrants have unmet oral health needs due to economic and linguistic barriers, unfamiliarity with the Canadian health care system and low health literacy [23]. Furthermore, a need to create awareness among Punjabi immigrants about available health care resources and information is suggested.

2.4.3.2 Feasibility

There is substantial cultural diversity within Indian population, which complicates the issue of characterizing their oral health status. For example, immigrants hailing from South of India may differ in their oral health status from immigrants from Punjab due to wide differences in diet.

Furthermore, there are various factors that need to be taken into consideration such as when the sample includes a broader range, the number of participants needed for study increases, the cost of the study increases, and a greater risk exists that the true intervention effect may go undetected because of the noise added by the heterogeneity of population. If I would have included all the South Asian communities in my research study then the target population would have heterogeneity due to varied languages, food and health behaviors. Thus, to keep our sample group homogeneous, I decided to focus only on Punjabi speaking immigrants. Also, it was easier for me to access Punjabi population since I am a Punjabi and I have lived and raised

my family within this Punjabi community. Moreover, my more than ten years of community volunteer experience has helped me to build trust within this community.

2.4.3.3 Need expressed by target population

Sporadically, members of a non-profit organization of Montreal's Punjabi community, the Sikh Women Association of Montreal (SWAM) shared their oral health related needs and experiences with myself. In brief, they articulated that they avoid going to dentist due to financial barriers and most of them stated that they get their dental treatments done during their trips to India. Furthermore, they strongly expressed a need to learn how to take self-care of their oral health adequately. During such sporadic conversational exchange, I learned that very few community members mentioned having a daily routine of flossing and tongue cleaning and a variation existed in their tooth brushing behavior (frequency, techniques and duration). Recognizing, a need expressed by my community members to learn adequate knowledge, understanding and skills related to oral hygiene self-care, I proposed to conduct this study among Punjabi immigrants.

2. 5 Summary

The overarching goal of the present study was to develop and evaluate an oral health literacy intervention aimed to promote positive oral hygiene self-care behavior among adult Punjabi immigrants. To achieve this goal, I aimed to target all three elements (knowledge, skills and

behavior) of oral health literacy to enhance oral hygiene self-care behavior among Punjabi immigrants. While acknowledging the importance of healthy diet intake and regular dental visit that are equally critical along with oral hygiene self-care behavior but considering the timeline and scope, I chose to focus our present study on oral hygiene self-care behavior only.

Considering, all the knowledge gained through my extensive literature review, I learned that photonovel, participatory approach [93, 95] and "teach back method" [169]. have been effectively used to enhance knowledge among low health literate immigrants. Therefore, I planned to include photonovel and "teach back method as two components of our oral health literacy intervention for enhancement of knowledge and skills amongst low oral health literate Punjabi immigrants. Additionally, I planned to employ community based participatory approach by involving our community partner organization, the SWAM's members in all aspects of planning, designing and developing of photonovel to ensure creation of a culturally and linguistically appropriate photonovel by the community and for their community.

Literature review also revealed that oral hygiene self-care behavior is considered as habitual or a routine behavior [150] and a theory addressing habit and associative learning would be appropriate in the context of oral hygiene routine behavior. Furthermore, it has been suggested that the BCW is a systematic way to design a behavioral intervention [157] and it can be used among people having low health literacy since their limited capability and opportunity factors can be addressed by targeting education, enablement and training interventions of the BCW[154]. Thus, I selected the BCW theoretical framework that addresses habit and

associative learning factors along with capability and opportunity factors to design our theoretically driven oral hygiene self-care behavioral intervention. The advantage of the BCW in designing oral health literacy intervention was that it allowed us to target all the three elements of the oral health literacy concept (knowledge, skills and behaviour) through the six identified intervention functions (education, training, modeling, restriction, environmental restructuring and enablement) and behavior change techniques. Along with behaviour change, the BCW allowed us to accommodate the photonovel and "teach back method" as two components for enhancement of knowledge and skills amongst low oral health literate Punjabi immigrants.

Next, I planned to evaluate the developed oral health literacy intervention through a randomized controlled trial by recruiting 140 adult Punjabi immigrants who were Montreal's residents. Participants' pre and post intervention, levels of oral health literacy (both intervention and control groups) were measured using a validated oral health literacy measurement tool i.e. TS-REALD (Two Stage Rapid Estimate of Adult Literacy in Dentistry) [114]. I preferred to use the TS-REALD since it is quicker than commonly used the REALD-30 tool and it allows one to prescreen individuals into low, intermediate and high levels.

Appendix F presents the logic model [170] that acted as a guiding framework of the Safeguard Your Smile (SYS) intervention representing the resources, key activities, predicted outcomes of SYS intervention.

2.6 Contribution to the advancement of knowledge

Although, the field of oral health literacy has advanced in other developed countries yet, minimal oral health literacy related research [18, 61, 62] has been conducted in Canada. Particularly, there is a scarcity of research related to oral health literacy interventions among immigrants [63]. To our knowledge, the present study is a novel attempt in Canada to develop, implement and assess effectiveness of an oral health literacy intervention among Punjabi immigrants and has addressed the deficit on this subject. Furthermore, this study has contributed in advancement of knowledge by developing and evaluating a theoretically driven model of the "Safeguard Your Smile" an oral health literacy intervention that improved low oral health literacy among Punjabi immigrants by enhancing their oral health related knowledge, skills and oral hygiene related behavioral capabilities. This model can be adapted to develop and implement future interventions among other vulnerable communities to reduce the oral health disparities.

2.7 Candidate's role in the present research study

Being the lead researcher, I was compelled to engage in all endeavors related to the present research study. Guided by my PhD's supervisors, my first endeavor was to develop and write a research protocol of the present study and to obtain its ethical approval from the ethical review board of the Université de Montreal ("Comité d'éthique de la recherche en santé (CERES)").

Next, I registered the randomized clinical trial, entitled, "Safeguard You Smile" an oral health literacy intervention promoting positive oral hygiene self-care behavior among Punjabi immigrants: A randomized controlled trial" at the website www.clinical trial.gov (Clinical Trial number: NCT02521155). I recruited all the participants for the randomized controlled trial and for the focus group. Next, I conducted literature review and gathered and analyzed the data and wrote the four manuscripts that are included in the present manuscript based thesis. I have presented the results of the four studies through oral and poster presentations at various scientific meetings held in Montreal and Vancouver. One of the manuscript included in this thesis, "Oral Health Literacy: Findings of a Scoping Review" was published in 2015 and the rest three are in the process of submission. Along with my PhD, I remained actively involved in few other scientific research projects and my publications related to these projects are included in the annexure of this thesis.

3

Research manuscripts

CHAPTER 3: RESEARCH MANUSCRIPTS

This manuscript based thesis includes four manuscripts that provide a detailed description of the four investigations that I conducted to achieve objectives of the present research study.

1). The first manuscript entitled, "Oral Health Literacy: Findings of a Scoping Review" used Arksey O' Malley's framework to conduct a scoping review to synthesize the current evidence and knowledge gaps on the topic of oral health literacy. This study waas published in the EC Dental Science journal in 2015.

2). The second manuscript entitled, "Development and pilot testing of an oral hygiene self-care photonovel for Punjabi immigrants: a qualitative study" used a focus group methodology to develop an educational material called photonovel. This photonovel was used as one of the component of our oral health literacy intervention that was aimed to enhance oral hygiene self-care related knowledge and skills among the intervention participants.

3). The third manuscript entitled, "Applying Behavior Change Wheel method to develop an intervention to promote positive oral hygiene self-care behavior among low oral health literate adult Punjabi immigrants" describes development process of a theoretically grounded oral health literacy intervention aimed to promote oral hygiene self-care behavior. We employed a systematic Behaviour Change Wheel method (BCW) in developing the "Safeguard Your Smile" intervention aimed to promote positive oral hygiene self-care behavior. The first step of the

development process of intervention included identifying barriers and enablers of oral hygiene self-care behavior. After first stage of behavioral diagnosis, we identified from the BCW and mapped appropriate intervention functions, policy categories, behavior change techniques and mode of delivery to arrive at concrete strategies that were likely to be effective to bring the desired oral hygiene self-care behavioral change.

4). In the fourth and the last manuscript entitled, Effectiveness of "Safeguard You Smile" an oral health literacy intervention on oral hygiene self-care behavior among Punjabi immigrants: A randomized controlled trial, we assessed effectiveness of "Safeguard Your Smile" a theoretically grounded and community based oral health literacy intervention through following outcomes among Punjabi immigrants: i) oral hygiene self-care behavior ii) oral hygiene self-care knowledge iii) oral health literacy, iv) plaque index scores and v) gingival index scores.

MANUSCRIPT 1

Oral Health Literacy: Findings of a Scoping Review

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Abstract

The specific objective of this paper was to report on a scoping review conducted to identify and synthesize the current evidence and knowledge gaps on the topic of oral health literacy. It was guided by three key questions: 1) how is oral health literacy assessed? 2) What is the relationship between oral health literacy and (i) oral health knowledge (ii) oral health outcomes (iii) access and satisfaction with dental care services? 3) What interventions are developed for vulnerable populations having low oral health literacy?

We used the scoping review methodology introduced by Arksey and O'Malley and searched electronic databases on the OVID (MEDLINE and EMBASE), Google scholar and conducted manual searches identifying oral health literacy related literature published in English from the years 2002 to 2014.

From a preliminary pool of 97 screened articles, a final set of 31 relevant research articles was selected. Our scoping review affirmed a need to develop precise oral health literacy assessment tools capturing its full complexity and that low oral health literacy is associated with poor oral health knowledge, poor oral health outcomes and inadequate satisfaction with dental care services. Furthermore, there is no clinically tested cut-off point representing what adequate oral health literacy level is required to navigate in today's complex oral health care system. In addition, we found that there is scarcity of oral health literacy interventions among low oral health literate populations with diverse socio-cultural context.

This scoping review concluded that there is a need to i) to develop precise assessment tools capturing full dimensions of oral health literacy, ii) to establish what adequate oral health literacy level is required to effectively navigate in today's oral health care system and iii) to develop and implement tailored interventions among low oral health literate populations with diverse socio-cultural context.

Keywords: Oral health literacy, oral health knowledge, oral health literacy measurement instruments, oral health literacy intervention, oral health disparities.

Introduction

Health literacy is the "degree to which individuals have the capacity to obtain, process, and understand the basic health information and services needed to make health related decisions" [1]. Health literacy refers not only to the abilities of individuals, but also to the communication practices of health information providers within health-related systems [2]. The United Nations considers health literacy as a critical determinant that ensures significant health outcomes [3]. Research indicates that people with limited health literacy use less preventive services, have poorer treatment adherence and have higher rates of hospitalization [4]. Furthermore, limited health literacy hinders people's ability to navigate effectively through today's complex health systems and to make informed health related decisions [5]. Consequently, poor health literacy is associated with poor health status extorting economic costs both for individuals and for health care systems [6]. Recent research reported that limited health literacy is a significant factor contributing in health disparities [7]. All the above-mentioned health literacy issues are potentially relevant to the oral health field as well [8-11] .

During last decade, there has been growing interest among oral health researchers and practitioners to study the relationship between health literacy and oral health, leading to emergence of the concept of Oral Health Literacy (OHL). The conceptualization of oral health literacy is marked by a report prepared by a workforce sponsored by the National Institute of Dental and Craniofacial Research [12]. This report underscored several research questions including oral health literacy measurement tools, potential association between health literacy

and oral health outcomes and emphasized a need to develop and test efficacy of oral health literacy interventions [12]. Additionally, reports released by the US Institute of Medicine and American Dental Association's health dentistry action plan underpinned the importance of oral health literacy [13-15].

Healthy people 2010 (a US document of health related national objectives) has defined oral health literacy as the "degree to which individuals have the capacity to obtain, process, and understand the basic health information and services needed to make oral health related decisions"[16]. The American Dental Association asserts that, "limited oral health literacy is a barrier to prevent, diagnose and treat oral diseases effectively" and has developed a strategic action plan to improve oral health literacy[15]. Furthermore, recent research affirmed that an improvement in limited oral health literacy is an essential element for better oral health outcomes and to reduce oral health disparities [17-19].

The specific objective of the present paper is to conduct a scoping review to identify and synthesize the current evidence and knowledge gaps on the topic of oral health literacy. The key questions that we aim to answer in this paper are: 1) how is oral health literacy assessed? 2) What is the relationship between oral health literacy and (i) oral health knowledge, (ii) oral health outcomes, (iii) access and satisfaction with dental care services? 3) What interventions are developed for vulnerable populations having low oral health literacy?

Methods

We used the scoping review methodology introduced by Arksey and O'Malley [20] to develop a mapping of the literature on oral health literacy. We diligently followed the five steps of the Arksey and O'Malley's scoping review methodology as described below: 1) Identify the research questions, 2) identify all relevant studies, 3) select the studies for detailed analysis, 4) chart the data identifying the key themes and concepts and 5) to collate and summarize the findings of selected studies.

Step 1: Identify the research question

We identified following three research questions:

1) How is oral health literacy assessed? 2) What is the relationship between oral health literacy and (i) oral health knowledge, (ii) oral health outcomes, (iii) access and satisfaction with dental care services? 3) What interventions are developed for populations having low oral health literacy?

Step2: Identify all relevant studies

The first author Navdeep Kaur (NK) conducted rigorous literature search of the electronic databases on the OVID (MEDLINE and EMBASE) and Google scholar identifying the relevant publications on oral health literacy from years 2002-2014. For an extensive scoping of the oral

health literacy field, NK conducted manual searches of the publications listed in the reference lists of the articles that resulted from the search. In brief, we limited our search string to the research studies that i) met our pre-established inclusion and exclusion criteria (as listed in table 1) ii) offered relevant content regarding our research questions and iii) measured oral health literacy with a validated instrument.

Table 1: Inclusion and exclusion criteria

Inclusion criteria
▪ Identified through electronic databases on OVID (MEDLINE and EMBASE) and Google Scholar
▪ Selected using keywords; oral health literacy, oral health knowledge, oral health literacy measurement instruments, interventions and oral health disparities
▪ Research studies that measured oral health literacy with a validated instrument
▪ Time period (from 2002-2014) in order to be current with the most recent research
Exclusion criteria
▪ Article did not include oral health literacy and oral health outcome, measurement tool or oral health literacy intervention
▪ Commentary articles/conference reports/theses/workshop summaries
▪ Unavailable in English

We defined a validated instrument as the one that previously had psychometric evaluations (reliability and validity) and had been used to measure oral health literacy in peer-reviewed research studies. Keywords used to search the literature were; oral health literacy, oral health knowledge, oral health literacy measurement instruments, oral health literacy interventions and oral health disparities. All the searched citations were stored in the Endnote software to track and screen out the abstracts and to select studies for the inclusion in our scoping review.

Step 3: Select the studies for detailed analysis

In total, we identified through database 591 publications. After vigilant screening, at first stage we retrieved a preliminary pool of 97 publications specifically on oral health literacy including empirical studies, commentaries, conceptual articles, workshop summaries, theses etc. A large proportion of the identified documents were conceptual articles or commentaries advocating for the importance of oral health literacy. There were also a significant number of publications that employed either qualitative or quantitative research methods to measure oral health literacy. Thus, after carefully reviewing the titles and abstracts of the 97 publications (excluding the duplications), 50 citations were screened out since they did not meet the inclusion criteria of our scoping review.

In all, full texts articles of the 47 selected abstracts were retrieved and printed out for in depth analysis. During further rigorous screening and content analysis, 16 publications were excluded since they did not report outcomes of interest to our research questions. Finally, based on our inclusion and exclusion criteria, 31 research papers that explicitly addressed our research questions were deemed relevant for inclusion in our scoping review. Figure 1 presents the flow chart of our study selection process.

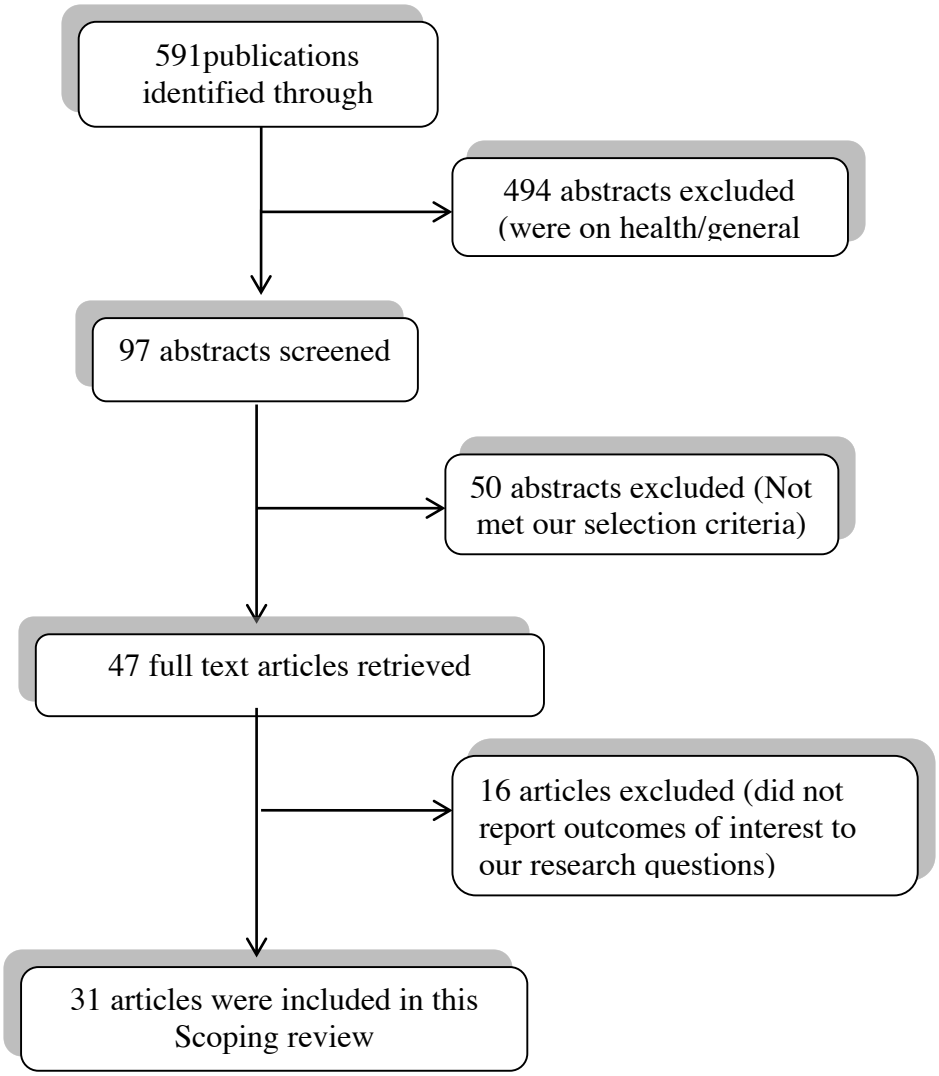

Figure 1: Studies selection process

Step 4: Charting the data

The fourth phase of the scoping review involves reading each article in detail to identify and chart key emerging themes. After reading each article in detail, we developed a standard data extraction sheet and included descriptive characteristics of included studies such as author's name, study design as shown in the tables include, author name as and summarized in the table 3.

Step 5: Collate, summarize and report the findings of the studies

The selected set of studies was critically analyzed and the key findings are summarized in the following results section of our scoping review:

Results

Characteristics of the selected studies

Majority of the 31 selected publications included in our scoping review were from the United States and their years of publication ranged from 2007-2014. Furthermore, the included publications used diverse study designs and assessment tools to measure oral health literacy. Out of the total 31 publications, 13 reported on oral health literacy instruments, 15 addressed the relationship between oral health literacy and i) oral health knowledge, ii) oral health outcomes and iii) access and satisfaction with dental care and 3 were on oral health literacy

interventions. Following is the description of all selected studies starting from studies on oral health literacy assessment tools:

1) How is oral health literacy assessed?

Amongst the 13 publications on oral health literacy measurement tools, 7 studies presented tools (REALD-30, REALD-99, REALM-D, TS-REALD, REALMD-20, OHLA-S and HKREALD-30) [21-27] that were modified versions of health literacy tool known as the Rapid Estimate of Adult Literacy in Medicine (REALM) [28]. The REALD-30 was the first oral health literacy assessment tool that uses 30 words from the ADA's glossary of dental terminology arranged in a specific order of increasing difficulty based on number of syllables, word length and combination of sounds. Each correct word recognized and pronounced scores one point with 0 as lowest and 30 as highest scores [22]. Low REALD-30 (<13 out of 30) scores mean poor oral health related quality of life [8].

Four other assessment tools (TOFHLiD, OHLI, CMOHK and HKOHLAT-P) [29-32] were modeled after the Test of Functional Health Literacy in Adults (TOFHLA) [33]. They consist of i) reading passages employed to test understanding of given instructions and ii) numerical ability test to evaluate understanding of prescriptions details associated with dental treatments. It was unclear whether the tools modelled after TOFHLA were designed to be used in any health care settings. Additionally, one publication [34] reported on the development and validation of an original questionnaire used to measure oral health literacy. Recently, a new tool called Health

literacy in dentistry (HeLD) is developed to measure oral health literacy among rural Australian aboriginals. It is a 29 items scale and is modified version of health literacy management (HeLM) scale [35]. In all, 10 studies reported assessment tools developed for English speaking adult populations, predominantly North Americans, 3 studies [26, 27, 32] reported tools for Spanish and Cantonese populations. Further details about the current oral health literacy measurement tools are presented in the Table 2.

Table 2: Research studies (n=13) on Oral Health Literacy (OHL) measurement tools

Author and year	Name of the measure	Modified version of	Brief description of the tool	Psychometric properties (Reliability and validity)	Advantages	Disadvantages
I) Modified versions of Rapid Estimate of Adult Literacy in Medicine (REALM) tools						
Lee et al. (2007) [21]	**REALD-30** (**R**apid **E**stimate of **A**dult **L**iteracy in **D**entistry)	REALM	REALD-30 consists of 30 dental words taken from the American dental association's glossary and is used to measure OHL.	*Reliability:* Cronbach's α=0.87 (REALM) *Validity:* Convergent validity (Pearson's correlations coefficients were 0.86-REALM and 0.64-TOFHLA)	REALD-30 is completed in 5-10 minutes.	REALD-30 does not test comprehension of words.
Richman et al.(2007) [22]	**REALD-99** (**R**apid **E**stimate of **A**dult **L**iteracy in **D**entistry)	REALM	REALD-99 added 69 more dental words into the existing tool REALD 30 to measure OHL.	*Reliability* Cronbach's α=0.86 (REALM) *Validity* *C*onvergent validity (Pearson's Correlation coefficient were 0.80 with REALM	REALD-99 is completed in short time (5-10 minutes	REALD-99 relies only on the word recognition.
Atchison et al. (2010) [23]	**REALM-D** (**R**apid **E**stimate of **A**dult **L**iteracy in **M**edicine and **D**entistry)	REALM	REALM-D is a modified version of REALM i.e. health literacy measure that had 66 words. Eighteen more dental words were added to in REALM to form 84 words of REALM-D.	*Reliability:* Cronbach's α= 0.958 (REALM) *Validity:* Criterion validity was assessed with (REALM 66) (Pearson correlation coefficient= 0.95)	REALM-D is a screening tool that identifies incorrect medical/dental word recognition. It is short and quick.	REALM-D does not assess the patient's ability to understand the meaning of dental/medical term. It is completed in two visits.
Stucky et al. (2011) [24]	**TS-REALD** (**T**wo **S**tage-	REALM	TS-REALD is improved version of REALD-30, which uses only one third	*Reliability:* Cronbach's α > 0.85 (REALM) *c*onvergent validity:	TS-REALD is tailored according to respondent's	TS-REALD does not test comprehension of words

	Rapid **E**stimate of **A**dult **L**iteracy in **D**entistry)		items of REALD-30 and it is two stage routing test	(correlation between Newest vital sign –NVS instrument & TS-REALD=0.51)	dental health literacy level. It takes less than 2 minutes.	
Gironda et al. (2013) [25]	**REALMD-20 (R**apid **E**stimate of **A**dult **L**iteracy in Medicine and **D**entistry)	REALM	REALMD-20 is a screening tool that quickly detects inadequate dental /medical word recognition using 20 screening terms.	*Reliability:* Cronbach's α= 0.95 (REALM) *Concurrent validity:* Spearman's rho (0.32) Convergent validity Spearman's rho REALM=0.93 REALM D=0.93	REALMD-20 is completed in 2-3 minutes only. It includes terms used in multi-disciplinary clinical settings.	REALMD-20 does not assess patient's ability to understand the meaning of the dental/medical terms.
Lee et al. (2013) [26]	**OHLA-S (O**ral **H**ealth **L**iteracy **A**ssessment in **S**panish	REALM	OHLA-S is designed to measure the OHL in Spanish speaking population.	*Reliability:* Cronbach's α=0.70-0.80 (REALM) Predictive validity (OHLAS-OHIP)	OHLA-S Contains the dental words as REALD-30 but in Spanish language (testing both pronunciation and comprehensi on).	OHLA-S is designed for Spanish population only
Wong et al. (2012) [27]	**HKREALD-30 (H**ong **K**ong **R**apid **E**stimate of **A**dult **L**iteracy in Dentistry)	REALM	HKREALD-30 was developed by using the REALD-99 as template. It consists of 30 basic dental terms used in Cantonese speaking population of Hong Kong.	*Reliability:* Cronbach's α= 0.84 *C*onvergent validity Spearman's rho= 0.69	HKREALD-30 Provides a rapid method to screen basic health literacy of Chinese adults.	HKREALD-30 Assesses OHL of Cantonese speaking population only
II) Modified versions of Test of Functional Health Literacy in Adults (TOFHLA) tools						
Gong et al. (2007) [29]	**TOFHLiD** (**T**est **O**f **F**unctional **H**ealth **L**iteracy in **D**entistry)	TOFHLA	TOFHLiD consists of 68-item reading comprehension section (three passages such as instructions about fluoride varnish application) and12-items numerical ability test.	*Reliability:* Cronbach's α=0.63-0.86 *Validity:* Convergent validity (with READ-99 r=0.82)	TOFHLiD includes additional testing of a consent form and Medicaid form.	TOFHLiD has lengthy administration and is completed in 30 minutes. Certain contents of this tool e.g. Medicaid rights are not feasible in developing countries.
Sabbahi et al. (2009) [30]	**OHLI** (**O**ral **H**ealth **L**iteracy **I**nstrument)	TOFHLA	OHLI consists of 38-item reading comprehension with words e.g. dental caries and periodontal disease. Numeracy section consists of 19 items to	*Reliability:* Cronbach's α=>0.70 for oral health knowledge and OHLI Convergent validity; moderate to strong correlation between OHLI and TOFLA scores (Spearman's rho=0.613)	OHLI tests one's ability to read and understand texts related to dentistry.	OHLI is lengthy and is completed in 45 minutes.

			comprehend dental prescription directions.			
Macek et al. (2010) [31]	**CMOHK** (**C**omprehens ive **M**easure of **O**ral **H**ealth **K**nowledge)	REALM + Short-TOFHLA	CMOHK was a survey instrument developed to determine conceptual oral health knowledge. It was categorized into three levels of knowledge (Poor, fair and good).	*Reliability:* Cronbach's α=>0.74 Criterion validity-REALM	CMOHK measures the conceptual knowledge of the ability to interpret numbers.	CMOHK does not measure the conceptual knowledge of words and measures the ability to interpret numbers only.
Wong et al.(2013) [32]	**HKOHLAT-P** **H**ong **K**ong **O**ral **H**ealth **L**iteracy **A**ssessment **T**ask for **P**ediatric dentistry	TOFHLiD + OHLI	HKOHLAT-P Examines Chinese parents or caregiver's OHL levels in pediatric dentistry. It provides an estimate of one's ability to read and understand text related to dentistry and tests numerical ability.	*Reliability:* Cronbach's α= 0.71 *Validity:* Convergent and predictive validity	HKOHLAT-P is a potential model for developing valid and reliable OHL measurement tools for other non-speaking populations	It captures the oral health literacy skills of Chinese population only.
Devi et al. (2011) [34]	Questionnaire	Question naire-e	This is a self-administered questionnaire having 15 closed ended questions framed on various dental aspects and four options out of which one was correct.	*Reliability:* Cronbach's α=0.69 *Validity:* Convergent when compared with OHLI instrument (correlation coefficient; r=0.613)	It is a self-administered questionnaire .	The predictive validity of this instrument was measured using subjective criteria only.
Jones et al. (2014) [35]	Health Literacy in Dentistry (HeLD) scale for rural Australian aboriginals	Modified version of Health literacy Managem -ent scale (HeLM)	It is a 29-item scale and scores seven domains of oral health literacy; communication, access, receptivity, understanding, utilization, support and economic barriers. Scores are coded from 0-4 with higher scores means high oral health literacy	*Reliability* Cronbach's α= 0.91 *Validity:* Convergent and predictive validity were associated with few variables only	It is predicted that this tool may be useful in measuring oral health literacy among indigenous and other vulnerable populations.	The external reliability of this tool was tested in regional indigenous population only and needs further testing in other indigenous and non indigenous populations that limits the predicted potential of this tool

In general, current oral health literacy measurement tools have focused on word recognition, pronunciation, computational tasks (e.g. tests patient's ability to know numerical instructions

on appointment slips or prescription vials), with the purpose of assessing reading ability of the common dental words [30, 34]. In addition, no study has established what adequate threshold level of oral health literacy is required to effectively navigate through today's complex oral health care system [36]. Furthermore, despite of their potential to assess word recognition and basic reading skills current tools have failed to capture the full complexity of one's oral health literacy level [37, 38].

2) Correlations between oral health literacy and (i) oral health knowledge, (ii) oral health outcomes and (iii) access and satisfaction with dental care services

Fifteen publications examined the relationship between oral health literacy and selected correlates. Out of these, 3 studies addressed the association between oral health literacy and oral health knowledge, 8 between oral health literacy and oral health outcomes and 4 between oral health literacy and access to dental services. Most publications used REALD-30 tool [21] to measure oral health literacy level. Ten were cross-sectional studies, four were prospective cohort studies and one was a qualitative study. We have tabularized and summarized the details of all 15 included studies with respect to outcomes based on our second research question in the table 3. Below is the description of the correlations between oral health literacy and (i) oral health knowledge, (ii) oral health outcomes and (iii) access and satisfaction with dental care services:

(i) *Oral health literacy and oral health knowledge*

Three studies [9, 39, 40] have examined the relationship between limited oral health literacy and oral health knowledge. Hom et al. administered six item knowledge survey to low income pregnant women assessing their oral health related knowledge (score ranged from 0-6) and measured their oral health literacy level by using the REALD-30 tool. They reported a positive and significant relationship between REALD-30 scores and oral health knowledge scores [9]. Vann et al. reported that poor oral health literacy among female caregivers was significantly associated with poor oral health knowledge and poor oral health status among their children [40]. Similarly, Jones et al. reported that those with limited oral health knowledge were more likely to have lower oral health literacy levels. All three studies found a positive and significant relationship between oral health literacy and oral health knowledge this relationship pervaded regardless of the socio-demographic characteristics.

(ii) Oral health literacy and oral health outcomes

Eight studies [10, 41-48] examined the relationship between oral health literacy and oral health outcomes. Miller et al. evaluated caregiver's oral health literacy and preschool children's oral health status and oral health behaviors. They found a significant association between caregiver's oral health literacy score and children's clinical oral health status [41]. Caregivers of children with mild to moderate treatment needs had higher scores on REALD-30 than children in severe

treatment need. Likewise, a study by Bridges et al. showed that caregivers low oral health literacy was associated with poor oral health status of their children [47].

Parker et al. reported that REALD 30 scores were lower amongst those who believed teeth should be brushed irregularly [42]. Lee et al and Ueno et al' studies were conclusive in linking higher oral health literacy with higher oral health status [10, 45]. Wehmeyer et al. found that lower oral health literacy was associated with severe periodontal disease [43]. Similarly, Sistani and Sanzone et al. provided evidence of an association between low oral health literacy with poor dental health [46, 48]. In summary, all examined studies have demonstrated an association between low oral health literacy and poor oral health outcomes.

(iii) Oral health literacy and access and satisfaction with dental care services

The relationship between oral health literacy and access and satisfaction with oral health care services was less clear. Among the four studies identified through our search, Divaris et al. concluded that respondents in the low oral health literacy category reported more negative impacts of oral health related quality of life compared to those with higher oral literacy [49]. Two studies reported that low oral health literacy was associated with less dental services utilization and a higher number of failed dental appointments [50, 51]. Arora et al.'s study reported that diverse ethno-cultural groups prefer and retain knowledge when oral health information is culturally sensitive, written in plain language, with simple illustrations and without dental jargons [52].

Table 3: Research studies (n=15) on relationship between Oral Health Literacy (OHL) and (i) oral health knowledge, (ii) oral health outcomes, (iii) access and satisfaction with oral health care services

Author and year	Study design	OHL assessment tools	Indicator assessed	Relationship of assessed indicator with OHL
(i) ORAL HEALTH KNOWLEDGE				
Hom et al. (2012) [9]	Prospective cohort	REALD-30	Oral health knowledge	Higher levels of oral health knowledge are significantly associated with higher levels of OHL ($p<0.01$)
Jones et al. (2007) [39]	Cross-sectional	REALD-30	Oral health knowledge	Lower OHL is associated with lower oral health knowledge ($p<0.01$).
Vann et al. (2010) [40]	Prospective cohort	REALD-30	Oral health knowledge	Caregivers lower OHL is associated with poor oral health status and poor oral health knowledge of their children.
(ii) ORAL HEALTH OUTCOMES				
Miller et al. (2010) [41]	Cross-sectional	REALD-30	Oral health outcomes	Low oral health literacy of caregiver was significantly associated with poor child oral health status ($p<0.5$)
Parker et al. (2010) [42]	Cross-sectional	REALD-30	Oral health outcomes	Poor OHL is significantly associated with poor oral health knowledge and deleterious oral health behaviors. ($p<0.05$)
Lee et al. (2012) [10]	Prospective cohort	REALD-30	Oral health outcomes	Independent of age, race and education higher OHL is associated with improved oral health status ($p<0.01$).
Wehmeyer et al. (2012) [43]	Cross-sectional	REALD-30	Oral health outcomes	Lower OHL is associated with severe periodontal disease. One decreased unit of OHL increases the chances of having worse periodontal disease to 1.19 times ($p<0.002$).
Ueno et al. (2012) [45]	Cross-sectional	Questionnaire	Oral health outcomes	OHL is significantly associated with poor oral health behaviors and poor clinical oral health status ($p<0.001$).
Sistani et al. (2013) [46]	Cross-sectional	OHL-AQ Oral Health	Oral health outcomes	

		Literacy- Adult Questionnaire		Low OHL is significant indicator of poor self reported health. (p<0.001)
Bridges et al. (2013) [47]	Cross-sectional	HKREALD-30 and HKOHLAT-P	Oral health outcomes	Caregivers low OHL level was significantly associated with dental caries status of children they take care of (p<0.05)
Sanzone et al.(2013) [48]	Cross-sectional	REALD 30	Oral health outcomes	Caregivers low OHL is associated with deleterious oral health behaviors and oral hygiene practices. (p<0.03)
(iii) ACCESS AND SATISFACTION WITH ORAL HEALTH CARE SERVICES				
Divaris et al.(2012) [49]	Prospective cohort	REALD-30	Access and satisfaction with oral health care services	Subjects in the low OHL group reported more adverse oral health related quality of life impacts verses those with higher literacy. (p<0.05)
Holtzman et al.(2013) [50]	Cross sectional	REALM-D	Access and satisfaction with oral health care services	Low OHL is significantly associated with failed dental appointments.83.3% failure rate was reported for low OHL scores as compared to 24.2% failure for high OHL scores.
Shin et al.(2013) [51]	Cross sectional	REALD 30	Access and satisfaction with oral health care services	Low OHL is significantly associated with dental anxiety that hinders oral health care services utilization. (p<0.003)
Arora et al. (2012) **[52]**	Qualitative study	REALD-30	Access and satisfaction with oral health care services	Participants favored health information that is culturally sensitive and written in plain language with the use of illustrations.

3) What interventions are developed for vulnerable populations having low oral health literacy?

We retrieved only 3 studies on oral health literacy interventions that are briefly described below: i) Helen Mills developed oral health literacy intervention for aboriginal adults [53]. Her study's purpose was to determine if series of educational sessions can improve oral health literacy

related outcome measures i) oral health knowledge, ii) self-efficacy and iii) sense of fatalism. An intervention study design with incorporated qualitative and quantitative components was used on a sample of 15 aboriginal adults. Data were collected through pre-and post-questionnaires and oral health literacy was measured using the TS- READLD tool. Their results reported that program was effective in improving oral health knowledge and self-efficacy but since this study had a very small sample size, therefore their results cannot be generalized [53].

ii) Hjertstedt et al. investigated the impact of community based educational intervention on oral health literacy and oral hygiene of older adults[44].This study used pre-post study design among 67 older primarily Caucasian adults . The intervention consists of five 2-hour long visits at the apartment of the participant. Participants received patient education pertaining to oral health and importance and methods of oral hygiene, benefits of fluoride, side-effects of medications, role of saliva in oral health and aspects of nutrition. Oral health literacy was assessed using the READLD 30 and plaque index was measured using O'Leary, Drake and Naylor at the baseline and at endpoint. This study concluded that community based educational intervention involving multiple interactions can significantly and positively impact oral health literacy and oral hygiene status among older adults [44].

iii) Parker et al. has published a study protocol of a randomized control trial among Australian aboriginals [54]. They hypothesized that it is possible to enhance oral health literacy through interventions attuned to socio-cultural context of the communities [54]. They plan to use clustered randomized control (N=400) trial having a delayed intervention study design. Forty

clusters will be formed based on family and social groups. Clusters will be randomized into immediate intervention (n=20 clusters) or control (n=20 clusters) delayed intervention group by using a computer generated permuted block randomization sequence. The intervention group will receive intervention at the onset of trial and the control intervention group will receive after 12 months. Their intervention consists of five oral health educational workshops and data will be collected through a self-report questionnaire at baseline, at 12 months and at 24 months. The primary outcome measure will be oral health literacy and secondary outcome measures include oral health knowledge, oral health self-care, use of dental services, oral health-related self-efficacy and oral health-related fatalism [54].

Table 4: Research studies (n=3) on Oral Health Literacy (OHL) interventions

Author and year	Study design	OHL assessment tool	Interventions in brief
Mills (2011) [55]	An intervention study design with incorporated qualitative and quantitative components	TS-REALD	On a sample of 15 aboriginal adults, data were collected through pre and post questionnaires and oral health literacy was measured using the TS- REALD tool. Series of educational sessions were provided to improve oral health literacy related outcome measures i) oral health knowledge, ii) self-efficacy and iii) sense of fatalism. The results of this study reported that program was effective in improving oral health knowledge and self-efficacy among aboriginal adults.
Hjertstedt et al. (2013) [44]	A pre–post study design	REALD-30	The intervention consists of five 2-hour long visits at the apartment of the participant. Participants received patient education pertaining to oral health and importance and methods of oral hygiene, benefits of fluoride, side effects of medication, role of saliva in oral health and aspects of nutrition. Oral health literacy was assessed using the REALD 30 and plaque index was measured using O'Leary, Drake and Naylor at the baseline and at endpoint. This study concluded that community based educational intervention involving multiple interactions can significantly and positively impact oral health literacy and oral hygiene of older adults.
Parker et al. (2012) [54]	Randomized controlled trial	HeLD	Intervention consists of series of five culturally sensitive oral health education workshops delivered over a 12-month period to aboriginal adults(n=400). The intervention group will receive the intervention from outset of the study. The control group will be offered 12 months following their enrolment in the study. Data will be collected through self-reported questionnaires at baseline, at 12 months and at 24 months. Primary outcome: oral health literacy. Secondary outcomes: oral health knowledge, oral health self-care, use of dental services, oral health related self-efficacy.

Discussion

In this paper, we set out to identify and synthesize published evidence on the topic of oral health literacy. Our principal findings have affirmed that low oral health literacy is positively and significantly related to poor oral health knowledge, poor oral health behaviour and poor oral health outcomes. Evidence related to the association between limited oral health literacy and access and satisfaction with dental health care services was insufficient due in part to the paucity of studies. In addition, although current oral health literacy assessment tools may have some applicability in a clinical setting yet they fail to capture all dimensions of oral health literacy such as oral health knowledge and comprehension, cultural and conceptual knowledge, critical thinking skills, etc. This finding supports results from a previous studies that current tools do not offer accurate assessment of oral health literacy level [30, 34, 37, 38, 56] as they cannot differentiate between (a) lack of background knowledge in oral health related domains, (b) lack of familiarity with language and types of materials used, or (c) cultural differences in approaches to oral health care [57].

In this review, we also found that no gold standard of what threshold level of oral health literacy is required to navigate through today's complex oral health system exists. Furthermore, we observed a trend of using the REALD-30 assessment tool whereas the tools such as the TOFHLiD that measure functional oral health literacy had been relatively used less. One reason for this could be that REALD-30 takes only 5-10 minutes to administer whereas the TOFHLiD takes 30 minutes and some of the contents of the latter such as Medicaid rights are not applicable

in countries other than the US. However, we cannot determine which one between REALD-30 and TOFHLiD is a better tool since they measure different capacities and have different threshold levels to determine limited oral health literacy.

Interestingly, we noticed that even studies that used the same tool i.e. REALD-30 have reported varied cut-off points of low oral health literacy. For example, Jones et al. reported a clinical threshold of 21 valid responses out of 30 items [39] and Vann et al. and Divaris et al. reported a threshold of 13 valid responses out of 30 items [40]. Furthermore, no study has established what adequate threshold level of oral health literacy is required to effectively navigate through the oral health care system [36]. We believe that to conduct a comparative analysis of the current assessment tools, it is imperative to establish a gold standard of what cut-off point represents adequate oral health literacy level required to effectively navigate in today's oral health care system.

We found scarce number of studies on interventions among vulnerable populations having low oral health literacy. Noteworthy, the existing studies on oral health literacy interventions were potentially successful in improving oral health related knowledge among vulnerable populations but evidence lacks if these interventions were successful in bringing sustainable oral health behavioral change. Moreover, the theoretical underpinning of all the above mentioned oral health literacy interventions was not clear.

In addition to our research questions, our scoping review also highlighted the existence of a gap between limited oral health literacy skills of patients and the communication practices embedded in context of medicine of the oral health care providers [39, 52]. In other words, those who cannot comprehend the information provided by the oral health professional are unable to implement oral health promoting and preventive actions. Therefore, in order to enhance effective communication practices of oral health care providers, Maybury et al. proposed incorporating communication approaches courses in dental school curriculum [58]. Furthermore, it is proposed that oral information and educational materials should be provided i) in plain language with no jargons and ii) should be linguistically sensitive to the socio-cultural practices of the diverse population groups [52, 59].

The primary strength of the present scoping review is that it offers a breadth of overview of current evidence on the topic of oral health literacy. Previous two reviews on oral health literacy[37, 38] have solely focused on the measurement tools whereas our scoping review has identified and synthesized the current evidence and knowledge gaps on oral health literacy on the whole. Although we conducted a rigorous scoping review yet it has few limitations. First, due to our narrow search string, we may have missed out few publications in this review. However, the publications that we read during the later stage of our scoping review did not add any significant insight. Second, we acknowledge that the scoping review methodology that we used, does not systematically conduct quality assessment and critical appraisal of the research studies. Third, heterogeneity in study designs and approaches intrinsically limited our potential to categorize publications based on their similarities or differences. Finally, given that most the

studies were conducted in the United States, the findings cannot be generalized to health systems of other under developed countries.

Despite of few limitations, we believe that present scoping review offers substantial evidence on measurement tools, trends, directions and priority issues related to oral health literacy. Specifically, in addition to emphasizing a need for precise oral health literacy measurement tools it outlines a need of tailored oral health literacy interventions among low oral health literate populations.

Conclusions and recommendations

Oral health literacy is a multidimensional concept, its precise measurement is crucial to design effective health educational materials and in order to develop interventions aimed to improve limited oral health literacy [45]. Based on our scoping review we emphasize the need to develop comprehensive assessment tools to capture all dimensions of oral health literacy. In addition, future research should also investigate what oral health literacy interventions could bring sustainable oral health related behavioral changes among low oral health literate populations with diverse socio-cultural context. Also, future assessments are required to determine whether public or private dental health organizations and services are providing understandable and locally relevant information and services. Additional research work exploring whether there is pathway between limited oral health literacy and poor oral health outcomes and the wider socio-cultural context that shape this process would be beneficial. In brief, improvement of limited

oral health literacy through collaborative efforts of researchers, stakeholders, community partners, and oral health care providers can empower individuals and communities to make informed and appropriate oral health promoting decisions that could bring positive oral health outcomes and thereby reducing oral health disparities.

Author's contribution

The first author contributed in the conception, design, analysis and writing of the draft of the manuscript. The second and the third author contributed in the refinement and revision of the manuscript. All authors have read and approved the final version of the manuscript.

Conflict of interest:

There are no conflicts of interest to declare.

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MANUSCRIPT 2

Development and pilot testing of an oral hygiene self-care photonovel for Punjabi immigrants: a qualitative study

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Abstract

Introduction: The purpose of our research study was to develop and pilot test a culturally and linguistically appropriate oral hygiene self-care photonovel for Punjabi immigrants.

Methods: Purposeful sampling was used to recruit five members of a Punjabi community organization the Sikh women Association of Montreal and we conducted focus group discussions in three sessions during August 2015. We used thematic content analysis approach to label and sort the data into themes and the storyline and contents of photonovel were drawn from the emerged themes. We used comic life 3 version 3.1.1 software to create a final version of the "Safeguard Your Smile" (SYS) photonovel and printed it for pilot testing. For pilot testing, we recruited 10 additional participants and the photonovel was revised as per suggestions obtained during this pilot testing.

Results: Four major themes emerged from the focus group discussions: i) lack of understanding about oral hygiene self-care related knowledge and risk factors; ii) lack of adequate oral hygiene self-care related skills and routine; iii) lack of emphasis on prevention; and iv) perceived barriers to access dental health. Thematic content analysis revealed lack of knowledge and inadequate oral hygiene self-care related skills and routine. Guided by the overarching themes that emerged from the focus group discussions, a final version of the photonovel script was written, photographs of key characters were included and a copy of photonovel was printed for pilot

testing. Pilot test results showed that overall, more than 80% participants reported that the SYS photonovel was culturally and linguistically appropriate and easy to understand.

Conclusions: This study affirmed that culturally and linguistically appropriate photonovel is an effective tool to enhance oral hygiene self-care knowledge among ethnic communities.

Keywords: Photonovel, oral hygiene self-care, focus group discussions, Punjabi immigrants.

Introduction

The Canadian Council of learning has defined health literacy as "person's ability to access, understand, evaluate and communicate information in a way to promote, maintain and improve health in a variety of settings across the life course" [1]. The fundamental idea behind health literacy is that greater is one's knowledge, understanding and skills of self-managing one's health, better is one's health [2]. Studies show that low health literacy is associated with barriers to access health care, poor treatment adherence, high rates of hospitalization [3] and poor health outcomes [4].

Evidence from Canadian health literacy literature suggests that higher rates of low health literacy are prevalent in certain population subgroups such as aboriginals, immigrants and seniors [1]. Results of International Adult Literacy and Skills Survey (IALSS) show that

approximately 60% immigrants fell below level 3 in prose literacy as compared to 37% Canadians [5, 6]. Prose literacy refers to the knowledge and skills needed to understand and use information from texts including editorials, news stories, brochures and instruction manuals. According to the Instititut de la statistique du Quebec, 55% of Quebec adults fall below the level 3 prose literacy threshold (i.e. the minimum threshold required for coping with demands of daily life) which inhibits their health information seeking ability and brings poor health outcomes [7].

Health literacy refers not only to the abilities of individuals, but also to the communication practices of health information providers [8]. However, the complexity of current verbal and written health communications practices is challenging for low health literate immigrants who may not always understand the information they read and what health professionals tell them [9]. It has been reported that a significant gap exists between the reading skills of low health literate patients and the health related educational materials provided by health care professionals [10, 11].

The Canadian Public health Association (CPHA) recommended that improvements in health literacy in which immigrants are particularly disadvantaged is critical to bring positive health outcomes and reduce health disparities [5]. Nutbeam proposed that improvements in health literacy involves helping people to gain knowledge, skills and to develop their motivation and confidence to act on knowledge through more personal form of communication and community based outreach [12]. The WHO's report entitled "Health literacy the solid facts" suggested to

develop and employ specific "migrant-friendly strategies" and to engage immigrants, individuals and communities through cultural mediators in planning and implementing of health literacy improving efforts [13]. Furthermore, use of plain language is emphasized and use of audio-visual aids such as images, photographs, graphic illustrations etc. is encouraged [13].

Poureslami et al. used participatory approach, culturally relevant educational videos and a pictorial pamphlet to impact asthma patients' self-management among low health literate Punjabi, Mandarin, and Cantonese immigrants [14]. Their results showed that participatory approach and use of culturally and linguistically appropriate materials are effective means to improve health of ethno cultural communities [14].

Amongst the few notable Canadian health literacy interventions, community participatory approach using educational tool called photonovel has been considered to be effective among immigrant women having low health literacy [15]. Photonovel was used to educate participants about how to promote their health by making healthy food choices and adopt exercise routine. The study concluded that participatory approach, photonovel and social network components of the intervention were the key factors that encouraged women to make healthy food choices and adopt exercise routine [15].

In addition, an access to culturally and linguistically appropriate health related information targets critical health literacy of individuals and enables them to make informed health related

choices and decisions [15]. McGinnis et al. effectively used photonovel to educate community members of Tampa Bay area in Florida about prostate cancer [16].

Photonovel resembles a comic book but instead of drawings it contains photographs of real people and has limited text balloons and has been considered as an effective method to convey health related messages among low health literates [15, 16]. Photonovel is based on Paulo Freire's theory of critical consciousness which posits that critical consciousness develops through dialogue and participatory action [17]. When people develop critical consciousness, they apply their critical thinking skills to analyze information critically, increase awareness, and participate actively in using information to make informed decisions that allows for greater self-efficacy and empowerment [18]. The UNESCO's (United Nations of Educational, Scientific and Cultural Organization) document and by Nimmon et al [19] provides a comprehensive stepwise processes of how to create and publish a photonovel [20].

Eliminating oral health disparities has become a national public health priority in most western countries[21]. It is reported that oral diseases are prevalent amongst Canadian immigrants [22] due to limited awareness about preventive and oral health promoting measures [23, 24]. Although photonovel related to hepatitis B screening [25], tuberculosis [26], nutrition knowledge [27] had been developed yet there is scarcity of research studies related to development and evaluation of photonovel related to oral hygiene self-care. The purpose of the present study was to develop and pilot test a culturally and linguistically appropriate oral hygiene self- care photonovel for Punjabi immigrants.

Specific objectives

1) To conduct focus group discussions to understand perceptions, knowledge, needs, barriers and enablers related to oral hygiene self-care behavior of Punjabi immigrants.
2) To develop a culturally and linguistically appropriate photonovel for Punjabi immigrants from information gained through focus group discussions.
3) To pilot test cultural relevance, format and comprehensibility of contents of the developed photonovel.

Methods

Approval from the ethics review board committee

Prior to beginning the process of photonovel development, we obtained ethical approval from the ethics review board of the Université de Montreal i.e. "Comité d'éthique de la recherche en santé (CERES)" (refer to appendix G and H). As an incentive, the study participants received a soft tooth brush, dental floss and fluoridate tooth paste (having 0.254% sodium fluoride).

Secured free and informed consent from all the study participants

A free and informed written consent (appendix J) was secured from the study participants prior to their involvement or recruitment in the study. Prior to obtain their free and informed consent,

the lead researcher (NK) of this study explained each participant about the basic elements of our study in simple language suitable to participants' level of understanding. The basic elements included were: the purpose of our research, participant's role in the study, the use of data, precautions taken concerning data security such as confidentiality anonymity etc. NK ensured that adequate opportunities to ask questions was provided to all participants.

Particularly, NK ensured to ask for consent of the focus group participants' regarding the use of any technical data gathered such as audio/ visual/ photographic records and each focus group participant had the right to refuse and reject the use of such devices or to withdraw from this research study at any time if they wish. After the verbal exchange, participants were presented with a written consent document and given sufficient time to read it before agreeing to participate. Non-English speaking participants were provided a consent form in Punjabi language (appendix N).

Study design and participants

This study used qualitative focus group study design and purposive sampling method to recruit five participants from our community partner organization, the Sikh Women Association of Montreal (SWAM). Participants were Punjabi immigrants and their ages ranged between 30-60 years.

Data collection and procedure

Focus group discussions were conducted during August 2015 at time and locations convenient for the participants. Three sessions were held and each session lasted between 60-90 minutes. Lead researcher (NK) acted as a moderator and used a brief interview guide to facilitate the focus group discussion that were audio-recorded and transcribed verbatim. The aim of the first focus group session was to understand the perceptions, knowledge, needs, barriers and enablers related to oral hygiene self-care behavior among Punjabi immigrants.

The subsequent two sessions were focused on development of a photonovel guided by guidelines of the photonovel development processes specified by the UNESCO [20] and by Nimmon et al.[19] According to Nimmon et al. collaborative photonovel development can be done in 10 steps.: i) forming a group; ii) naming a problem; iii) considering the audience; iv) writing a story; v) developing characters and costumes; vi) taking photographs; vii) preparing the dialogue; viii) using digital technology; ix) seeking audience feedback; and x) publishing the photonovel. Overall, the materials needed are relatively easy to procure and the production photonovel is simple [19].

The development process of photonovel took approximately ten hours in total but the timings of the focus group sessions were discussed and scheduled per the availability and convenience of the focus group participants. Next, the storyline and content of photonovel were drafted by including the key issues identified during the first focus group session.

Data analysis of focus group discussions

The data analyses included transcription, debriefing, codification, data display, thematic content analysis and interpretation. The focus group's discussions were transcribed word by word from the recordings and coded by the lead researcher (NK). Two investigators (first and second author of this manuscript) read through each transcript carefully to identify specific themes generation and highlighted the significant statements with a constant debriefing to facilitate the analysis. We used 'thematic content analysis to label and sort the data into themes and sub-themes to reach at the emerging interpretations and results.

Photonovel development and pilot testing procedure

Guided by the overarching themes that emerged from the focus group discussions, a final version of the photonovel script was written, photographs of key characters were included and a copy of photonovel was printed for pilot testing. We used a software known as comic life 3 version 3.1.1 to create the photonovel. Comic life 3 software provides fonts, templates, panels, balloons and captions that were used to create the final printed copy of the photonovel.

Please refer to appendix T and U to refer to the Punjabi and English language versions of the photonovel that we developed entitled "Safeguard Your Smile".

Pilot testing of photonovel

The final printed copy of the photonovel was pilot tested among Punjabi community members. Ten participants for pilot testing were selected from the Punjabi community using snowball sampling. We used a 10 items questionnaire to use during pilot testing that was developed based on evaluation questions by Roter et al. [28] Pilot testing questionnaire as shown in the table 1 of this manuscript included questions about i) cultural relevance (Does it matter that when you read SYS photonovel the people in story are like you?; Is the SYS photonovel a reflection of your own cultural oral health values?), ii) comprehensibility of contents (Do you agree that contents of the SYS photonovel are easy to understand?) and iii) format of the photonovel. The questionnaire included few questions that had responses yes/no and others had a 5 point Likert scale.

Considering the time and difficulty in recruiting members resource constraints, we predetermined that once we reach saturation point then we will stop pilot testing the questionnaire. From saturation point we implied that we will evaluate the collected data after 8 participants and see if next two additional participants provide no longer new input/ information beyond what obtained from previous participants then at that point, we will stop testing our questionnaire since no new or relevant insights seem to be emerging from more data being collected.

Results

Focus group discussions

Four major themes emerged from the focus group discussions: i) lack of understanding about oral hygiene self-care related knowledge and risk factors; ii) lack of adequate oral hygiene self-care related skills and routine; iii) lack of emphasis on prevention; and iv) perceived barriers to access to dental health care.

i) Lack of understanding about oral hygiene self-care related knowledge and risk factors

In general, the focus group members were aware of the importance of dental health care, however they were unaware of the risk factors related to inadequate oral hygiene self-care. In general, participants lacked definite knowledge concerning the role of dental plaque causing gum diseases. Participants reported that their main source of oral hygiene self-care knowledge and skills were their family members and expressed that oral health care providers generally shared post treatment instructions and rarely shared information about adequate skills and behavior related to oral hygiene self-care.

Overall, all participants perceived that dental health is important for quality of life.

"I have seen few of my close family members, my mother in law and my grandmother that when once natural teeth from your mouth are gone its never the same thing".

"If you want to enjoy your life and your natural teeth are not healthy, you kind of loose it".

"Although a tooth of my husband hurts but he doesn't want to get it extracted because he says that there is no substitute for real teeth. If you continue extracting one after another your whole mouth will get empty".

"I had many ups and downs with dental problems. I suggest that you may reduce your other expenses and do some saving to take care of your teeth it is very important because in my experience there are so many foods that we can't enjoy without teeth".

ii) Lack of adequate oral hygiene self-care related skills and routine

All the participants mentioned having a daily brushing routine but none of them had a daily routine of dental flossing and tongue cleaning as well. Furthermore, they reported no awareness concerning a need to floss and tongue cleaning. In addition, lack of adequate knowledge and skills related to dental flossing stood out as a main barrier to floss daily. Thus, there was a clear need expressed for improvements in oral hygiene self-care related skills particularly of flossing and to receive adequate knowledge about adequate frequency, duration and techniques of oral hygiene self-care behavior.

"I brush twice daily and I don't floss, my daughter sometimes flosses but no one else in my family does flossing".

"I saw my husband does it sometime, it looks like a thread but neither me nor my children ever did it"

"I never learned to floss and I don't like it but if something is stuck in teeth I use tooth pick and I have gaps in my teeth".
"Honestly, they never showed me the method that this is how we should floss".

"Tongue cleaning, very rarely, it is not a regular thing for me".

iii) Lack of emphasis on prevention by oral health care providers

The focus group also provided an insight into a lack of emphasis on prevention by the oral health care providers in general and stated that they have primarily received post treatment instructions and rarely preventive knowledge related to oral hygiene self-care from their oral health care providers. Two subthemes emerged out of this main theme: i) lack of emphasis on preventive treatment; ii) inadequate involvement of patient in treatment decision making.

"My husband had a tooth problem and he went to a dentist here (Canada) and instead of treating it dentist told him to extract it. My husband said that I do not want to extract it, first try to treat it instead of extracting. They did not do any treatment and after that my husband never went again. He said that he will get it treated when he will visit India. My husband still has the problem and he is waiting to go to India in November to get it checked up and treated there".

"My husband had a dental problem and we went to a dentist... they always suggest to get it extracted and that is their end solution".

"I went to a dentist here and he said that your last tooth is not growing properly and without any need he extracted it".

iv) Perceived barriers to access dental health care

Two sub-themes emerged out of this main theme: i) language barrier and ii) financial barriers

"My mother in law came here and she had problem with her teeth. But she could not go to dentist since immigrants do face problems here, first is language problem, second someone has to accompany her as she can't go alone".

ii) Financial barriers theme had further two subthemes: a) lack of dental insurance coverage and b) lack of satisfactory treatment

a) Lack of dental insurance coverage

A great deal of discussion was centered on lack of dental insurance coverage and high cost involved to get all sorts of dental treatments in Canada as compared to India. It was highlighted that high cost involved is a major barrier to access oral health care and it impacts negatively on

people's aspirations in diverse ways to have good oral health care. For example, it was considered a major factor influencing their decision making whether to access dental care in Canada or to postpone it and get it done later during their next visit to India.

"Due to financial problem, we can't pay the dental expense and this is the biggest problem".

"I went to a dentist but when he told me the expense I told him that I can't get that treatment, then, I went to India and got a filling done but that filling came out in the past 4-5 years but I have not gone to dentist here (Canada) to ask what to do about it".

"*Its been more than 10 years and I do not remember exactly but since it was expensive that is why I did not agree to get dental treatment".*

"I have four wisdom teeth and dentist is telling me that I should get them extracted, I said ok, but when he gave me an estimate that ok was gone because it was too expensive. Then I thought since my wisdom teeth are not giving me any trouble so I don't want to get them extracted now".

I had some cavities but I never went to doctor here (Canada)" but when I went to India I got my fillings done from there.

b) Lack of satisfactory treatment

Few participants who got their treatment done from India described their experiences about their unsatisfactory treatments. Those who were satisfied with their treatments done in India said that the problem is that if anything goes wrong with their dental prosthesis/ treatment, dentists in Canada do not repair that same dental prosthesis.

"In fact, for my mother in law they extracted all of her teeth and replaced with full permanent denture in India. But its shape is so bad that when she laughs it seems as if it will fall off". It is so expensive here. So now she will go back again to India and get it fixed again and my father in law too because the denture he had from India is broken also".

"Once I went to dentist in India since I had pain because I had a cavity, I told him I had pain. It was a complete tooth and just a small cavity that could have been treated somehow. But he put me on chair and extracted my tooth, not only he extracted but he also broke the root of it and left some part of it remaining. And while he was extracting, I heard a noise of "tuck" and I told him also that something is left but he said there is nothing. It was such a solid tooth and when I had check-up here (Canada) that left out root was seen in the x-ray. There was gum covering it and it used to hurt me and then dentist extracted it here, he told me there are some more expenses that i need to get like one bridge worth of $10,000 but I never got it done after".

The following part of the result section presents findings of the pilot study conducted to test cultural relevance, comprehensibility and format of the photonovel:

Pilot testing of photonovel

For the pilot testing of the SYS photonovel, 10 additional participants were recruited. All participants were Punjabi immigrants since they were born in Punjab and reported Punjabi language as their mother tongue. More than half (6) of the participants were females and ages of the 7 participants ranged between 48-68 years. Education level of 8 participants was of intermediate level since 6 people reported college/technical education and 2 people reported having completed university education. Two participants were full time workers, 2 were homemakers and 6 were retired. In total, 6 participants reported having a dental insurance. As shown in table 1 below most of the participants had positive responses about the SYS photonovel. The format of the photonovel, ease of understanding and clarity of message were reported as main positive features.

Overall, 9 participants reported that the SYS photonovel was a good tool for oral hygiene self-care and through it they gained knowledge and skills on how to perform good oral hygiene self-care. Almost 8 participants perceived that SYS was culturally and linguistically relevant and easy to understand. Revisions were made as suggested by participants during pilot testing of few spelling errors and to further simplify the dialogues of the photonovel. Table 1 presents the response rate of the 10 participants who read and evaluated the SYS photonovel during pilot testing.

Table 1: Participants' response of "Safeguard Your Smile" (SYS) about photonovel

1.Do you agree that contents of the SYS photonovel are easy to understand?	
Strongly agree	8
Agree	2
2.Do you agree that SYS photonovel is developed by someone who knows Punjabi community well?	
Strongly agree	10
3. How much time it too you to read the SYS photonovel?	
Average time	8 minutes
4. Does it matter that when you read SYS photonovel the people in story are like you?	
Yes	8
No	1
Somewhat	1
5. Is the SYS photonovel a reflection of your own cultural oral health values?	
Yes	7
No	2
Somewhat	1
6. Do you agree that SYS photonovel is a good tool to learn oral hygiene self-care knowledge?	
Strongly agree	9
Agree	1
7. Do you think that after reading the SYS photonovel you have gained knowledge and skills on how to take good oral hygiene self-care?	
Yes	8
No	1
Somewhat	1
8. Do you think it helps to have oral health materials like this to gain knowledge if you do not speak French/English?	
Yes	10
9. Will you recommend SYS photonovel to other members of Punjabi community?	
Yes	10

Discussion

The present study identified four themes identifying various perceptions held by Punjabi immigrants regarding oral hygiene self-care. Four major themes emerged from the focus group discussions: i) lack of understanding about oral hygiene self-care related knowledge and risk factors; ii) lack of adequate oral hygiene self-care related skills and routine; iii) lack of emphasis on prevention; and iv) perceived barriers to access dental health. Overall, 90% participants reported that the SYS photonovel was a good tool for oral hygiene self-care and they gained knowledge and skills on how to take good oral hygiene self-care. Almost 80% perceived that SYS was culturally and linguistically relevant and easy to understand (80%). This study's findings confirmed that photonovel developed by the community members and for the community members is an effective tool to enhance oral hygiene self-care knowledge among Punjabi community. To our knowledge this is the first study to develop a culturally and linguistically appropriate oral hygiene self-care related photonovel for Punjabi immigrants.

A limitation of this study was its small sample size and the content of the photonovel was primarily based on the focus group discussion among Punjabi immigrants, raising the possibility that the information included in the present photonovel may not be applicable or relevant to other ethno-cultural communities. Furthermore, all participants of our focus group were females. The main reasons we had only women in our sample were: our partner organization (the Sikh women association of Montreal) has only women members; ii) we tried our best to invite and include men also to participate but they said they were unavailable due to their busy

work schedules. Interestingly, none amongst our 140 participants raised this question that why there are no men in the photonovel? A speculation that why no one raised this point is that although Punjabi community is patriarchal yet traditionally in general the overall role of nurturing and ensuring the health of family is allocated to women. Therefore, I assume that it quite felt natural to the participants that women are involved in health management issue. However, I agree that it is good to have diversity and it is possible that this question may be raised in other patriarchal societies in future studies. Therefore, we recommend including both men and women as the main characters in the photonovel in the future studies.

Despite of these limitations the "Safeguard Your Smile" photonovel was well received by the Punjabi community who pilot tested it and affirmed it will be effective in improving oral hygiene self-care knowledge and skills of Punjabi immigrants. The ultimate and future goal of the SYS photonovel is to use it to improve oral health literacy i.e. oral hygiene self-care related knowledge and skills and promote adequate behavior among immigrants in our future study.

Author's contribution

The first author contributed in the conception, design, data collection and data analysis and writing of the draft of the manuscript. The second, third and the fourth authors contributed in the refinement and revision of the manuscript. All authors have read and approved the final version of the manuscript.

Conflict of interest: There are no conflicts of interest to declare.

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MANUSCRIPT 3

Applying Behavior Change Wheel method to develop an oral health literacy intervention to promote positive oral hygiene self-care behavior among low oral health literate adult Punjabi immigrants

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Abstract

Introduction: This paper describes development process of an oral health literacy intervention by using the Behaviour Change Wheel (BCW) method to promote positive oral hygiene self-care behavior among low oral health literate adult Punjabi immigrants.

Methods: We employed the BCW method and diligently followed its three stages and eight steps to develop an oral hygiene self-care behavioral intervention for low oral health literate adult Punjabi immigrants. At the first step of operationalization of the BCW, based on focus group findings of our previous study (refer to manuscript #2 in this thesis) and discussions among research team of the study, we identified barriers and facilitators in performing oral hygiene self-care behavior perceived by the Punjabi community. Additionally, what needs to change in terms of capability, opportunity, and motivation of study participants to bring the desired change in oral hygiene self-care behavior were identified. After behavioral diagnosis, we identified, selected and mapped appropriate, intervention functions, policy categories, Behavior Change techniques (BCTs) and mode of delivery to arrive at concrete strategies that were likely to be effective to bring the desired oral hygiene self-care behavioral change.

Results: Oral hygiene self-care behaviour was identified as a target behavior, detailing the specifics of the behavior (frequency, duration and technique), and the context in which it needs to be carried out. We identified six intervention functions (education, training, modeling, restriction environmental restructuring and enablement) and two policy categories options

(communication and service provision) to influence the capability, opportunity and motivation components related to oral hygiene self-care behavior. The advantage of the BCW in designing oral health literacy intervention was that it allowed us to target all the three elements of the oral health literacy concept (knowledge, skills and behaviour) through the six identified intervention functions (education, training, modeling, restriction, environmental restructuring and enablement). Next, we identified six BCTs that were considered relevant to address the identified barriers related to oral hygiene self-care behavior. Safeguard Your Smile, an oral hygiene self -care behavioral intervention of 60 minutes' duration was developed for face to face delivery and with a follow up after three months was designed to improve the oral hygiene self-care behavior among low oral health literate adult Punjabi immigrants.

Conclusions: The BCW is a systematic method for planning design and content of behavioral interventions that details explicit design and content of intervention that can be easily replicated and evaluated.

Keywords: Behavior change wheel, oral hygiene self-care, behavior change, intervention

Introduction

Despite overall improvements in oral health status of Canadians, preventable oral diseases such as dental decay and gum diseases remain concentrated among vulnerable populations [1]. Oral diseases are preventable as well as treatable. Preventive interventions are increasingly becoming a focus of dental Public Health and much efforts concentrate on behavioral and lifestyle changes. It is widely accepted that positive self-care behaviors play a central role in maintenance of oral health and prevention of disease [2]. Prevention and management of oral disease are critically dependent upon one's daily oral hygiene self-care behavior, healthy dietary intake, refrain from tobacco use and regular dental visits [3] . In general, the elementary oral hygiene self-care behavior which is a cornerstone of preventing oral diseases is practiced inadequately [4].

Growing evidence suggests that behavioral interventions guided by a relevant theory tend to bring effective behavioral changes [5] by targeting underlying mechanisms that facilitate the pathway between intervention and behavioral outcomes [6]. It has been reported that despite many advantages of using a theory to develop an intervention, behavioral change interventions generally are infrequently theoretically driven [7]. Noteworthy, a meta-analysis reported that only 22.5% studies had explicitly used behavioral change theories and the studies that had used a behavior change theory, applied it sub-optimally [7]. Likewise, in oral health field, Renz et al. conducted a systematic review and their findings revealed that only four studies were based on behavioral theories and the sub-optimal application of the theory in all four studies was

underscored [8]. Thus, Renz et al. concluded that "there is a need for greater methodological rigor in the design of trials in this area" [8].

Till date, various theory driven behavioral change models had been developed to guide strategies for promoting healthy behaviors and to facilitate effective adaptation for coping with illness. However, there is a consensus view amongst behavioral theorists that selection of a relevant theory amongst existent 83 behavior change theories [9] can be challenging since many of the constructs used by current health behavior theories are similar but different terminology is used or have overlapping constructs [10-13]. Additionally, there is no basis and guidance to determine which theory among the several theories predicts behaviour or behaviour change most precisely [11]. Given the literature on health behavior theory is full of pros and cons about most of the individual level theories and in absence of any guidance [11] an appropriate theory selection is daunting for intervention designers. It has been suggested that effective behavioral change interventions addressing today's key health issues shall be selected based on tested scientific theory, rather than on investigator's choice, common sense or intuition [14, 15].

Recently, Michie et al. developed the Behavior Change Wheel (BCW) i.e. an integrative theoretical framework has overcome this problem by synthesizing the common features of the 19 frameworks and linked them in a comprehensive and systematic method to design diverse behavioral interventions in wide variety of setting [12, 16]. The BCW is based on COM-B model that proposed that people need capability (C), opportunity (O) and motivation (M) to perform a behavior (B). The BCW provides an easy, systematic and practical method for

designing intervention and details explicit components of intervention that can be easily replicated and evaluated [16].

Previously, the BCW has been successfully used in initiatives such as to improve hand hygiene national campaign 'Clean your hands' among hospital staff [17] and to reduce sedentary behavior in older adults [18], to increase attendance at stop smoking services [19], increasing frequency of physical activity for cancer patients[20]. Asimakopoulou et al. has advocated the relevance and need to introduce the BCW theoretical framework in dental public health to design oral health related behavioral interventions [12]. Lovelle et al. used the BCW in patient education in reducing cancer pain recommended that the BCW can be used to design interventions for people having low health literacy since their limited capability and opportunity factors can be addressed by targeting enablement and training interventions of the BCW [21]. Thus, in the context of oral hygiene self-care behavior which is a routine behavior [22] we hypothesized that the BCW which addresses habit and associative learning factors along with capability and opportunity factors would be appropriate to develop an oral hygiene behavioral intervention for low oral health literate Punjabi immigrants.

While acknowledging the importance of healthy diet intake and regular dental visit that are equally critical along with oral hygiene self-care behavior but considering the timeline and scope, we chose to focus our present study on oral hygiene self-care behavior only. The purpose of our present study is to develop an oral health literacy intervention by employing the Behavior

Change Wheel method to promote positive oral hygiene self-care behavior among low oral health literate adult Punjabi immigrants.

Methods

We employed the BCW [23] method and as shown in Figure 1 below [24] we diligently followed its three stages and eight steps to develop an oral hygiene self-care behavioral intervention for low oral health adult Punjabi immigrants. At the first stage of understanding the behavior, based on focus group findings of our previous study and discussions among research team of the study, we identified what needs to change in terms of capability, opportunity, and motivation (the components of the COM-B) to bring the desired change in behavior. Further details of the focus group conducted have been described in the manuscript # 2 that is included in the present thesis.

Two researchers who are first two authors of this manuscript, discussed findings of focus group and defined the problem in behavioral terms (identified what needs to change in terms of three sources of behavior i.e. 'capability', 'opportunity', and 'motivation' for the desired behavior to emerge).

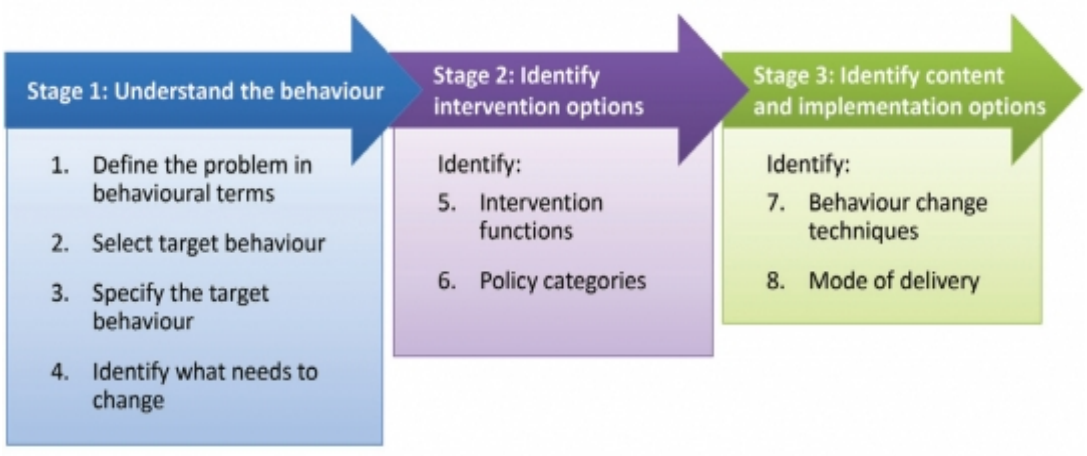

Figure 1: Behavior change intervention design process (Source Mitchi et al. 2014)

Next, we selected and specified target behavior, detailing the specifics of the behavior (frequency, duration and technique), and the context in which it needs to be carried. At the second stage, we identified and mapped from the range of provided intervention functions and policy categories in the BCW. At the third stage, we identified and mapped appropriate behavior change techniques from the taxonomy of Behaviour Change Techniques taxonomy version 1 (BCTTv1) to arrive at concrete strategies and selected the mode of delivery that were likely to be effective to bring the desired oral hygiene self-care behavioral change [25]. Michie et al. has recommended the use of APEASE criteria at step 4, 5 and 6 of the BCW method to select appropriate intervention functions, policy categories and Behaviour Change Techniques (BCTs). It is suggested that while selecting intervention functions, policy categories and BCT think of this question "Does the intervention function/policy category/ behavior change technique meet the APEASE criteria (**A**ffordability, **P**racticability, **E**ffectiveness/cost-

effectiveness, **A**cceptability, **S**ide-effects/safety, **E**quity)?" The APEASE criteria guides an intervention designer to make a judgement and thus choose appropriately what options of intervention functions and policy categories will be locally relevant, likely to be feasible, and could be implemented as a cohesive intervention. Thus, as recommended by the BCW, we consistently followed the APEASE criteria while identifying and mapping appropriate intervention functions, policy categories, BCTs and modes of delivery [23]. After BCTs were identified content of the intervention was developed and tailored around the themes of the identified barriers (COM) and we referred to the identified BCTs to ensure our intervention content is applied to them.

Results

The results of application of the three stages and eight steps of the BCW to design oral hygiene self-care behavior are presented below:

Stage 1: Understanding the behavior

The results of focus group have been reported before in the manuscript number 2 of this thesis. As shown in the following Table 1a, based on findings of the focus group and discussions between two researchers (first and second authors of this manuscript) the target behavior and the specifics of the behavior (frequency, duration and technique) were defined and selected.

Table 1 a: Stage 1- Understanding the behavior

Step 1: Define the problem	Poor oral health related knowledge, skills and poor oral health behavior among Punjabi immigrants having low oral health literacy.
Step 2: Select target behavior	Oral hygiene self-care behavior (to improve frequency, duration & technique) of tooth brushing, flossing, mouth rinsing and tongue cleaning.
Step 3: Specify target behavior	We specified oral hygiene self-care behavior to change in low oral health literate Punjabi immigrants as: i) Brushing teeth twice daily for at least 2 minutes by using a soft brush and a fluoridated tooth paste, brushing teeth softly and by making small back and forth strokes). ii) Flossing once daily iii) Tongue cleaning once daily. iv) Rinse twice daily with a mouth rinse.

Table 1b below presents the detailed description of the factors identified during focus group and discussion between researchers (capability, opportunity and motivation) that were considered as necessary to be changed to bring about a desired change in oral hygiene self-care behavior among the low oral health literate Punjabi immigrants.

Table 1 b: Stage 1(Step 4)- Identify what (COM-B components) needs to change

Step 4: COM-B component	Behavioral diagnosis- Description of what needs addressing in intervention based on the focus group	Is there a need to change?
Physical capability	Lack of skills of how to adequately clean teeth, tongue and inter-dental areas (to improve frequency, duration and technique).	Yes
Psychological capability	Lack of knowledge and awareness about what are the risks of dental plaque and consequences of not removing it daily. Encouraging to make an action plan.	Yes

Physical opportunity	Perception that time is a barrier- finding the time and availability of access to tools and learning opportunity and helping them to select a consistent cue as reminder to help them to enable the act.	Yes
Social opportunity	Providing an access to culturally and linguistically appropriate intervention provided by one of their own expert community members and to learn in a group of their peers.	Yes
Reflective motivation	Promote positive attitude toward the creating a plan of when, where and how to perform the desired behavior in the same situation.	Yes
Automatic motivation	Oral hygiene self-care behavior is a routine behavior and repeating a same behavior using a consistent contextual cue progressively increases its automaticity.	Yes

Stage 2: Identifying the intervention function and policy options

The COM-B components identified at the stage 1 were mapped to the appropriate intervention functions available within the BCW. Out of a nine possible intervention functions, our research team identified six intervention functions since they met the APEASE criteria (education, training, modeling, restriction, environmental restructuring and enablement) to address the identified barriers during focus group. The advantage of the BCW in designing oral health literacy intervention was that it allowed us to target all three elements of the oral health literacy concept (knowledge, skills and behaviour) through the six identified intervention functions (education, training, modeling, restriction, environmental restructuring and enablement).

Tables 2a and 2b below present intervention functions and policy categories identified and mapped from the range of options provided by the BCW. The Table 2 a presents evaluation and mapping of each intervention function and the Table 2 b presents evaluation and mapping

of each policy category against the APEASE criteria that were likely to be considered as effective in bringing about the desired behavioral change. Six intervention functions (education, training, modeling, restriction, environmental restructuring and enablement) were subsequently mapped to two policy categories (communication and service provision) since they met the APEASE criteria. The policy categories of fiscal measures, regulation, legislation, and environmental and social planning were excluded for not meeting the APEASE criteria.

Table 2a: Stage 2 (Step 5) - Identifying intervention functions

Step 5: Identify intervention function from the BCW	
Intervention function	**Does the intervention function meet the APEASE criteria?**
Education	Yes
Persuasion	Yes
Incentivisation	No-not affordable or cost-effective
Coercision	No- not practical or acceptable
Training	Yes
Restriction	Yes
Environmental restructuring	Yes
Modeling	Yes
Enablement	Yes
APEASE criteria= affordability, practicability, effectiveness/cost-effectiveness, acceptability, side-effects/safety, equity	

Table 2b- Stage 2 (Step 6)- Identifying the policy categories from the BCW

Step 5: Identify policy category from the BCW	
Policy category	**Does the policy category meet the APEASE criteria?**
Communication	Yes (through photonovel we developed)
Guidelines	No—not necessary
Fiscal measure	No-not affordable or cost-effective
Regulation	No- not practical or acceptable
Legislation	No- not practical or acceptable
Environmental/Social planning	No- not practical or acceptable
Service provision	Yes- Intervention will be provided to the participants
APEASE criteria= affordability, practicability, effectiveness/cost-effectiveness, acceptability, side-effects/safety, equity	

Stage 3: Identifying content and implementation options of intervention

At the third stage, appropriate Behaviour Change Techniques (BCTs) and mode of delivery were selected for an oral hygiene self-care behavioral intervention. Behaviour change techniques (BCTs) linked to the relevant chosen interventions functions were identified from the Behaviour Change Technique Taxonomy (BCTTv1), which lists 93 BCTs with descriptions and examples of their application [25]. Our research team identified six BCTs that were considered relevant to address the identified barriers related to the target behaviour.

Table 3: Stage 3 (Step 7 and Step 8) - Identifying content and implementation options

Step 7: Identify Behavior Change Techniques (BCT) from the taxonomy		
BCTTv1code	**BCT label**	**Example how this will be represented in SYS intervention's component**
5.1	**Provide information about health consequences**	Explain risk factors of dental plaque and poor oral hygiene self-care behavior and benefits of action and consequences of inaction on oral and general health using educational material (through photonovel that we developed).
6.1	**Model or demonstrate the behavior**	To demonstrate skills of adequate tooth brushing, flossing and tongue cleaning methods (frequency, duration and technique) by using images and "teach back "approach.
1.4	**Prompt specific goal setting**	To encourage participants to make a concrete plan specifying when where and how will they daily perform the oral hygiene self-care behavior and a coping plan.
7.1	**Teach to use prompts/cues**	To encourage participants to identify prompts/cues this can remind them to perform the behaviour e.g. particular time of day/ activity/ mobile phone reminder.
2.3	**Prompt self-monitoring of behavior**	To checkmark and monitor daily their progress of oral hygiene self-care behavior on a provided weekly calendar.
8.3	**Habit formation**	To encourage participants to repeat their oral hygiene self-care routine using a consistent contextual cue to progressively increase its automaticity through associative learning process.
BCT = Behaviour change technique. BCTTv1 = Behaviour change technique taxonomy		
Step 8: Identify mode of intervention delivery:		
Intervention will be provided by the principal investigator during in person meeting to small group of 5 participants either at the participant's home or at a mutually agreed upon suitable place and follow up will be done on phone.		

Table 3 presents the details of the six behaviour change techniques (BCTs) selected from the 'behaviour change technique taxonomy version 1' (BCTTv1), the mode of delivery identified was to deliver the intervention in a face-to-face setting and a follow up to be done on phone since these all met the APEASE criteria.

Table 4: Safeguard Your Smile an oral hygiene self-care behavioral intervention

COM-B components served by intervention functions	Intervention functions	Policy categories through which BCTs can be delivered	BCTs to deliver intervention functions	Intervention component	Format
Capability psychological Reflective motivation	Education	Communication and Service provision	5.1	Enhance knowledge using photonovel	Supporting material (photonovel
Capability psychological	Training Modeling	Communication and Service provision	6.1	Demonstrate skills using teach back	Presentation and verbal showing skills on dentoform
Physical opportunity	Environmental restructuring	Communication and Service provision	1.4 and 7.1	Encourage to create a concrete plan	Verbal
Automatic motivation	Restriction	Service provision	2.3	Assign self-monitoring task	Supporting material and task
Physical opportunity Reflective motivation	Enablement	Service provision	8.3	Follow up once a month	Verbal
APEASE criteria= affordability, practicability, effectiveness/cost-effectiveness, acceptability, side-effects/safety, equity					

Final developed intervention- "Safeguard Your Smile" (SYS)

Safeguard Your Smile an oral hygiene self-care intervention was designed to influence three sources of behavior i.e. 'capability', 'opportunity', and 'motivation' for the desired adequate oral hygiene self-care behavior to emerge among low oral health literate adult Punjabi immigrants. After BCTs were identified content of the intervention was developed and tailored around the themes of the identified barriers (COM) and by continually referring to the identified BCTs to ensure content applied to them. The advantage of the BCW in designing oral health literacy intervention was that it allowed us to target all three elements of the oral health literacy concept (knowledge, skills and behaviour) through the six identified intervention functions (education, training, modeling, restriction, environmental restructuring and enablement).The SYS iintervention will be provided by the Principal Investigator (PI) during in person meeting to small group of 3-4 participants either at the participant's home or at a mutually agreed upon suitable place and follow up will be done on phone. Table 4 illustrates how the intervention functions, policy categories and intervention components related to the COM-B factors of the BCW.

The final developed SYS intervention consisted of five components (as shown in the Figure 2) including:

i) The first component of intervention contributes to enhance knowledge and understanding of participants about adequate oral hygiene self-care behavior (BCT 5.1).

Using the educational material (SYS photonovel) developed by the community and for the community the goal would be to enhance knowledge and understanding of participants regarding the risk factors of dental plaque, gingivitis and benefits and risks of action or inaction of oral hygiene self-care behavior on one's oral as well as general health.

ii) Training of adequate oral hygiene self-care skills (frequency, duration and technique) by using "teach back method" (BCT 6.1). PI will employ "teach back method" to ensure it is completely understood by the participants. "Teach-back method" is a way of confirming that your patient has understood what you have explained to him/her. To use this method, after explaining the health-related information to patient, we ask the patient to repeat the information explained in their own words. In case, the patient is unable to remember or accurately repeat what we explained them, we repeat to clarify our information and allow them to teach it back again and repeat this till the patient can correctly describe in their own words the given information [26].

iii) Action planning activity to encourage participants to create a concrete plan of using what cue, when, where and how will they implement their daily oral hygiene self-care routine and coping plan. Furthermore, PI will encourage participants to identify their preferred environmental prompt/cue that can be used to remind them to perform the daily oral hygiene self-care behaviour e.g. particular time of day, activity or technologies such as mobile phone alerts. (BCT 1.4 and 7.1).

iv) Self -monitoring task to daily checkmark one's progress on the provided calendar on the last page of the photonovel (BCT 2.3).

v) Three monthly follow ups on phone will be conducted by the principal investigator (BCT 8.3) for reinforcement of behavior.

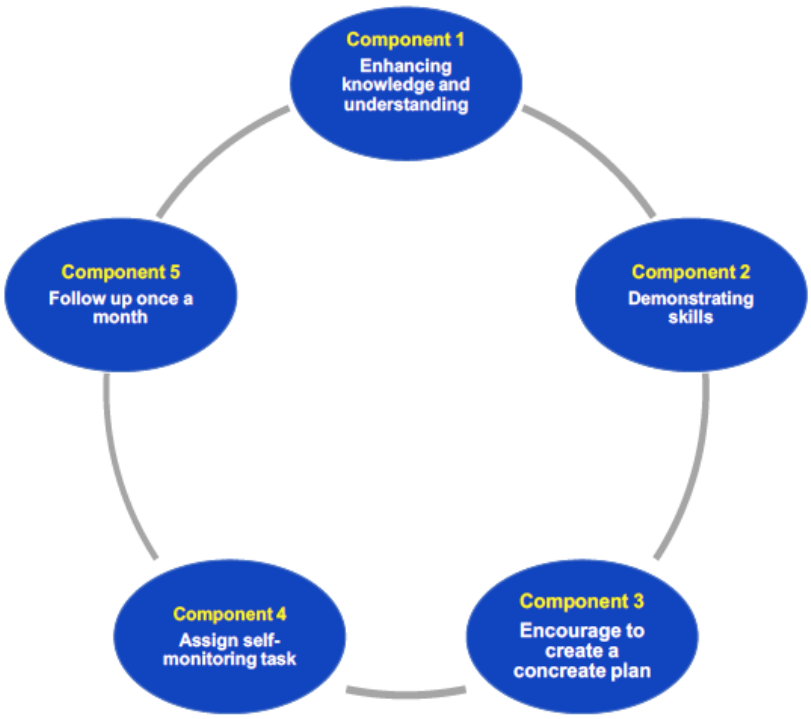

Figure 2: Components of Safeguard Your Smile intervention

Discussion

Safeguard Your Smile intervention is a novel and theory driven intervention developed by employing the Behavior Change Wheel method (BCW) to promote positive oral hygiene self-care behavior among low oral health literate adult Punjabi immigrants. The BCW provided a systematic method of characterizing interventions that enables their outcomes to be linked to mechanisms of action, and it can help to diagnose why an intervention may have failed to achieve its desired goal thereby explaining "why and how" aspects of the intervention and would greatly enhance its replicability.

Particularly, by identifying various barriers, intervention functions, policy categories and linking those with specific behavior change technique and intervention component we ensured a better understanding of “why and how” the intervention was developed and thereby increased the opportunity for others to replicate the whole process.

Our study differs from other previous oral hygiene self-care behavioral interventions which did not rely on an explicit theory to design and develop the contents of their interventions. A previous study that has illustrated that a series of educational sessions can improve oral health knowledge and self-efficacy [27]. However, this study had a very small sample size, therefore their results cannot be generalized and also it lacks evidence if it was successful in bringing sustainable oral health behavioral change [27].

Another pre-post study conducted among 67 older primarily Caucasian adults also employed community based educational intervention involving multiple interactions to significantly and positively impact oral health literacy and oral hygiene status among older adults [28]. However, the theoretical underpinning of the before mentioned oral health literacy intervention was unclear. Thus, our study differs from previous oral hygiene self-care behavioral interventions since it employed pragmatic method to design interventions and addressed the scarcity of theory-driven interventions in the field of dental public health.

The strength of this intervention is use of the BCW i.e. a systematic method for its development since the BCW provides a wide range of options that are based on a systematic evaluation of theory and evidence for making the best use of the understanding and resources available to arrive at a strategy. A limitation identified in this study was that we had a small sample size of only five participants in the focus group (this focus group was conducted and explained in manuscript#2 of this thesis) to identify the barriers and enablers at interpersonal level only. Despite this limitation this paper has given an explicit account of development process of an oral health literacy intervention aimed to promote oral hygiene self-care behavior by employing the BCW method that is replicable.

Future study

Safeguard Your Smile (SYS) an oral health literacy intervention is developed to enhance positive oral hygiene self-care behavior among low oral health literate immigrants however, its

potential must be assessed. In the next phase of our research, we will be conducting a randomized controlled trial to evaluate effectiveness of the SYS intervention to improve oral hygiene self-care behavior among low oral health literate Punjabi immigrants. We recommend that after our randomized controlled trial study if effective then the SYS intervention could be adapted among other vulnerable populations to reduce oral health disparities. However, we recommend that the future research shall consider inclusion of additional strategies tailored according to specific target behavior change needs in other vulnerable communities.

Author's contribution

The first author contributed in the conception, design, analysis and writing of the draft of the manuscript. The second and the third author contributed in the refinement and revision of the manuscript. All authors have read and approved the final version of the manuscript.

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MANUSCRIPT 4

Effectiveness of "Safeguard You Smile" an oral health literacy intervention on oral hygiene self-care behavior among Punjabi immigrants: A randomized controlled trial

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Abstract

Introduction

The purpose of the present study was to evaluate the effectiveness of "Safeguard Your Smile", an oral health literacy intervention promoting oral hygiene self-care behavior among Punjabi immigrants.

Methods

We enrolled 140 volunteer Punjabi immigrants aged between 18-60 years, who were Montreal residents. Participants were randomly allocated to receive either "Safeguard Your Smile" intervention or a conventional pamphlet. The following outcome measures were assessed at baseline and three months after intervention in both experimental and control groups: self-reported oral hygiene self-care behavior and knowledge using a self-administered questionnaire, plaque and gingival indices were assessed through a clinical examination conducted by a dentist using Loe and Sillness indices and oral health literacy was measured using the TS-REALD oral health literacy assessment tool. Linear mixed model for repeated measures were used to compare the intervention and control groups (between) at pre-and post-intervention (within).

Results

The two groups were statistically equivalent at baseline. Linear mixed model comparing the intervention and control groups at pre-and post-intervention yielded significant positive differences ($p < 0.0001$) between the two groups for dependent variables: oral hygiene self-care

knowledge and behaviour, oral health literacy and plaque and gingival indices. Participants who received intervention showed improvements in their oral health literacy scores, oral hygiene self-care knowledge and behaviour (frequency, technique and duration of their brushing and flossing) as well in their plaque and gingival indices.

Conclusion

Safeguard Your Smile an oral health literacy intervention can successfully enhance positive oral hygiene self-care behavior among low oral health literate immigrants.

Keywords: Oral health literacy intervention, oral hygiene self-care behavior, Punjabi immigrants, randomized controlled trial, oral health disparities.

Introduction

Good oral health is integral to general health and is vital for one's overall quality of life and well-being [1]. Despite an overall improvements in oral health status among the Canadian population, preventable oral diseases such as dental decay and gum diseases remain concentrated among vulnerable populations such as immigrants, aboriginals, seniors etc.[2] In 2014, Ghiabi et al. reported that 53% immigrants had untreated dental decay, 89% had gingivitis and 73% had periodontitis versus 32% of native Canadians [3].

It has been reported that immigrants experience gradual deterioration in their health status [4, 5] in part due to significant barriers such as economic, cultural, linguistic and limited health literacy [6]. Calvasina et al. reported that Brazilian immigrants face challenges to access and navigate the Canadian dental care system that are brought about by low income, language barriers and lack of self-efficacy/knowledge about the dental system [7]. Brodeur et al. conducted a survey on 5,795 Quebec's immigrant women and found that recent immigrant women use less preventive services as compared to long term immigrants and non-immigrants and this difference was primarily due to financial and cultural barriers [8]. MacEntee et al. stated that older Punjabi speaking immigrants have difficulty accessing dentist and they manage their oral diseases with either home remedies, emergency room visit or during their visit to India [9]. Marshall et al. reported that Punjabi and Chinese populations have expressed their unmet needs of general health including dental care services due to economic reasons, unfamiliarity with the Canadian health system and due to their limited health literacy [10].

The 2003 International Adult Literacy and Life Skills Survey (IALSS) found that 60% of immigrants lacked sufficient literacy skills to cope with the demands of life and work in today's complex society as compared to 37% of Canadians [11]. The Canadian Public health Association (CPHA) recommends that improvements in health literacy in which immigrants are particularly disadvantaged is critical to bring positive health outcomes and reduce health disparities [12].

Recently, oral health literacy has emerged as an important determinant of oral health [13, 14] and a potential pathway to reduce oral health disparities. [15-17]. Oral health literacy refers to the "degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make oral health related decisions"[18]. Simply put, oral health literacy refers to an ability to obtain, understand and use a set of oral health related knowledge, skills and adequate oral health care behaviors to maintain good oral health.

Atchinson et al reported that immigrants have lower oral health literacy as compared to non-immigrants [19]. Studies have shown that oral health literacy is associated with: i) poor oral health knowledge [20-22], ii) poor oral health behaviors [23-25], iii) less dental services utilization [26, 27], and iv) poor oral health status [28-32]. Ueno et al. demonstrated a significant relationship between the low level of oral health literacy and poor oral health behaviors and poor oral hygiene status [24].

Dental plaque (a sticky layer containing bacteria) is the primary etiological agent of oral diseases such as dental caries and periodontal disease. If not managed at an early stage dental plaque may lead to cascade of events such as dental caries, periodontitis, tooth loss or even contribute to other systemic diseases such as diabetes, CVD, bacterial pneumonia. Prevention and management of oral diseases is critically dependent upon one's daily oral hygiene self-care behavior, healthy dietary intake and regular dental visits. Nevertheless, the elementary oral hygiene self-care behavior which is the cornerstone of preventing and controlling gingivitis is not adequately practiced primarily due to lack of awareness about its importance and necessity [33].

Concerned about the prevalence of low oral health literacy among vulnerable groups in US, several landmark documents such as Surgeon General's report [34], the National Institute of Dental and Craniofacial Research's report [35], two reports by the Institute of Medicine and American Dental Association's health dentistry action plan [36-38] recommended that community wide effective oral health literacy interventions are needed to create public awareness about causes and preventive measures of oral diseases [39].

Evidence from US and Australia showed that community based oral health literacy interventions have a potential to reduce risk factors for oral diseases among aboriginals [40] and seniors [23]. Although, the field of oral health literacy has advanced in other developed countries yet, minimal oral health literacy related research [7, 41, 42] has been conducted in Canada. Specifically, the scarcity of research related to oral health literacy interventions among

immigrants lends urgency to our present study addressing the deficit on this subject. The purpose of our study is to assess effectiveness of an oral health literacy intervention promoting positive oral hygiene self-care behavior among Punjabi immigrants.

Safeguard Your Smile intervention

A detailed development process of the 'Safeguard Your Smile' (SYS) intervention has been described in the manuscript # 3 of this thesis [43]. The SYS intervention had following 5 components:

i) First component of the SYS intervention involved reviewing of a photonovel specially designed for this intervention in partnership with Punjabi community participants to understand the risk factors of dental plaque, gingivitis and benefits and risks of action or inaction of oral hygiene self-care behavior on oral and general health [44] .

ii) Second component involved demonstration of adequate tools and skills of tooth brushing, flossing and tongue cleaning (frequency, duration and technique) by demonstrating on dentoform and by employing the "teach back" technique to ensure it is well understood by the participants.

iii) During the third component, participants were encouraged to make a concrete plan specifying when, where, and how would they prefer to perform the daily routine of oral hygiene self-care behavior and in case they miss it what will be their coping plan. Furthermore, participants were encouraged to identify their preferred environmental prompt/cue that could act as a reminder to prompt them to perform their daily oral hygiene self-care routine e.g. particular time of day, activity or technologies such as mobile phone alerts. Each participant was advised to register their individual concrete plan and preferred cue on the last page of the photonovel provided to them.

iv) Fourth component involved encouraging participants to daily checkmark their progress of oral hygiene self-care routine on the provided calendar at the back of the photonovel for complete three months after intervention.

v) Fifth component involved a follow up by the lead researcher (through phone calls to each participant of the intervention group once a month for reinforcement of their behavior.

The objective of present study was to test whether "Safeguard Your Smile" an oral health literacy intervention will be effective in promoting positive oral hygiene self-care behavior among Punjabi immigrants. We hypothesized that "Safeguard Your Smile" will improve oral health literacy and oral health (gingivitis) among intervention participants compared to a non-intervention control group. Effects of SYS intervention will be evidenced by the improvement

in the following primary outcomes: i) oral hygiene self-care knowledge ii) oral hygiene self-care behaviour iii) oral health literacy iv) plaque index scores and v) gingival index scores.

Methods

Study design

We adopted a parallel group, no blind randomized controlled trial study design. The 2-by-2 repeated measures design consisted of two groups of participants, one group (intervention) received the "Safeguard your smile" intervention and the other group (control) received a conventional English language oral hygiene self-care pamphlet. Each participant was measured at two time points: once at baseline and three months after the intervention. The goal of our study was to compare the change across time in intervention group to the change across time in control group. As an incentive, the study participants received a soft tooth brush, dental floss and fluoridate tooth paste (having 0.254% sodium fluoride).

Ethical approval

The present randomized clinical trial was reviewed and approved by the "Comité d'éthique de la recherche en santé" i.e. ethics review board of the Université de Montreal (refer to appendix G) and was registered at the website www.clinical trial.gov (Clinical Trial number: NCT02521155).

Study participants

Participants were recruited from Montreal metropolitan areas having dense population of Punjabi immigrants through variety of methods such as referrals from the members of our community partner organization, word of mouth, by visits to Punjabi community's temples, community centers, and grocery stores. To be eligible, participants met following inclusion criteria: i) Punjabi immigrants who were residing in Montreal ii) between 18-60 years iii) were in good general health and iv) gave written informed consent. Exclusion criteria were: i) non-permanent residents ii) use of orthodontic appliances iii) self-reporting of presence of any disease of soft/ hard oral tissues e.g. advanced periodontitis; any systemic diseases e.g. diabetes etc. and intake of any medications such as anticonvulsants, calcium channel blockers and chemotherapy.

Sample size

Calculation for study sample was based on estimates from a previous study by Hjertsted et al [23]: Experimental group plaque index (mean±sd): pre 0.36±0.20; post: 0.28±0.21 change=0.08. Control group plaque index (mean±sd): pre 0.36±0.20; post 0.34±0.21 change=0.02 control group. The correlation between measurement pairs was estimated at 0.8. Sample size estimation, based on test for two groups of pre-post scores, was calculated as: n=70 for each group for an effect size=0.45, with power of 80%, and alpha=0.05 using a two-sided t-test.

Variables

Independent variable was group (intervention versus control). Dependent variables were: Oral Health Literacy (OHL), oral hygiene self-care knowledge, oral hygiene self-care behavior, plaque index (PI) and gingival index (GI). Additionally, age due to significant differences between control and intervention group and language of questionnaire were considered as covariates.

Variables were measured using the following instruments:

i) TS- REALD (Two Stage-Rapid Estimate of Adult Literacy in Dentistry)

Participant's oral health literacy (both intervention and control groups) levels were measured using TS-REALD (Two Stage Rapid Estimate of Adult Literacy in Dentistry) [45]. TS-REALD is a validated word recognition routing test in which participants are asked to read a list of 5 dental words aloud and one point is given for the correct pronunciation. This test categorizes the participants depending on their scores into three groups for further testing i) low literacy stage-2 (4 words test); ii) average literacy stage-2 (6 words test); and high literacy stage-2 (3 words test). The score from routing test is added to stage-2 score and this is called raw score. This raw score is translated into a scaled score by using the scaled score translational table that had been derived using psychometric testing [45] [46].

ii) Loe and Sillness plaque and gingival indices

Using Loe and Sillness plaque index which is a simple and non-invasive method [47], the deposits of dental plaque of participants was assessed. Participants were asked to chew a harmless dental plaque disclosing tablet and let it mix with their saliva, swish it for 30 seconds and spit it out and rinse with water. The red color of the disclosing tablet remaining on the teeth made deposits of plaque visible and facilitated assessment of where dental plaque was overlooked while brushing. The dental plaques disclosing tablets (GUM Red-Cote) were bought from the dental store at the Université de Montreal. It contains medicinal ingredients: D&C Red #28 and non-medicinal ingredients are: cherry flavoring, dextrose/malt dextrose blend, FD&C Blue #1, magnesium stearate, mannitol powder, sodium saccharin.

Dental plaque index scores were assessed by using a sterilized mouth mirror used in dental clinics and the Loe and Sillness index only on the six Ramfjord teeth (16, 12, 24, 36, 32, 44 on proximal, buccal and lingual sides). Score 0= no dental plaque seen in the gingival area; score 1= dental plaque present on the free gingival margin; score 2= moderate accumulation of dental plaque at the gingival margin seen by naked eye and score 3= abundant dental plaque in the gingival margin. Using a blunt dental probe and mouth mirror used in dental clinic, we used Loe and Sillness gingival index scores to assess gingivitis, score 0=no gingival inflammation, 1=mild inflammation-slight change in color of gingiva, 2=moderate inflammation-moderate

glazing, redness, edema and hypertrophy, tendency to bleed, score 3=severe inflammation, marked redness and hypertrophy, tendency to spontaneous bleeding.

iii) Self-administered questionnaire

The self-administered questionnaire included items: socio-demographic information, oral hygiene self- care related knowledge, skills and oral hygiene self-care behavior (frequency, duration and adequate technique). This questionnaire was used to measure the pre-and post-intervention oral hygiene self-care knowledge and oral hygiene self-care behaviour for both intervention and control groups. This questionnaire was translated in Punjabi language and was provided to the participants who could not read or write in English.

Procedure

After the recruitment (after obtaining their free and informed consent) of 140 subjects, participants were randomly assigned to the experimental or control group using a computer generated random sequence provided by a statistician. For data recording purpose, the intervention group participants were invited in small groups (3-4 participants) at one of the participant's home or at a suitable quiet place chosen by participants. Baseline measures of the outcome measures: i) oral hygiene self-care knowledge ii) oral hygiene self-care behavior iii) oral health literacy iv) plaque and v) gingival index scores were assessed.

Next, the lead researcher (NK) provided one-hour long SYS intervention to the intervention group participants and gave a conventional pamphlet to the control group. NK ensured that all the five components of the intervention were delivered, one-hour time allotted for intervention was respected and all questions and concerns of participants regarding the intervention were addressed. Post -intervention i.e. after three months once again the outcome measures were assessed.

As shown in the figure 1 below, the equipment required during the intervention were photonovel, pamphlet, dentoform, a long brush and for dental plaque examination equipment included a lab coat, surgical gloves, sterilized mouth mirror, disclosing tablet, mask, and an examination light.

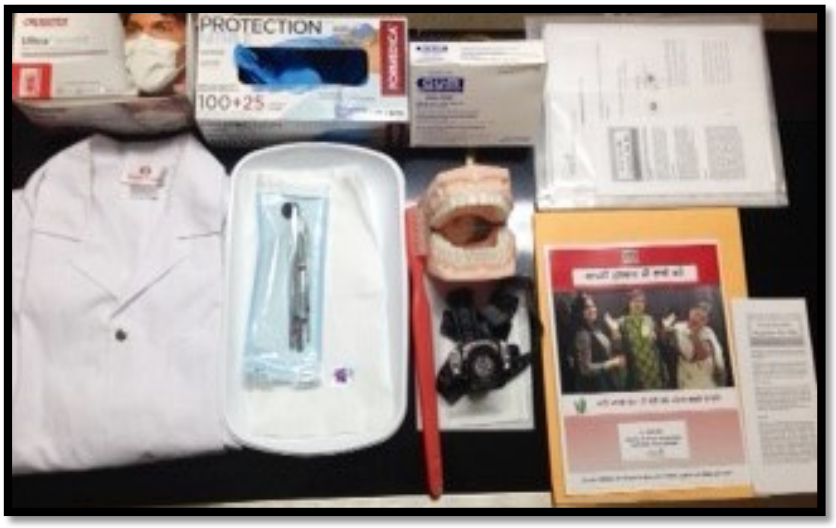

Figure 1: Equipment used during intervention

A schematic of our research study is presented in the Figure 2

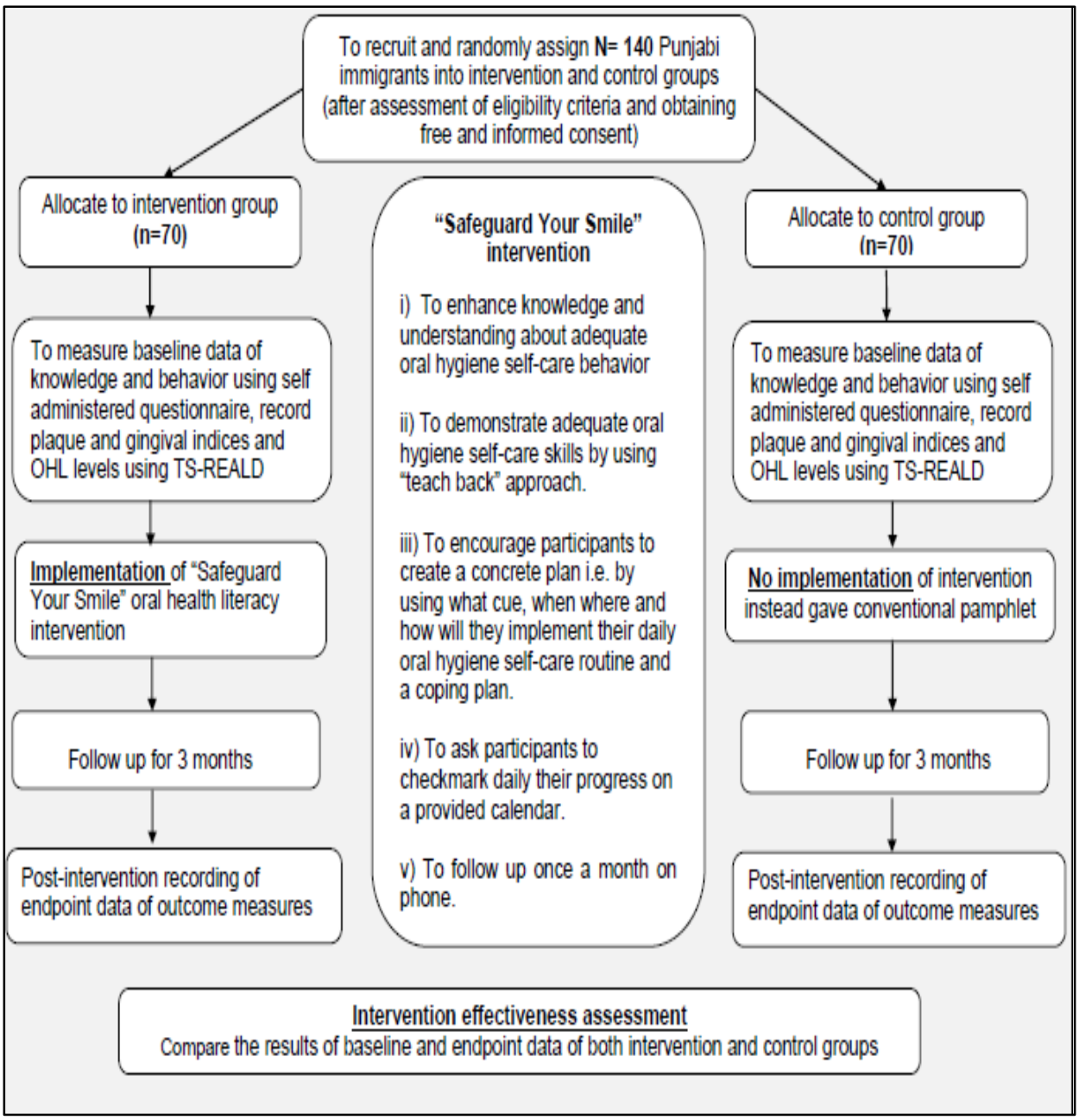

Figure 2: Schematic of our research study

Statistical analysis

Pre-and post-intervention data were entered by lead researcher's (NK) into her personal computer and analyzed using SPSS (version 22). Prior to the main data analysis, a consistency check of baseline characteristics of both groups was conducted by cross tabulation. The distribution of socio-economic characteristics such as age, gender, income, education level, occupation status and insurance status across intervention and control groups was tested using Chi-squared test for contingency table. To ensure the validity of the Chi-squared test, we regrouped the variables with categories (income, education and occupational status) having less than 5 entries to ensure that that all chi-squared tests are valid.

In order to test the effect of the intervention on oral hygiene self-care knowledge and oral hygiene self -care behavior, we aggregated the scores of the number of correct answers given by the participants of the self-administered questionnaire that was used during pre-and post-intervention to measure oral hygiene self-care knowledge and oral hygiene self-care behaviour of the study participants. Our research study involved two independent factors: 1) within subject time (i.e. measurements before and after intervention) and 2) assigned group membership (i.e. intervention and control group).

Based on a 2 by 2 factor design with repeated measurement, we employed a linear mixed model to assess the causal effects of the Safeguard Your Smile intervention on the dependent variables. We used a linear mixed model because in our dataset in addition to two independent factors we

needed to adjust for i) age (since female participants of age groups 32-45 years were overrepresented in intervention group than control group) ii) language (since self-reported questionnaires were in two languages, English and Punjabi).

To handle drop outs in the study and unanswered questionnaire questions, we performed a sensitivity analysis using the Worst Outcome Carried Forward (WOCF). The WOCF in the present study consisted of using the pre-intervention values measured as observed data in the post intervention. This strategy ensures even if the data is not missing at random our results are robust to the worst-case scenario.

Results

Sample characteristics

Initially 140 participants were recruited however, 21 people (15%) dropped out between pre-test and post-test primarily due to reasons such as their work schedules or were simply not interested or unavailability due to personal reasons. All participants were Punjabi immigrants. They all reported being born in Punjab and Punjabi language as their mother tongue. More than half (60%) of the participants were females and age of most of participants (46.4%) ranged between 32-45 years.

Education level of most participants (64.5%) was of intermediate level since 37.7% people reported college/technical education and 26.8% people completed university education. Almost 63.6 % were full time workers (including 14.3% self- employed), 5% worked part time, 1.4% were occasional worker and 22.1% were homemakers and only 2.9% reported being out of work.

In total, 72.9% participants reported having no dental insurance, 24.3% had employment insurance and 2.9% had private insurance. Participants randomized into intervention and control group differed as a function of age since females in age groups 32-45 years were overrepresented in intervention group than control group.

Randomization check

Table 1 illustrates the socio-economic characteristics of 140 participants (including who completed the intervention and the dropouts). Both intervention and control groups were homogenous since no significant differences were found at baseline and pre-intervention except for age that was significantly different between the control and intervention groups ($p<0.01$).

Table 1: Socioeconomic characteristics of participants

Characteristics	Control group (N=70) n (%)	Intervention group (N=70) n (%)	P-value
Age in years			
18-31	19(27.1)	18(25.7)	0.013
32-45	25(35.7)	40(57.1)	
46-60	26(37.1	12(17.1)	
Gender			
Female	36(51.4)	48(68.6)	0.057
Male	34(48.6)	22(31.4)	
Annual income			
$0-49999	33(24.3)	40(18.6)	0.704
$50000to 89999	15(22.9)	12(35.7)	
$90000+	5(14.3)	4(11.4)	
$Unknown	15(7.1)	14(5.7)	
Education level			
College/Technical	25(35.7)	28(40)	0.694
High school or less	24(34.2)	25(35.7)	
University	21(30)	17(24.3)	
Occupation status			
Full time worker	35(50)	34(48.6)	0.930
Part time worker	20(17.1)	22(27.1)	
Self-employed/Part time	15(1.4)	14(24.3)	
Insurance status			
Insured	51(72.9)	51(72.9)	1.000
Not insured	19(27.1)	19(27.1)	

*χ^2, $p < 0.01$

Table 2: Baseline characteristics of outcome measures

Outcome measures	Control Group (N=70)	Intervention Group (N =70)	P-value
Oral hygiene self-care knowledge			
Mean (SD)	2.843 (1.528)	2.4 (1.511)	0.087
Median	3	2	
Interquartile Range	2-4	2-4	
Oral hygiene self-care behavior			
Mean (SD)	2.417 (1.441)	2.643(1.642)	0.051
Median	2	3	
Interquartile Range	1-4	1-4	
OHL Score			
Mean (SD)	32.21 (7.190)	35.06 (7.615)	0.050
Median	31.00	35.00	
Interquartile Range	31.00-38.00	27.00-40.25	
Plaque Index			
Mean (SD)	1.324 (0.488)	1.353 (0.347)	0.069
Median	1.33	1.33	
Interquartile Range	1.000-1.570	1.160-1.500	
Gingival Index			
Mean (SD)	0.958 (0.664)	1.054 (0.560)	0.036
Median	0.935	1.19	
Interquartile Range	0.3775-1.442	0.520-1.370	

Table 2 shows the baseline outcomes measures of intervention and control groups. As shown in table 2 although the p-value of the gingival index is less than 0.05 yet clinically this value is considered similar and this apparent difference has no clinical relevance.

Linear Mixed Model for Repeated Measures (LMMRM)

For assessing the effects of intervention, we used the Linear Mixed Model for Repeated Measures (LMMRM) by incorporating the variables for group (intervention vs control), time (pre-and post-intervention), the interaction term between time and group, age and language of self-administered questionnaire where appropriate.

As shown in the following Table 3, the first column shows whether there was any difference in the control group measurements between pre-and post. The second column shows that at the pre-intervention whether there was any diff between intervention and control groups. The third column shows at the post-intervention whether there was any difference between intervention and control groups. The significant p-values in the third column suggests that our intervention Safeguard Your Smile was effective.

Table 3: Linear mixed model repeated measure analysis

Fixed Effects						
Outcome variable	**Time Point[1] (Pre versus Post) Control group**		**Randomized group Assignment[2] (Control versus Intervention)**		**Randomized Group Assignment Interaction with Time[3]**	
	Effect (95% CI)	**Significance**	**Effect (95% CI)**	**Significance**	**Effect (95% CI)**	**Significance**
Oral hygiene self-care knowledge	0.82 (0.34-1.31)	0.0008	0.27 (-0.27-0.81)	0.8365	3.57 (2.88-4.26)	<0.0001
Oral hygiene self-care behaviour	0.48 (0.07-0.90)	0.0216	-0.23 (-0.75-0.30)	0.8006	3.10 (2.50-3.69)	<0.0001
OHL Score	1.41 (0.53-2.29)	0.0014	0.66 (-1.93-3.25)	0.692	5.10 (3.85-6.34)	<0.0001
Plaque Index	-0.07 (-0.21 -0.27)	0.0962	0.04 (-0.08-0.17)	0.5171	-0.93 (-1.04- -0.81)	<0.0001
Gingival Index	-0.01 (-0.72-0.29)	0.1889	0.11 (-0.07-0.29)	0.7814	-0.93 (-1.06- -0.80)	<0.0001

[1]This can be interpreted as the effect of control measurement (pre and post) on the outcome of interest.
[2]This can be interpreted as the effect of random group assignment on the pre-intervention measurement on the outcome of interest.
[3]This can be interpreted as the effect of actual intervention versus control intervention in the post-intervention measurement on the outcome of interest.

As shown in Table 3 above, the interaction term in the linear mixed model can be interpreted as the effect of "Safeguard Your Smile" versus control group on the post-intervention outcome measures. Here, for both oral hygiene self-care knowledge and oral hygiene self-care behavior, the participants who received "Safeguard Your Smile" answered correctly in average 3.57 (95% CI: 2.88-4.26) and 3.10 (95%CI: 2.5-3.69) questions respectively more than those who received the conventional pamphlet. Furthermore, in the clinically measured plaque and gingival indices, the intervention group who received the SYS intervention showed a decrease of 0.93 (95% CI: 1.04 - 0.81) and 0.93 (1.06-0.80) their plaque and gingival index respectively and there was an increase in the OHL scores of 5.10 (3.85 – 6.34) points. Interestingly, along with the effect of the "Safeguard Your Smile" intervention on the intervention group, we observed that even the control intervention had some beneficial effect on the oral health self-care knowledge, oral health self-care behavior and oral health literacy scores of the control group participants. We believe this improvement is due to the conventional pamphlet, that we gave to control group. However, the effect of Safeguard Your Smile intervention were far more as compared to the control group effect.

It should be noted that the WOCF imputation model [48] yielded only a slightly weaker result, and the effect of "Safeguard Your Smile" versus control group remained highly significant in all 5 outcomes (Refer to appendix W for the WOCF table). Based on this finding we can surely say that the beneficial effect of the SYS intervention was indeed there.

The effect of "Safeguard Your Smile" can be visualized in the following Figure 3.

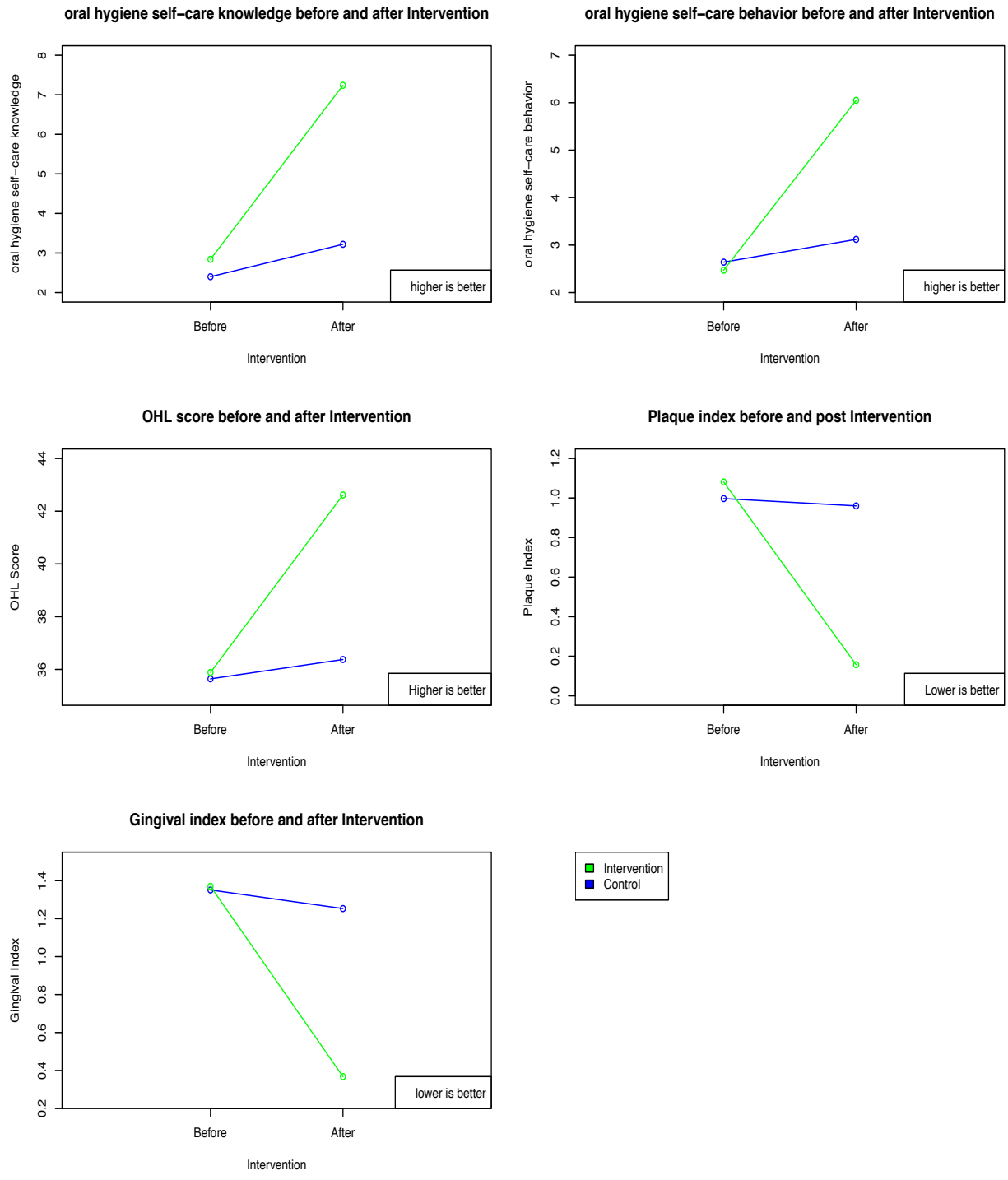

Figure 3: Effects of the intervention on oral hygiene self-care knowledge, oral hygiene self-care behavior, OHL scores, gingival indices and plaque indices

Discussion

This parallel group, no blind randomized controlled trial assessed the effectiveness of the "Safeguard your Smile" an oral health literacy intervention aimed to promote positive oral hygiene self-care behavior among Punjabi immigrants. Linear Mixed Model for repeated measures comparing the intervention and control groups at pre-and post-intervention yielded significant positive differences between the two groups for dependent variables: oral hygiene self-care knowledge and behavior, oral health literacy and plaque and gingival indices. To our knowledge, the present research study is the first attempt to evaluate effectiveness of an oral health literacy intervention promoting oral hygiene behavior among Punjabi immigrants.

Findings of our study are partially in line with a previous study done by Mills et al. that illustrated that a series of educational sessions can improve oral health knowledge and self-efficacy [46]. However, their study's sample size was quite small , therefore their results cannot be generalized and also it lacked evidence showing if it was successful in bringing sustainable oral health related behavioral change [46]. Another pre-post study conducted among 67 older primarily Caucasian adults that employed community based educational intervention involving multiple interactions to significantly and positively impact oral health literacy and oral hygiene status among older adults [23]. However, the theoretical underpinning of the previous oral health literacy interventions was unclear. Thus, our study differs from both previous studies since we implemented and evaluated an oral health literacy intervention that

was based on behavioral change wheel theoretical model and evaluated its effectiveness among relatively much larger sample size (140 Punjabi immigrants).

Interestingly, beyond the effect of the "Safeguard Your Smile" intervention on intervention group, we also observed that even the control intervention had a beneficial effect on the oral health self-care knowledge, oral health self-care behavior and oral health literacy scores of the control group participants. This improvement on control group may be due to the oral hygiene self-care related information provided in the conventional pamphlet.

A strength of our study was that we clinically measured the clinical outcome measures, plaque and gingival indices before and after intervention along with measuring the oral health literacy, oral hygiene self-care knowledge and behaviour through self- reported questionnaires. One of the limitations of the present study was that the oral health literacy measurement tool that we used did not capture all dimensions of oral health literacy level since it is primarily a word recognition assessment tool and cannot differentiate between (a) lack of background knowledge in oral health related domains, (b) lack of familiarity with language and types of materials used, or (c) cultural differences in approaches to oral health care.

Till date, the field of oral health literacy is still waiting for the development of a new oral health literacy instrument that could capture all dimensions of the oral health literacy. Despite this limitation, the novel attempt of the present research study to implement and evaluate a

theoretically grounded and community based oral health literacy intervention is a contribution to the scarce literature on oral health literacy interventions among immigrants.

Future oral health literacy intervention studies should develop and employ more precise oral health literacy measurement tool capturing all dimensions of oral health literacy implement and evaluate this intervention in other community groups. Furthermore, rigorous evaluations of the cost-effectiveness of oral health literacy interventions to optimize oral health literacy intervention procedures for different ethnic, age and gender groups are needed. The effectiveness of behavior change interventions is often limited in a way that after the intervention is over, the gained behaviors are generally lost in the long-term. Therefore, we recommend that future research shall consider inclusion of technology elements in addition to human guidance into interventions ensuring sustainable oral health related behavioral changes.

Technology element such as prompts (e.g. mobile phone reminder) can offer support through persuasion and contribute to enhance long term sustainability of behaviour. This study found that most respondents received oral hygiene self-care information from medical care providers. Therefore, we recommend that future research studies shall explore effectiveness of oral health literacy interventions improving oral health by integrating oral health literacy interventions within primary health care settings. To conclude, the present study provided an evidence that oral health literacy interventions such as Safeguard Your Smile can successfully enhance positive oral hygiene self-care behavior among low oral health literate immigrants.

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Conflict of interest: There are no conflicts of interest to declare.

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4

Discussion

CHAPTER 4: DISCUSSION

This chapter first presents a brief overview of the synthesis and significance of the major findings, discusses the strengths and limitations of the four studies included in this thesis and provides recommendations for future direction of research and knowledge dissemination.

Our findings in the present study are novel as they describe both development and evaluation of a theoretically driven model of "Safeguard Your Smile" (SYS) an oral health literacy intervention that improved low oral health literacy among Punjabi immigrants by enhancing their oral health related knowledge, skills and oral hygiene self-care related behavior and has addressed the deficit on this subject. Our findings in the present study suggest that interventions such as the SYS are sorely needed among immigrants since in general immigrant populations may have varying levels of knowledge, skills and inadequate oral hygiene self-care related routine that must be addressed.

4.1 Synthesis and significance of the findings

We conducted four studies having four specific objectives to attain the ultimate overarching goal of this research study i.e. to develop and evaluate effectiveness of the "Safeguard Your Smile" i.e. an oral health literacy intervention aimed to promote positive oral hygiene among Punjabi immigrants. The findings of this dissertation are relevant for both research and practice.

The first investigation identified and synthesized the current evidence and knowledge gaps related to interventions and measurement tools of oral health literacy. Additionally, associations between oral health literacy and (i) oral health knowledge (ii) oral health outcomes (iii) access and satisfaction with dental care services were synthesized. Findings of this study affirmed that low oral health literacy is positively and significantly related to poor oral health knowledge, poor oral health behaviour and poor oral health outcomes. In addition, current oral health literacy assessment tools fail to capture all dimensions of oral health literacy such as oral health knowledge and comprehension, cultural and conceptual knowledge, critical thinking skills, etc.

Our this finding was in line with results from a previous studies that current tools do not offer accurate assessment of oral health literacy level [61, 123, 126-128] as they cannot differentiate between (a) lack of background knowledge in oral health related domains, (b) lack of familiarity with language and types of materials used, or (c) cultural differences in approaches to oral health care [129]. In this scoping review, we also found that no gold standard of what threshold level of oral health literacy is required to navigate through today's complex oral health system exists. Furthermore, we found scarce number of studies on interventions among vulnerable populations particularly immigrants having low oral health literacy.

The second study's objective was to develop a culturally and linguistically appropriate photonovel to enhance oral hygiene self-care related knowledge and skills among Punjabi immigrants. Focus group meetings revealed four themes identifying various perceptions and

needs of Punjabi immigrants regarding oral hygiene self-care. Four major themes emerged from the focus group meetings: i) understanding about oral hygiene self-care related knowledge and risk factors; ii) oral hygiene self-care related skills and routine; iii) lack of emphasis on prevention; and iv) perceived barriers to access dental health.

The third investigation involved development of a theoretically grounded intervention to promote positive oral hygiene self-care behavior among Montreal's Punjabi immigrants. By identifying various barriers and enablers and linking those with specific behavior change technique we provided a better understanding of how the intervention was developed and thereby increased the opportunity for others to replicate this whole process. To our knowledge this is a novel study that employed the BCW method in developing oral hygiene self-care behavioral intervention. We employed the BCW since i) it is an integrative theory i.e. based on an overarching model of 19 widely used behavioral change theoretical frameworks drawn from a systematic review of wide range of literature ii) it provides an easy, systematic and practical method to follow in designing intervention iii) it is comprehensive iv) it can be employed to design diverse behavioral interventions in wide variety of setting.

Moreover, it provides a systematic way of characterizing interventions that enables their outcomes to be linked to mechanisms of action, and it can help to diagnose why an intervention may have failed to achieve its desired goal thereby explaining "why and how" aspects of the intervention and would greatly enhance its replicability. Thus, our study differs from many previous oral hygiene self-care behavioral interventions which did not rely on theory to design

interventions and addresses a scarcity of theory-informed, tailored behavioral interventions developed using a systematic approach.

The fourth and the last study of this thesis included a parallel group randomized controlled trial that assessed the effectiveness of the "Safeguard your Smile" an oral health literacy intervention aimed to promote positive oral hygiene self-care behavior among Punjabi immigrants. Linear mixed model comparing the intervention and control groups at pre-and post-intervention yielded significant differences between groups for dependent variable: oral health literacy and plaque and gingival indices since for all three indices the intervention had an extremely significant positive effect with $p < 0.0001$. Participants who received intervention increased brushing and flossing had a significant improvement in the plaque and gingival indices and oral health literacy. To our knowledge, the current research study is first in Canada to evaluate an oral health literacy intervention aimed to improve oral hygiene self-care behavior among Punjabi immigrants.

Findings of our study are partially in line with a previous study that has illustrated that a series of educational sessions can improve oral health knowledge and self-efficacy [130]. However, the previous study had a very small sample size, therefore their results cannot be generalized and also it lacked evidence showing if it was successful in bringing sustainable oral health related behavioral change [130]. Another pre-post study conducted among 67 older primarily Caucasian adults also employed community based educational intervention involving multiple interactions to significantly and positively impact oral health literacy and oral hygiene status

among older adults [34]. However, the theoretical underpinning of the afore-mentioned oral health literacy intervention was unclear. Thus, our study differs from both previous since we implemented and evaluated an intervention based on behavioral change theoretical model (BCW) and evaluated its effectiveness among comparatively much larger sample (140 Punjabi immigrants).

4.2 Strengths and limitations of the studies

The primary strength of the second study is its community based participatory approach to create a photonovel by the community and for the community. We ensured to have an active involvement of our community partner organization (SWAM) in all aspects of planning, designing and developing of the Safeguard Your Smile photonovel. In addition, my doctoral thesis supervisors' expertise in health promotion, public health and health disparity research fields and experience working with vulnerable populations were the steering forces in shaping and directing this research study.

A limitation of this study was its small sample size and the content of the photonovel was primarily based on the focus group discussion conducted among Punjabi immigrants exclusively, raising the possibility that the information included in the present photonovel may not be applicable or relevant to other ethno-cultural communities. Another limitation was that the participants and all characters of our photonovel were women only. The main reasons we

had only women in our sample were: our partner organization (the Sikh women association of Montreal) has only women members; ii) we tried our best to invite and include men also to participate but they said they were unavailable due to their busy work schedules. Interestingly, none amongst our 140 participants raised this question that why there are no men in the photonovel? A speculation that why no one raised this point is that although Punjabi community is patriarchal yet traditionally in general the overall role of nurturing and ensuring the health of family is allocate to women. Therefore, I assume that it quite felt natural to the participants that women are involved in health management issue. However, I agree that it is good to have diversity and it is possible that this question may be raised in other patriarchal societies in future studies. Therefore, it is prudent to recommend this point for future studies to include both men and women as the main characters in the photonovel.

Despite of this limitation, overall the "Safeguard Your Smile" photonovel was well received by Punjabi community and demonstrated to be effective in improving oral hygiene self-care knowledge and skills of Punjabi immigrants. This study's findings confirmed that culturally and linguistically appropriate photonovel are an effective tool to enhance oral hygiene self-care knowledge and skills among immigrants.

The strength of the third investigation was use of the BCW method to develop an oral hygiene self-care behavioral intervention since it ensured that SYS intervention was theory informed and evidence based. This developed model of theoretically grounded oral hygiene self-care behavioral intervention could be adopted among other vulnerable populations to reduce oral

health disparities. A limitation identified in this study was that we had a small sample size of only five participants to identify the barriers and enablers of oral hygiene self-care behavior. The main strength of our fourth study was that although the assessments oral hygiene self-care knowledge and behavior were conducted using self-reported questionnaires yet additionally, we objectively measured the clinical outcome measures, plaque and gingival indices before and after intervention. A limitation of this study was that the oral health literacy measurement tool that we used does not offer accurate assessment of oral health literacy level since it cannot differentiate between (a) lack of background knowledge in oral health related domains, (b) lack of familiarity with language and types of materials used, or (c) cultural differences in approaches to oral health care. Despite of this limitation the novel attempt of the current research study to evaluate a theoretically driven and community based oral health literacy intervention among Punjabi immigrants is a contribution in a scarce literature on oral health literacy interventions.

4.3 Future direction of research

Oral health literacy is a multidimensional concept, our scoping review affirmed the need to develop comprehensive assessment tools to capture all dimensions of oral health literacy. In addition, future research should also investigate what oral health literacy interventions could bring sustainable oral health related behavioral changes among low oral health literate populations with diverse socio-cultural context.

In addition, our scoping review also highlighted the existence of a gap between limited oral health literacy skills of patients and the communication practices embedded in context of medicine of the oral health care providers [37, 90]. In other words, those who cannot comprehend the information provided by the oral health professional are unable to implement oral health promoting and preventive actions. Therefore, in order to enhance effective communication practices of oral health care providers, Maybury et al. proposed incorporating communication approaches courses in dental school curriculum [171]. Furthermore, it is proposed that oral information and educational materials should be provided i) in plain language with no jargons and ii) should be linguistically sensitive to the socio-cultural practices of the diverse population groups [90, 172].

Thus, future assessments are required to determine whether public or private dental health organizations and services are providing understandable and locally relevant information and services. Additional research work exploring whether there is pathway between limited oral health literacy and poor oral health outcomes and the wider socio-cultural context that shape this process would be beneficial.

The effectiveness of behavior change interventions is often limited in a way that after the intervention is over, the gained behaviors are generally lost in the long-term. Therefore, we recommend that future research shall consider inclusion of additional strategies tailored to ensure sustainable behavior changes. For example, future research may consider inclusion of technology elements in addition to human guidance into interventions to ensure sustainable oral

health related behavioral changes. Technology element such as prompts (e.g. mobile phone reminder) can offer support through persuasion and contribute to enhance long term sustainability of behaviour. More rigorous evaluations of the effectiveness and cost-effectiveness of specific intervention components are needed. Research is also needed to optimize intervention components for different ethnic, age and gender groups.

This study found that most respondents reported that they received oral hygiene self-care information either from their medical care provider. Therefore, further studies on how to improve oral health literacy by embedding interventions and distribution of appropriate educational materials within primary care setting are recommended. The future endeavor could be to convert the SYS photonovel into a video format to facilitate future implementation and evaluation among other communities. Furthermore, future studies can follow a stratified sampling method that is having equal number of participants from varied ethnicities to evaluate effects of oral hygiene self-care behavioral intervention.

4.4 Knowledge dissemination

The vision of Safeguard Your Smile intervention is to have healthy and vibrant immigrant communities having adequate oral health literacy (knowledge, skills and behavior) to prevent oral diseases. The transfer of knowledge of our study's findings to micro (public) and macro level (policy makers) will be well ensured.

Following is our plan for dissemination of results of our study:

The findings of this study will be published in a peer-reviewed dental journal. In addition, we'll disseminate the results of the study through Power Point and poster presentations during local or international seminars, conferences and university research days and community events of Punjabi and other South Asian communities. Also, we will either personally hand-out hard copies or e-mail its soft copies to the Ordres des dentistes du Quebec, Canadian dental association etc. and organizations such as Quebec's centre of literacy, national public health institute of Quebec. Furthermore, we will share a summary report of our findings highlighting the key points with the stakeholders for consideration during future policy planning.

1) Our community partner Sikh Women Association of Montreal organizes an annual function where hundreds of people gather. We plan to use their platform to perform an ethnodrama on the script of the photonovel for wider circulation. Ethnodrama/ethnotheatre is referred as "an innovative knowledge translation technique and a dissemination tool that uses theatrical performances (performing as a play/ drama) based on research findings to disseminate research results to a variety of stakeholders" [173]. In addition, we will share summary report of key findings with other community organizations and if permitted will post photonovel on their website for its wider circulation.

2) We plan to upload our photonovel and a brief synopsis of our study and its results in a DVD format and show this DVD at five Gurdwaras (Sikh temples) of Montreal where every weekend

Punjabi community gathers for prayer services and social meetings. We will first seek permission of the management to show this DVD at the libraries of the Montreal's Gurdwaras using projector.

3) Using established network of the principal investigator we will present this DVD during various health awareness events organized in Montreal by the South Asian immigrant communities.

4) Also, we plan to provide a copy of this DVD to the executive committee of the South Asian women center where many Punjabi women reach out for help and attend language classes.

5) Furthermore, in future if funding and time will permit we can translate the photonovel into Hindi, Urdu, Bengali and Tamil languages and leave copies of it at community centers and religious places of all South Asian communities.

Our plan for advocacy

Rather than aspiring to provide an access to both preventive and curative treatment needed for everybody we will propose a concrete plan how we might answer the present and future preventive oral health care needs of recent immigrants in a most efficient manner in Canada. We plan to share the main findings of our study highlighting the key findings with key stakeholders of dental public health during a meeting and will create a strategy together to

outreach other key stakeholders to advocate for following:

1) Central and essential to any oral health care services is to have an implemented oral health policy. We will advocate for free or subsidized oral health literacy improving services for immigrants. If financial resource seems to be a constraint, then free or subsidized preventive services may be provided to only those immigrants who fall below poverty line. Once an oral health policy is formulated only then we can specifically focus to offer Safeguard Your Smile interventions at CLSC services. Surely the man power will be deficient but we will create a blueprint to act upon. Also, dental schools, mobile clinics and volunteering clinicians may provide pro bono services at specified time and settings.

2) We will share a summary report of our study's findings with the Ordres des dentistes du Quebec, Canadian dental association etc. and organizations such as Quebec's centre of literacy, national public health institute of Quebec. If permitted, we will advocate for the oral hygiene self-care preventive information to be provided by using Safeguard Your Smile photonovel at various adult centers in Quebec to educate recent immigrants on this topic. The goal shall be to improve understanding about the importance of preventive oral hygiene self-care behavior through adult educational program.

3) The next most important step in the forward direction is advocating for initiating one credit course on oral health literacy at dental schools of Quebec for undergraduate dental students and dental hygienists. Both photonovel and Safeguard Your Smile intervention can be used in

undergraduate curriculum of dental professionals and dental hygienists to make students better equipped for treating people with limited oral health literacy. It should also prepare and encourage students for opportunities to do fieldwork and provide them with firsthand experience to work with vulnerable populations such as immigrants. Last but not the least we will advocate for financial support for further research to implement such interventions in other vulnerable groups.

5

Conclusions

CHAPTER 5: CONCLUSIONS

This manuscript based thesis has described development and evaluation an oral health literacy intervention aimed to promote oral hygiene self-care behavior among Punjabi immigrants. Using the BCW as theoretical framework the present study ensured that the SYS intervention was theory driven, evidence based and replicable. Furthermore, development of a culturally and linguistically appropriate photonovel developed by using community participatory approach was instrumental to enhance oral hygiene self-care knowledge among Punjabi community. Finally, the successful completion of this research project has improved the limited oral health literacy among the Punjabi immigrants by enhancing their oral health knowledge, oral health related skills and oral hygiene self-care related behavior.

This novel attempt of the present research study to develop and evaluate an oral health literacy intervention aimed to promote positive oral hygiene behavior among immigrants is pioneer in Canada and has addressed the deficit of oral health literacy interventions among immigrants. Furthermore, it has contributed in advancement of knowledge by developing theoretically driven and community based model of oral health literacy intervention that could be adapted for future interventions among other vulnerable communities. That said, efforts such as Safeguard Your Smile interventions to improve oral hygiene self-care behaviour among persons with low oral health literacy are probably inexpensive compared with making larger, structural changes to the health system, and thus ought to be considered as part of an overall strategy to reduce disparities.

To conclude, improvement of limited oral health literacy through collaborative efforts of researchers, stakeholders, community partners, and oral health care providers can empower individuals and communities to make informed and appropriate oral health promoting decisions that could bring positive oral health outcomes for all thereby contribute in reducing oral health disparities.

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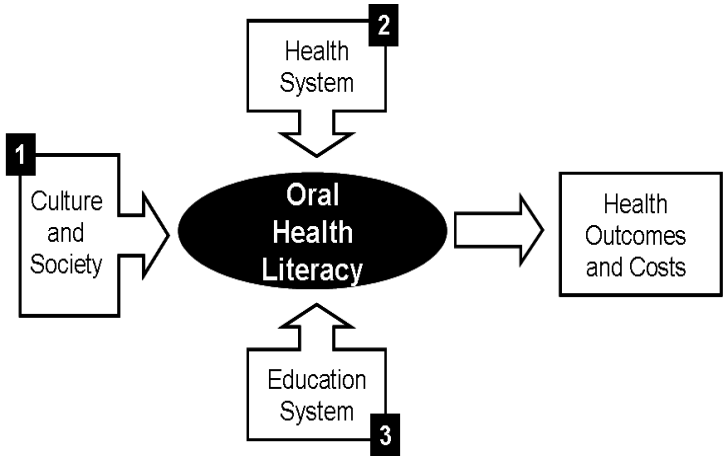
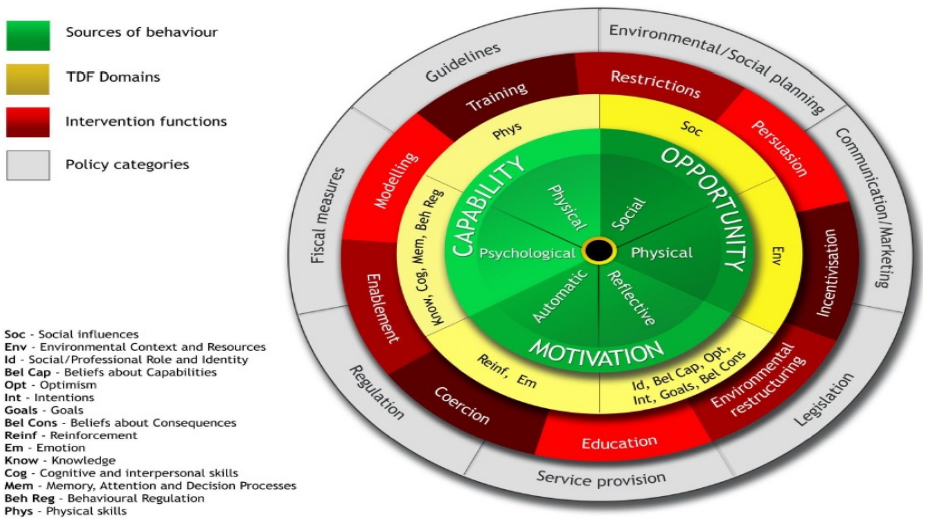
Appendices



Appendix A: Oral Health Literacy conceptual framework
(Source Institute of Medicine 2004)



Appendix B: Behaviour Change Wheel (Source Mitche et al.)

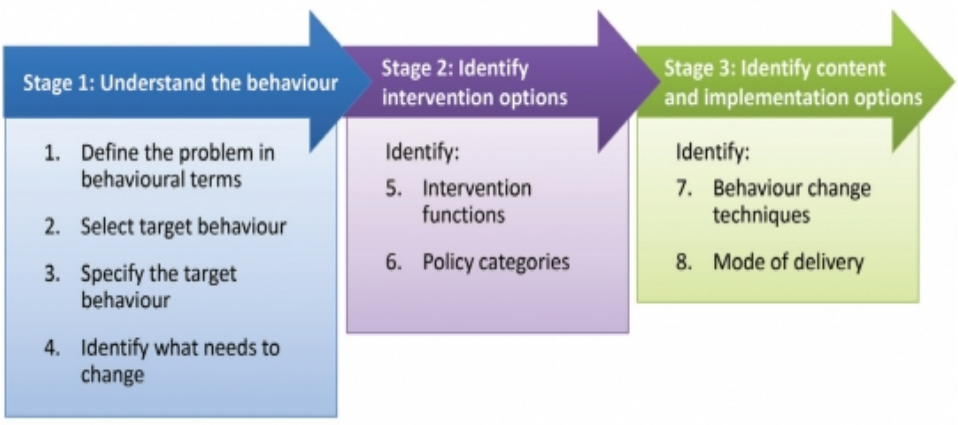
Table 1 Mapping COM-B components to TDF domains

COM-B component		TDF domain
Capability	Psychological	Knowledge
		Skills
		Memory, attention and decision processes
		Behavioural regulation
	Physical	Skills
Opportunity	Social	Social influences
	Physical	Environmental context and resources
Motivation	Reflective	Social/professional role and identity
		Beliefs about capabilities
		Optimism
		Beliefs about consequences
		Intentions
		Goals
	Automatic	Social/professional role and identity
		Optimism
		Reinforcement
		Emotion

COM-B, Capability, Opportunity and Motivation model; TDF, Theoretical Domains Framework.

Appendix C: Mapping COM-B components to TDF domains

(Source: Atkin et al.)



Appendix D: Stages and steps of designing process of behavior change intervention

(Source Mitchie et al.)

Appendix E: Theories included in the TDF

MOTIVATION THEORIES

- Theory of planned behaviour (+ theory of reasoned action, protection motivation theory, health belief model)
- Social cognitive theory
- Locus of control theories
- Social learning theory
- Social comparison theory
- Cognitive adaptation theory
- Social identity theory
- Elaboration likelihood model
- Goal theories
- Intrinsic motivation theories

- Self-determination theory
- Attribution theory
- Decision making theories (e.g. social judgment theory, "fast and frugal" model, systematic versus heuristic decision making)
- Fear arousal theory

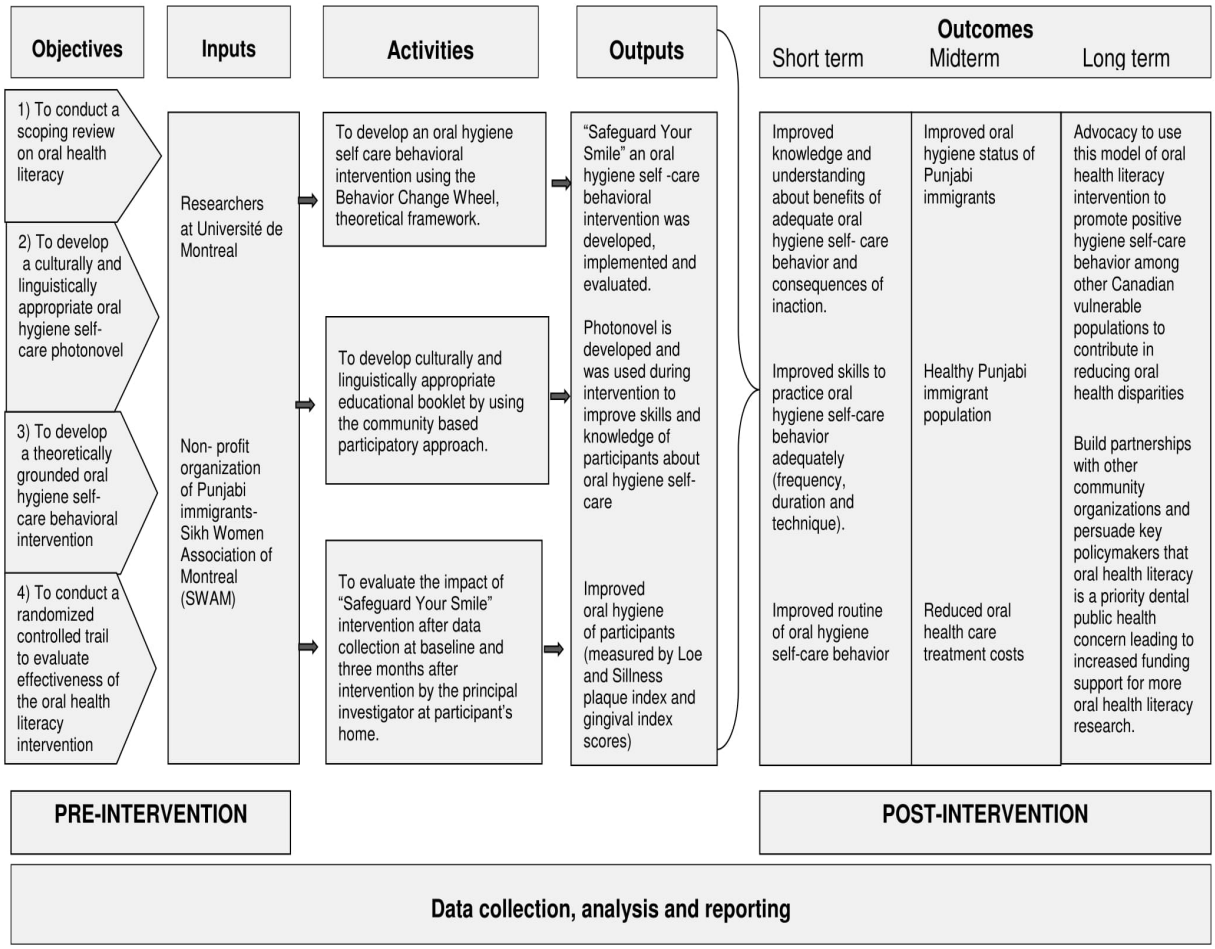
ACTION THEORIES

- Learning theory
- Operant theory
- Modelling
- Self-regulation theory
- Implementation theory/automotive model
- Goal theory
- Volitional control theory
- Social cognitive theory
- Cognitive behaviour therapy
- Transtheoretical model
- Social identity theory

ORGANISATION THEORIES

- Effort-reward imbalance
- Demand-control model
- Diffusion theory
- Group theory (e.g. group minority theory)
- Decision making theory
- Goal theory
- Social influence
- Person situation contingency models

Appendix F: Logic model of Safeguard Your Smile intervention



Appendix F: Logic model of "Safeguard Your Smile"- an oral health literacy intervention

Appendix G: Cover letter of ethical approval

Université de Montréal

Comité d'éthique de la recherche en santé

6 July 2015

Objet: Approbation éthique – « Safeguard You Smile' an oral health literacy intervention promoting positive oral hygiene self-care behavior among Punjabi immigrants: A randomized controlled trial »

Mme Navdeep Kaur,

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
Louise Potvin, professeure titulaire, École de santé publique - Département de médecine sociale et préventive
Daniel Pierre Kandelman, professeur titulaire, Faculté de médecine dentaire - Département de santé buccale
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Appendix H: Certificate of Ethical approval

Université de Montréal

N° de certificat
15-071-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	**Safeguard You Smile' an oral health literacy intervention promoting positive oral hygiene self-care behavior among Punjabi immigrants: A randomized controlled trial**
Étudiante requérante	**Navdeep Kaur** (ND), Candidate au Ph. D. en sciences biomédicales, Faculté de médecine
Sous la direction de	Louise Potvin, professeure titulaire, École de santé publique - Département de médecine sociale et préventive, Université de Montréal & Daniel Pierre Kandelman, professeur titulaire, Faculté de médecine dentaire - Département de santé buccale, Université de Montréal.

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.

Dominique Langelier, présidente
Comité d'éthique de la recherche en santé
Université de Montréal

6 juillet 2015
Date de délivrance

1er août 2016
Date de fin de validité

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Appendix I: Consent form for RCT in English

Université de Montréal
Faculté de médecine
Département de la Science Biomédicale

Information and consent form

Title of the research project

'Safeguard Your Smile' an oral health literacy intervention promoting positive oral hygiene self-care behavior among Punjabi immigrants: A randomized controlled trial

Principal investigator **Navdeep Kaur**
PhD candidate, Department of Biomedical Sciences,
Faculty of medicine, Université de Montreal
Phone: (514) 620-7488
E-mail: navdeep.kaur@umontreal.ca

You are invited to participate in a research project. Before accepting to participate in this project, please take time to read this document presenting the conditions of participation in the project. Do not hesitate to ask any questions that you will find useful to ask the person presenting this document.

Purpose of research project

The purpose of this research project is to improve the knowledge, skills and behavior of the research study participants about how to keep and maintain good oral hygiene self-care routine (frequency, duration and technique).

Terms of participation

Each participant will be asked to answer the questions of a survey and their oral hygiene will be examined (once at the start of the project and once after three months). Participants will receive for almost one hour long intervention in a group of 5-7 people by the principal investigator aimed to improve the knowledge, skills and behavior of the participant about how to keep and maintain good oral hygiene self-care routine.

Risks involved in participating in this research project

There are no risks involved in participating in this research project.

Benefits of participating in this research project

Participants will gain knowledge and learn adequate skills about how to practice and maintain an adequate oral hygiene self care behavior to prevent oral diseases and promote their oral health. Additionally, all participants will receive a free tooth brush, a dental floss and fluoridated toothpaste.

Voluntary participation and withdrawl from the research project

Please note that your participation is completely voluntary and you are free to withdraw from this research project at any time you wish. By signing this information sheet and consent, you are not waiving any of your legal rights nor releasing the researchers, the funding agency or establishment of their civil and professional responsibilities.

Confidentiality and anonymity

All information will be recorded under an identification number and participant' name will never be used in any of the data reports. All of the participants provided information will be kept confidential and secured with a password known only to the principal investigator and will be secured for next seven years after the study and will be destroyed (shredded and deleted) thereafter.

A description of this clinical trial will be available on http://www.clinicaltrials.gov, as required by U.S. Law. However, this web site will not include information that can identify you. At the most, the web site will include a summary of the results. You can search this Web site at any time. Our clinical trial's identifier is [Will *indicate the ClinicalTrials.gov identifier]*

Questions related to the research project

For any questions related to the research project please contact the principal investigator: Navdeep Kaur at (514) 620-7488 or e-mail navdeep.kaur@umontreal.ca; or for any of your concerns related to your rights and responsibilities of this research project you may e-mail the Comité d'éthique de la recherche en santé (CERES) at: ceres@umontreal.ca or call at 343-6111 extension 2604. Any complaints about your participation in this research project can be submitted to the Ombudsman of the University of Montreal, telephone number (514) 343-2100 or email ombudsman@umontreal.ca.

Consent and Signature

I have read and understood the information provided on this consent form about this research project. The principal investigator has answered my all questions and has left upto me to make a decision to participate or not in this research project. I understand that I am free to leave at any time if I decide not to participate and my participation in this research project is completely voluntary. I consent to take part in this research project.

First and Last name of the participant

Signature of the participant

Date :

Commitment and signature of the researcher

I certify that I have explained the information about the terms of this consent form to the participant and I answered questions he/ she had in this regard. I made it clear that the participant is free to terminate their participation at any time, without any negative consequence. I agree to give a signed and dated copy to the participant.

First and Last name of the researcher

Signature of the researcher

Date :

Thanks for your participation

Ce projet a été approuvé par le Comité d'éthique de la recherche en santé de l'Université de Montréal.
Projet no XX-XXX-CERES-D/P

Appendix J: Consent form for focus group in English

Information and consent form for focus group

Title of the research project

'Safeguard Your Smile' an oral health literacy intervention promoting positive oral hygiene self-care behavior among Punjabi immigrants: A randomized controlled trial

Principal investigator **Navdeep Kaur**
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Phone: (514) 620-7488
E-mail: navdeep.kaur@umontreal.ca

You are invited to participate in a research project. Before accepting to participate in this project, please take time to read this document presenting the conditions of participation in the project. Do not hesitate to ask any questions that you will find useful to ask the person presenting this document.

Purpose of research project

The purpose of this research project is to improve the knowledge and behavior of Montreal Punjabi immigrants about how to maintain good oral hygiene self care routine.

Terms of participation

You will be asked to participate in a focus group discussion to give your ideas and experiences with a goal to create an educational intervention tool called photonovel. Please note that all of this focus group discussion will be tape recorded and your pictures will be taken. Your pictures will be used to create and publish a photonovel. This photonovel will be used as an intervention tool to improve the knowledge and behavior of Montreal's Punjabi immigrants about how to maintain good oral hygiene routine.

Risks involved in participating in this research project

There are no risks involved in participating in this research project.

Ce projet a été approuvé par le Comité d'éthique de la recherche en santé de l'Université de Montréal.
Projet no XX-XXX-CERES-D/P

Benefits of participating in this research project

You will be receiving lots of information about how to improve your and your family's dental health by maintain good oral hygiene. And as a token of appreciation you will receive a free tooth brush, toothpaste and floss.

Voluntary participation and withdraw from the research project

Please note that your participation is completely voluntary and you are free to withdraw from this research project at any time you wish.

Confidentiality

All of your information will be recorded under an identification number. All the information that you provide us will be kept confidential and secured with a password known only to the principal investigator and will be secured for next seven years after the study and will be destroyed thereafter (shredded and deleted).

Questions related to the research project

For any questions related to the research project please contact the principal investigator: Navdeep Kaur at (514) 620-7488 or e-mail navdeep.kaur@umontreal.ca; or for any of your concerns related to your rights and responsibilities of this research project you may e-mail the Comité d'éthique de la recherche en santé (CERES) at: **ceres@umontreal.ca** or call at 343-6111 extension 2604. Any complaints about your participation in this research project can be submitted to the Ombudsman of the University of Montreal, telephone number (514) 343-2100 or email ombudsman@umontreal.ca.

Consent and Signature

I have read and understood the information provided on this consent form related to the research project. The principal investigator has answered my all questions about this research project and has left upto me to make a decision to participate or not. I understand that my participation is completely voluntary and I am free to leave at any time if I decide not to participate.

I consent to take part in this research project.

First and Last name of the participant	Signature of the participant
	Date :

Commitment and signature of the researcher

I certify that I have explained the information about the terms of this consent form to the participant and I answered questions he/ she had in this regard. I made it clear that the participant is free to terminate their participation at any time, without any negative consequence.

I agree to give a signed and dated copy to the participant.

First and Last name of the researcher	Signature of the researcher
	Date :

Thanks for your participation

Ce projet a été approuvé par le Comité d'éthique de la recherche en santé de l'Université de Montréal.
Projet no XX-XXX-CERES-D/P

Appendix K: Consent form for RCT in French

Université de Montréal
Faculté de médecine
Département de la Science Biomédicale

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT

TITRE DU PROJET DE RECHERCHE
« Préserver votre sourire» une intervention sur la littéracie en santé bucco-dentaire promouvant l'hygiène buccale positive parmi les immigrants Punjabi : Un essai contrôlé aléatoire.

Chercheur principale

Navdeep Kaur
Candidate au Doctorat, Département des sciences biomédicales, Faculté de médecine, Université de Montréal
Téléphone : (514) 620-7488
Courriel : navdeep.kaur@umontreal.ca

Vous êtes invité à participer à un projet de recherche. Avant d'accepter d'y participer, veuillez prendre le temps de lire ce document présentant les conditions de participation au projet. N'hésitez pas à poser toutes les questions que vous jugerez utiles à la personne qui vous présente ce document.

But du projet de recherche

Le but de ce projet de recherche est d'améliorer la connaissance, compétences et le comportement des participants de l'étude de recherche sur la façon de garder et maintenir une bonne hygiène bucco-dentaire de routine auto-soins (fréquence, durée et technique).

Conditions de participation

Chaque participant sera invité à répondre aux questions d'une enquête et leur hygiène bucco-dentaire sera examinée deux fois (une fois au début du projet et encore après trois mois) Les participants recevront une intervention d'une heure dans un groupe de 5-7 personnes par la chercheure principale visant améliorer les connaissances, compétences et comportements du participant sur la façon de garder et maintenir une bonne hygiène bucco-dentaire de routine auto-soins.

Risques associés dans la participation de ce projet de recherche

Aucun risque n'est associé avec la participation dans ce projet.

C.P. 6128, succursale Centre-ville
Montréal QC H3C 3J7
Téléphone : NoTel
courriel@umontreal.ca
www.umontreal.ca

Avantages associés dans la participation de ce projet de recherche

Les participants acquerront de la connaissance et apprendront des compétences adéquates sur la pratique et le maintien d'un comportement d'auto-hygiène de soins bucco-dentaires pour prévenir les maladies orales et promouvoir leur santé buccale. De plus, tous les participants recevront une brosse à dent gratuite, de la soie dentaire et de la pâte dentaire fluorée.

La participation volontaire et le retrait du projet de recherche

Veillez notez que votre participant est complètement volontaire et vous êtes libres de vous retirer de ce projet de recherche en tout temps. En signant ce formulaire de consentement, vous ne renoncez à aucun de vos droits légaux ni libérer les chercheurs, l'organisme de financement ou de l'établissement de leurs responsabilités civiles et professionnelles.

Confidentialité et anonymat

Toute l'information sera enregistrée sous un numéro d'identification et le nom du participant ne sera jamais utilisé dans tout rapport de données. Toute information procurée par le participant sera confidentielle et sécurisé avec un mot de passe connu seulement par la chercheure principale, qui sera gardé pour les sept prochaines années suivant l'étude, et sera détruit (râpé et supprimé) par la suite.

Une description de ce projet de recherche est disponible, en anglais seulement, sur le site Web http://www.ClinicalTrials.gov. Ce site ne contient aucune information permettant de vous identifier. Le site inclura tout au plus un sommaire des résultats lorsqu'ils seront disponibles. Vous pouvez consulter ce site en tout temps. Le numéro d'enregistrement de ce projet est le [ajouter le numéro NCT…].

Pour questions en liens avec le projet de recherche

Pour toute questions en liens avec le projet de recherche, veuillez contacter la chercheure principale Navdeep Kaur au (514) 620-7488 ou par courriel navdeep.kaur@umontreal.ca ; ou pour l'une de vos préoccupations liées à vos droits et responsabilités de ce projet de recherche, vous pouvez envoyez un courriel au Comité d'éthique de la recherche en santé (CERES) ceres@umontreal.ca ou appelez au 343-6111 extension 2604. Toutes les plaintes au sujet de votre participation à ce projet de recherche peuvent être soumises à

l'ombudsman de l'Université de Montréal, numéro de téléphone (514) 343-2100 ou par courriel ombudsman@umontreal.ca

Consentement et signature

J'ai lu et compris l'information se trouvant sur ce formulaire de consentement concernant le projet de recherche. Le chercheur principal a répondu à mes questions et a laissé jusqu'à moi la responsabilité de prendre la décision de participer ou non à ce projet de recherche. Je comprends que je suis libre de partir à tout moment et ma participation dans ce projet de recherche est complètement volontaire. Je consens à prendre part dans ce projet de recherche.

Prénom et nom du participant	Signature du participant
	Date :

Engagement et la signature du chercheur

Je certifie que je l'ai expliqué l'information sur les conditions de ce formulaire de consentement au participant et j'ai répondu aux questions qu'il / elle avait à cet égard. Je l'ai fait clairement pour que le participant soit libre de mettre fin à sa participation à tout moment, sans aucune conséquence négative . Je suis d'accord pour donner une copie signée et datée au participant

Prénom et nom du chercheur	Signature du chercheur
	Date :

Merci pour votre participation !

Appendix L: Consent form for Focus group in French

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT POUR GROUPE DE DISCUSSION

TITRE DU PROJET DE RECHERCHE

« Préserver votre sourire», une intervention sur la littéracie en santé bucco-dentaire promouvant l'hygiène buccale positive parmi les immigrants Punjabi : Un essai contrôlé aléatoire.

Chercheur principale **Navdeep Kaur**
Candidate au doctorat,
Département des sciences biomédicales
Faculté de médecine, Université de Montréal
Téléphone : (514) 620-7488
Courriel : navdeep.kaur@umontreal.ca

Vous êtes invité à participer à un projet de recherche. Avant d'accepter d'y participer, veuillez prendre le temps de lire ce document présentant les conditions de participation au projet. N'hésitez pas à poser toutes les questions que vous jugerez utiles à la personne qui vous présente ce document.

But du projet de recherche

Le but de ce projet de recherche est d'améliorer la connaissance, compétences et le comportement des participants de l'étude de recherche sur la façon de garder et maintenir une bonne hygiène bucco-dentaire de routine auto-soins (fréquence, durée et technique).

Conditions de la participation

Vous serez invité à participer dans la discussion de groupe et de partager vos idées et expériences avec un but de créer une intervention éducationnelle appelé photo-roman. Veuillez notez que la discussion de groupe sera filmé et vous serez pris en photo. Vos photos seront utilisées pour créer et publier un photonovel. Ce photonovel sera utilisé comme outil d'intervention pour améliorer la connaissance et le comportement des immigrants punjabi de Montréal sur le maintien d'une routine de bonne hygiène bucco-dentaire.

Risques associés dans la participation de ce projet de recherche

Aucun risque n'est associé avec la participation dans ce projet.

Avantages de la participation dans ce projet de recherche

Vous obtiendrez beaucoup d'information sur l'amélioration de votre santé dentale ainsi que celle de votre famille en maintenant une bonne hygiène orale. Vous obtiendrez une brosse à dent, de la soie dentaire et de la pâte dentaire.

La participation volontaire et le retrait du projet de recherche

Veillez notez que votre participant est complètement volontaire et vous êtes libres de vous retirer de ce projet de recherche en tout temps.

Confidentialité et anonymat

Toute l'information sera enregistrée sous un numéro d'identification et le nom du participant ne sera jamais utilisé dans tout rapport de données. Toute information procurée par le participant sera confidentielle et sécurisé avec un mot de passe connu seulement par la chercheure principale, qui sera gardé pour les sept prochaines années suivant l'étude, et sera détruit (râpé et supprimé) par la suite.

Questions en liens avec le projet de recherche

Pour toute questions en liens avec le projet de recherche, veuillez contacter la chercheure principale Navdeep Kaur au (514) 620-7488 ou par courriel navdeep.kaur@umontreal.ca ; ou pour l'une de vos préoccupations liées à vos droits et responsabilités de ce projet de recherche, vous pouvez envoyez un courriel au Comité d'éthique de la recherche en santé (CERES) ceres@umontreal.ca ou appelez au 343-6111 extension 2604. Toutes les plaintes au sujet de votre participation à ce projet de recherche peuvent être soumises à l'ombudsman de l'Université de Montréal, numéro de téléphone (514) 343-2100 ou par courriel ombudsman@umontreal.ca

Consentement et signature

J'ai lu et compris l'information se trouvant sur ce formulaire de consentement concernant le projet de recherche. Le chercheur principal a répondu à mes questions et a laissé jusqu'à moi la responsabilité de prendre la décision de

participer ou non à ce projet de recherche. Je comprends que je suis libre de partir à tout moment et ma participation dans ce projet de recherche est complètement volontaire. Je consens à prendre part dans ce projet de recherche.

Je consens à prendre part dans ce projet de recherche.

Prénom et nom du participant	Signature du participant
	Date :

Engagement et la signature du chercheur

Je certifie que je l'ai expliqué l'information sur les conditions de ce formulaire de consentement au participant et j'ai répondu aux questions qu'il / elle avait à cet égard. Je l'ai fait clairement pour que le participant soit libre de mettre fin à sa participation à tout moment, sans aucune conséquence négative. Je suis d'accord pour donner une copie signée et datée au participant

Prénom et nom du chercheur	Signature du chercheur
	Date :

Merci pour votre participation!

Appendix M: Consent form for RCT in Punjabi

Université de Montréal Faculté de médecine
Département de la Science Biomédicale

ਜਾਣਕਾਰੀ ਅਤੇ ਸਹਿਮਤੀ ਪੱਤਰ

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਦਾ ਸਿਰਲੇਖ

"ਆਪਣੀ **ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ** ਕਰੋ", ਪਰਵਾਸੀ ਪੰਜਾਬੀਆਂ ਦਰਮਿਆਨ **ਸਕਾਰਾਤਮਕ** ਦੰਦਾਂ ਦੀ **ਸਵੈ-ਸੰਭਾਲ** ਦੇ ਵਿਵਹਾਰ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਕਰਨ ਲਈ ਇੱਕ ਸਾਖਰਤਾ ਖੋਜ ਪਰੀਖਣ

ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ ਨਵਦੀਪ ਕੌਰ, ਬੀ.ਡੀ.ਐੱਸ, ਐਮ.ਐਸ.ਸੀ, **ਪੀਐਚਡੀ ਦੇ** ਕੈਂਡੀਡੇਟ,
ਬਾਇਓਮੈਡੀਕਲ ਸਾਇੰਸਜ਼ ਵਿਭਾਗ, ਡਾਕਟਰੀ ਵਿਭਾਗ, ਮੌਂਟਰਿਅਲ **ਯੂਨੀਵਰਸਿਟੀ**
ਫੋਨ ਨੰਬਰ: (514) 620-7488
ਈ ਮੇਲ ਪਤਾ: navdeep.kaur@umontreal.ca

ਇਸ ਖੋਜ **ਪ੍ਰਾਜੈਕਟ ਲਈ ਫੰਡ** ਮੌਂਟਰਿਅਲ **ਯੂਨੀਵਰਸਿਟੀ** ਦੇ **ਦੰਦਾਂ** ਦੇ ਵਿਭਾਗ, **ਦੁਆਰਾ ਮੁਹੱਈਆ ਕੀਤਾ ਗਿਆ ਹੈ**।

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਭਾਗ ਲੈਣ ਲਈ ਤੁਹਾਨੂੰ ਸੱਦਾ ਦਿੱਤਾ ਜਾ ਰਿਹਾ ਹੈ, ਇਸ ਵਿਚ ਭਾਗ ਲੈਣ ਤੋਂ ਪਹਿਲਾਂ ਇਸ **ਖੋਜ ਪ੍ਰੋਜੈਕਟ** ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦੀਆਂ ਸ਼ਰਤਾਂ ਬਾਰੇ ਲਿਖੀ ਜਾਣਕਾਰੀ ਨੂੰ ਚੰਗੀ ਤਰਾਂ ਪੜ ਲਵੋ। ਜਿਸ ਵਿਅਕਤੀ ਨੇ ਤੁਹਾਨੂੰ ਇਹ **ਜਾਣਕਾਰੀ ਅਤੇ ਸਹਿਮਤੀ ਦਸਤਾਵੇਜ਼** ਪੇਸ਼ ਕੀਤਾ ਹੈ ਉਹਨੂੰ, ਇਸ **ਖੋਜ ਪ੍ਰੋਜੈਕਟ** ਸਬੰਧਤ ਤੁਸੀਂ ਕੋਈ ਵੀ ਪ੍ਰਸ਼ਨ ਬਿਨਾਂ ਕਿਸੇ ਝਿਜਕ ਦੇ ਪੁੱਛ ਸਕਦੇ ਹੋ।

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਦਾ ਮੁੱਖ ਉਦੇਸ਼

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਦਾ **ਮੁੱਖ ਉਦੇਸ਼** ਪਰਵਾਸੀ ਪੰਜਾਬੀਆਂ ਦਰਮਿਆਨ ਦੰਦਾਂ ਦੀ **ਸਕਾਰਾਤਮਕ ਸਵੈ-ਸੰਭਾਲ** ਦੇ **ਰੁਟੀਨ** ਨੂੰ ਅਪਣਾਉਨ **ਅਤੇ ਬਣਾਈ ਰੱਖਣ ਲਈ** ਲਾਜ਼ਮੀ **ਗਿਆਨ, ਹੁਨਰ ਅਤੇ ਵਿਹਾਰ** ਬਾਰੇ ਜਾਣਕਾਰੀ ਵਿਚ ਵਾਧਾ **ਕਰਨਾ ਹੈ**।

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਿਚ ਸ਼ਮੂਲੀਅਤ ਦੇ ਆਧਾਰ

ਇਸ **ਖੋਜ ਪ੍ਰੋਜੈਕਟ** ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਹਰੇਕ ਵਿਅਕਤੀ ਨੂੰ ਇਕ ਵਾਰ **ਇਸ ਪ੍ਰਾਜੈਕਟ ਦੇ ਸ਼ੁਰੂ** ਵਿਚ **ਅਤੇ** ਦੂਸਰੀ ਵਾਰ ਤਿੰਨ ਮਹੀਨੇ ਬਾਅਦ, **ਇੱਕ ਸਰਵੇਖਣ ਦੇ ਸਵਾਲ ਦਾ ਜਵਾਬ ਦੇਣ ਲਈ** ਆਖਿਆ **ਜਾਵੇਗਾ** ਅਤੇ ਨਾਲ ਹੀ ਉਹਨਾਂ ਦੇ ਦੰਦਾਂ ਦਾ ਦੋ ਵਾਰ **ਮੁਆਇਨਾ** ਵੀ ਕੀਤਾ ਜਾਵੇਗਾ। ਇਸ ਖੋਜ **ਪ੍ਰਾਜੈਕਟ** ਦੀ **ਪ੍ਰਮੁੱਖ** ਖੋਜਕਾਰ, ਨਵਦੀਪ ਕੌਰ **ਹਿੱਸਾ ਲੈਣ** ਵਾਲੇ ਵਿਅਕਤੀਆਂ ਨੂੰ ਛੋਟੇ-ਛੋਟੇ **ਗਰੁੱਪਾਂ** ਵਿੱਚ ਦੰਦਾਂ ਦੀ **ਸਕਾਰਾਤਮਕ ਸਵੈ-ਸੰਭਾਲ** ਦੇ **ਰੁਟੀਨ** ਲਈ ਲਾਜ਼ਮੀ **ਗਿਆਨ, ਹੁਨਰ ਅਤੇ ਵਿਹਾਰ** ਵਿਚ ਵਾਧਾ ਕਰਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਧਾਨ ਕਰੇਗੀ।

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿੱਚ ਭਾਗ ਲੈਣ ਵਿਚ ਕਿਸੇ ਕਿਸਮ ਦਾ ਕੋਈ ਨੁਕਸਾਨ ਨਹੀਂ ਹੈ।

ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦੇ ਲਾਭ

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਵਿਅਕਤੀਆਂ ਨੂੰ ਦੰਦਾਂ ਦੀ ਸਕਾਰਾਤਮਕ ਸਵੈ-ਸੰਭਾਲ ਦੇ ਰੁਟੀਨ ਲਈ ਉਚਿਤ ਗਿਆਨ, ਹੁਨਰ ਅਤੇ ਵਿਹਾਰ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੋਵੇਗੀ ਜੋ ਕਿ ਦੰਦਾਂ ਦੇ ਰੋਗਾਂ ਤੋਂ ਬਚਾਉ ਕਰਨ ਲਈ ਸਿਹਤ ਲਈ ਬਹੁਤ ਲਾਹੇਵੰਦ ਹੋਵੇਗੀ। ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਹਰੇਕ ਵਿਅਕਤੀ ਨੂੰ ਇੱਕ ਦੰਦਾਂ ਦਾ ਬੁਰਸ਼, ਇੱਕ ਦੰਦਾਂ ਦੀ ਫਲੋਸ ਅਤੇ ਫਲੋਰਾਇਡ ਟੂਥਪੇਸਟ ਮੁਫਤ ਦਿੱਤਾ ਜਾਵੇਗਾ।

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਲੰਟਰੀ ਸ਼ਮੂਲੀਅਤ ਅਤੇ ਜਾਂ ਇਸਨੂੰ ਛੱਡਣ ਬਾਰੇ ਜਾਣਕਾਰੀ

ਕਿਰਪਾ ਕਰਕੇ ਇਸ ਗੱਲ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰੱਖੋ ਕਿ ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਤੁਹਾਡੀ ਸ਼ਮੂਲੀਅਤ ਤੁਹਾਡੀ ਆਪਣੀ ਇੱਛਾ ਅਨੁਸਾਰ ਹੈ ਤੁਹਾਨੂੰ ਪੂਰਾ ਹੱਕ ਹੈ, ਕਿ ਜੇ ਤੁਸੀਂ ਚਾਹੋ ਤਾਂ ਕਿਸੇ ਵੀ ਸਮੇਂ ਤੁਸੀਂ ਇਸ ਵਿਚ ਭਾਗ ਲੈਣ ਦਾ ਆਪਣਾ ਵਿਚਾਰ ਬਦਲ ਸਕਦੇ ਹੋ। ਇਸ ਜਾਣਕਾਰੀ ਅਤੇ ਸਹਿਮਤੀ ਦਸਤਾਵੇਜ਼ ਤੇ ਦਸਤਖਤ ਕਰ ਕੇ ਤੁਸੀਂ ਆਪਣੇ ਕਾਨੂੰਨੀ ਅਧਿਕਾਰਾਂ ਨੂੰ ਖਾਰਜ ਨਹੀਂ ਕਰ ਰਹੇ ਅਤੇ ਨਾ ਹੀ ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ, ਫੰਡ ਏਜੰਸੀ ਨੂੰ ਉਹਨਾਂ ਦੇ ਸਿਵਲ ਅਤੇ ਪੇਸ਼ੇਵਰ ਜ਼ਿੰਮੇਵਾਰੀਆਂ ਤੋਂ ਮੁਕਤ ਨਹੀਂ ਕਰ ਰਹੇ ਹੋ।

ਗੁਪਤਤਾ ਅਤੇ ਅਗਿਆਤਤਾ

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਵਿਅਕਤੀਆਂ ਬਾਰੇ ਇਕੱਤਰ ਕੀਤੀ ਸਾਰੀ ਜਾਣਕਾਰੀ ਨੂੰ ਇੱਕ ਵੱਖਰੇ ਪਛਾਣ ਨੰਬਰ ਦੇ ਹੇਠ ਦਰਜ ਕੀਤਾ ਜਾਵੇਗਾ। ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਸਾਰੇ ਵਿਅਕਤੀਆਂ ਦੀ ਜਾਣਕਾਰੀ ਨੂੰ ਗੁਪਤ ਅਤੇ ਸੁਰੱਖਿਅਤ ਰੱਖਿਆ ਜਾਵੇਗਾ। ਇਸ ਸਾਰੀ ਜਾਣਕਾਰੀ ਨੂੰ ਇਕ ਪਾਸਵਰਡ ਰਾਹੀਂ ਗੁਪਤ ਅਤੇ ਸੁਰੱਖਿਅਤ ਰੱਖਣ ਦੀ ਜਿੰਮੇਵਾਰੀ ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ ਦੀ ਹੋਵੇਗੀ। ਅਧਿਐਨ ਕਰਨ ਦੇ ਬਾਅਦ ਅਗਲੇ ਸੱਤ ਸਾਲ ਦੇ ਲਈ ਸਾਰੀ ਜਾਣਕਾਰੀ ਸੁਰੱਖਿਅਤ ਰੱਖੀ ਜਾਵੇਗੀ ਅਤੇ ਫਿਰ ਇਸਨੂੰ ਹਮੇਸ਼ਾਂ ਲਈ ਮਿਟਾ ਦਿੱਤਾ ਜਾਵੇਗਾ।

ਅਮਰੀਕੀ ਕਾਨੂੰਨ ਅਨੁਸਾਰ ਇਸ ਖੋਜ ਪਰੀਖਣ ਦਾ ਵੇਰਵਾ : http://www.clinicaltrials.gov ਨਾਮ ਦੀ ਵੈੱਬਸਾਈਟ ਤੇ ਉਪਲਬਧ ਹੋਵੇਗਾ। ਇਸ ਵੈੱਬ ਸਾਈਟ ਤੇ ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਵਿਅਕਤੀਆਂ ਬਾਰੇ ਕਿਸੇ ਕਿਸਮ ਦੀ ਕੋਈ ਜਾਣਕਾਰੀ ਨਹੀਂ ਪਾਈ ਜਾਵੇਗੀ। ਇਸ ਵੈੱਬ ਸਾਈਟ ਤੇ ਇਸ ਖੋਜ ਪਰੀਖਣ ਦਾ ਵੇਰਵਾ ਅਤੇ ਨਤੀਜੇ ਸੰਖੇਪ ਰੂਪ ਵਿਚ ਸ਼ਾਮਲ ਕੀਤੇ ਜਾਣਗੇ। ਤੁਸੀਂ ਕਿਸੇ ਵੀ ਵੇਲੇ ਇਸ ਵੈੱਬ ਸਾਈਟ ਤੇ ਜਾ ਕੇ ਇਸ ਖੋਜ ਪਰੀਖਣ ਦਾ ਵੇਰਵਾ ਵੇਖਸਕਦੇ ਹੋ. [ਸਾਡੇ ਖੋਜ ਪਰੀਖਣ ਦੀ ਪਛਾਣ ਹੈ :.....]

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਨਾਲ ਸਬੰਧਤ ਸਵਾਲਾਂ ਲਈ : ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਨਾਲ ਸਬੰਧਤ ਕਿਸੇ ਵੀ ਸਵਾਲ ਲਈ ਤੁਸੀਂ ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ, ਨਵਦੀਪ ਕੌਰ ਨਾਲ ਹੇਠ ਲਿਖੇ ਨੰਬਰ ਜਾਂ ਈ-ਮੇਲ ਰਾਹੀਂ ਸੰਪਰਕ ਕਰ ਸਕਦੇ ਹੋ:ਨਵਦੀਪ ਕੌਰ, ਟੈਲੀਫੋਨ ਨੰਬਰ (514) 620-7488 ਜਾਂ ਈ-ਮੇਲ ਪਤਾ navdeep.kaur@umontreal.ca

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਨਾਲ ਸਬੰਧਤ ਆਪਣੇ ਹੱਕ, ਜ਼ਿੰਮੇਵਾਰੀ ਜਾਂ ਚਿੰਤਾ ਦੇ ਵਿਸ਼ੇ ਬਾਰੇ ਗੱਲ ਕਰਣ ਲਈ, ਤੁਸੀਂ ਮੌਂਟਰਿਅਲ ਯੂਨੀਵਰਸਿਟੀ ਦੀ ਸਿਹਤ ਸਬੰਧਤ ਖੋਜ **ਪਰੀਖਣ** ਲਈ ਜਿੰਮੇਵਾਰ ਨੈਤਿਕ ਕਮੇਟੀ (CERES) ਨਾਲ ਹੇਠ ਲਿਖੇ ਨੰਬਰ ਅਤੇ ਜਾਂ ਈ-ਮੇਲ ਰਾਹੀਂ ਸੰਪਰਕ ਕਰ ਸਕਦੇ ਹੋ: ਈ-ਮੇਲ ਪਤਾ ਹੈ :ceres@umontreal.ca ਅਤੇ ਟੈਲੀਫੋਨ ਨੰਬਰ :343-6111 ਐਕਸ਼ਟੇਸ਼ਨ ਨੰਬਰ :2604

ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਿਚ ਆਪਣੇ ਸ਼ਮੂਲੀਅਤ ਬਾਰੇ ਕੋਈ ਸ਼ਿਕਾਇਤ ਹੈ ਤਾਂ ਮੌਂਟਰਿਅਲ ਯੂਨੀਵਰਸਿਟੀ ਦੇ ਓਮਬਡਸਮੈਨ ਨੂੰ ਹੇਠ ਲਿਖੇ ਨੰਬਰ ਜਾਂ ਈ-ਮੇਲ ਰਾਹੀਂ ਸੰਪਰਕ ਕਰ ਸਕਦੇ ਹੋ: ਟੈਲੀਫੋਨ ਨੰਬਰ (514) 343-2100 ਈ-ਮੇਲ ਪਤਾ :ombudsman@umontreal.ca

ਸਹਿਮਤੀ ਅਤੇ ਦਸਤਖਤ

ਮੈਂ ਇਸ ਜਾਣਕਾਰੀ ਅਤੇ ਸਹਿਮਤੀ ਫਾਰਮ ਤੇ ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਬਾਰੇ ਦਿੱਤੀ ਜਾਣਕਾਰੀ ਨੂੰ ਚੰਗੀ ਤਰਾਂ ਸਮਝ ਅਤੇ ਪੜ੍ਹ ਲਿਆ ਹੈ ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ ਨੇ ਮੇਰੇ ਸਾਰੇ ਸਵਾਲਾਂ ਦੇ ਜਵਾਬ ਦੇ ਦਿੱਤੇ ਹਨ ਅਤੇ ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਜਾਂ ਨਾ ਲੈਣ ਦਾ ਫੈਸਲਾ ਮੇਰੇ ਉੱਤੇ ਛੱਡ ਦਿੱਤਾ ਹੈ। ਮੇਰਾ ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਜਾਂ ਨਾ ਲੈਣ ਦਾ ਫੈਸਲਾ ਅਤੇ ਮੇਰੀ ਇਸ ਵਿਚ ਸ਼ਮੂਲੀਅਤ ਮੇਰੀ ਆਪਣੀ ਇੱਛਾ ਅਨੁਸਾਰ ਹੈ, ਅਤੇ ਜੇ ਮੈਂ ਚਾਹਾਂ ਤਾਂ ਕਿਸੇ ਵੀ ਸਮੇਂ ਇਸ ਵਿਚ ਭਾਗ ਲੈਣ ਦਾ ਵਿਚਾਰ ਬਦਲ ਸਕਦੀ/ ਸਕਦਾ ਹਾਂ । ਮੈ ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਨੂੰ 'ਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਆਪਣੀ ਸਹਿਮਤੀ ਦੇ ਰਿਹਾ/ਰਹੀ ਹਾਂ

ਸਹਿਮਤੀ ਦੇਣ ਵਾਲੇ ਦਾ ਪੂਰਾ ਨਾਮ	**ਸਹਿਮਤੀ ਦੇਣ ਵਾਲੇ ਦੇ ਦਸਤਖਤ**
	ਤਰੀਖ :

ਖੋਜਕਾਰ ਦੀ ਵਚਨਬੱਧਤਾ ਅਤੇ ਦਸਤਖਤ

ਮੈਨੂੰ ਭਾਗੀਦਾਰ ਕਰਨ ਲਈ ਇਸ ਨੂੰ ਸਹਿਮਤੀ ਫਾਰਮ ਦੇ ਆਧਾਰ 'ਤੇ ਸੰਪਤੀ ਬਾਰੇ ਜਾਣਕਾਰੀ ਨੂੰ ਸਮਝਾਇਆ ਹੈ ਅਤੇ ਮੈਨੂੰ ਉਸ ਨੂੰ / ਉਸ ਨੂੰ ਇਸ ਸਬੰਧ ਵਿਚ ਸੀ, ਸਵਾਲ ਦਾ ਜਵਾਬ ਦਿੱਤਾ ਹੈ, ਜੋ ਕਿ ਤਸਦੀਕ. ਮੈਨੂੰ ਕਿਸੇ ਵੀ ਨਕਾਰਾਤਮਕ ਨਤੀਜੇ ਦੇ ਬਗੈਰ, ਇਸ ਨੂੰ ਸਾਫ ਭਾਗੀਦਾਰ ਕਿਸੇ ਵੀ ਵੇਲੇ ਆਪਣੇ ਸ਼ਮੂਲੀਅਤ ਖਤਮ ਕਰਨ ਲਈ ਹੈ, ਜੋ ਕਿ ਮੁਫ਼ਤ ਹੈ ਕੀਤਾ ਹੈ. ਮੈਨੂੰ ਭਾਗੀਦਾਰ ਲਈ ਇੱਕ ਦਸਤਖਤ ਕੀਤੇ ਅਤੇ ਮਿਤੀ ਕਾਪੀ ਦੇਣ ਲਈ ਸਹਿਮਤ ਹਨ.

ਖੋਜਕਾਰ ਦਾ ਪੂਰਾ ਨਾਮ	ਖੋਜਕਾਰ ਦੇ ਦਸਤਖਤ
	ਤਰੀਖ :

ਤੁਹਾਡੀ ਸ਼ਮੂਲੀਅਤ ਲਈ ਧੰਨਵਾਦ

Ce projet a été approuvé par le Comité d'éthique de la recherche en santé de l'Université de Montréal.
Projet no XX-XXX-CERES-D/P

Appendix N: Consent form for Focus group in Punjabi

ਫੋਕਸ ਗਰੁੱਪ ਲਈ ਜਾਣਕਾਰੀ ਅਤੇ ਸਹਿਮਤੀ ਪੱਤਰ

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਦਾ ਸਿਰਲੇਖ

''**ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ**'', ਪਰਵਾਸੀ ਪੰਜਾਬੀਆਂ ਦਰਮਿਆਨ **ਸਕਾਰਾਤਮਕ** ਦੰਦਾਂ ਦੀ **ਸਵੈ-ਸੰਭਾਲ** ਦੇ ਵਿਵਹਾਰ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਕਰਨ ਲਈ ਇੱਕ ਸਾਖਰਤਾ ਖੋਜ ਪਰੀਖਣ

ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ ਨਵਦੀਪ ਕੌਰ, ਬੀ.ਡੀ.ਐੱਸ, ਐਮ.ਐਸ.ਸੀ, ਪੀਐੱਚਡੀ ਦੇ ਕੈਂਡੀਡੇਟ,
ਬਾਇਓਮੈਡੀਕਲ ਸਾਇੰਸਜ਼ ਵਿਭਾਗ, ਡਾਕਟਰੀ ਵਿਭਾਗ, ਮੌਂਟਰਿਅਲ ਯੂਨੀਵਰਸਿਟੀ
ਫੋਨ ਨੰਬਰ: (514) 620-7488
ਈ ਮੇਲ ਪਤਾ: navdeep.kaur@umontreal.ca

ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਲਈ ਫੰਡ ਮੌਂਟਰਿਅਲ ਯੂਨੀਵਰਸਿਟੀ ਦੇ ਦੰਦਾਂ ਦੇ ਵਿਭਾਗ, ਦੁਆਰਾ ਮੁਹੱਈਆ ਕੀਤਾ ਗਿਆ ਹੈ।

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਭਾਗ ਲੈਣ ਲਈ ਤੁਹਾਨੂੰ ਸੱਦਾ ਦਿੱਤਾ ਜਾ ਰਿਹਾ ਹੈ, ਇਸ ਵਿਚ ਭਾਗ ਲੈਣ ਤੋਂ ਪਹਿਲਾਂ ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦੀਆਂ ਸ਼ਰਤਾਂ ਬਾਰੇ ਲਿਖੀ ਜਾਣਕਾਰੀ ਨੂੰ ਚੰਗੀ ਤਰਾਂ ਪੜ ਲਵੋ। ਜਿਸ ਵਿਅਕਤੀ ਨੇ ਤੁਹਾਨੂੰ ਇਹ ਜਾਣਕਾਰੀ ਅਤੇ ਸਹਿਮਤੀ ਦਸਤਾਵੇਜ਼ ਪੇਸ਼ ਕੀਤਾ ਹੈ ਉਹਨੂੰ, ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਸਬੰਧਤ ਤੁਸੀਂ ਕੋਈ ਵੀ ਪ੍ਰਸ਼ਨ ਬਿਨਾਂ ਕਿਸੇ ਝਿਜਕ ਦੇ ਪੁੱਛ ਸਕਦੇ ਹੋ।

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਦਾ ਮੁੱਖ ਉਦੇਸ਼

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਦਾ ਮੁੱਖ ਉਦੇਸ਼ ਪਰਵਾਸੀ ਪੰਜਾਬੀਆਂ ਦਰਮਿਆਨ ਦੰਦਾਂ ਦੀ **ਸਕਾਰਾਤਮਕ ਸਵੈ-ਸੰਭਾਲ** ਦੇ ਰੁਟੀਨ ਨੂੰ ਅਪਣਾਉਨ ਅਤੇ ਬਣਾਈ ਰੱਖਣ ਲਈ ਲਾਜ਼ਮੀ ਗਿਆਨ, ਹੁਨਰ ਅਤੇ ਵਿਹਾਰ ਬਾਰੇ ਜਾਣਕਾਰੀ ਵਿਚ ਵਾਧਾ ਕਰਨਾ ਹੈ।

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਿਚ ਸ਼ਮੂਲੀਅਤ ਦੇ ਆਧਾਰ

ਤੁਹਾਨੂੰ ਆਪਣੇ ਵਿਚਾਰ ਅਤੇ ਅਨੁਭਵ ਦੇਣ ਲਈ ਇੱਕ ਫੋਕਸ ਗਰੁੱਪ ਚਰਚਾ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਸੱਦਾ ਦਿੱਤਾ ਜਾ ਰਿਹਾ ਹੈ। ਕਿਰਪਾ ਕਰਕੇ ਇਸ ਗੱਲ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰੱਖੋ ਇਸ ਗਰੁੱਪ ਚਰਚਾ ਨੂੰ ਟੇਪ ਦਰਜ ਕੀਤਾ ਜਾਵੇਗਾ ਅਤੇ ਤੁਹਾਡੀਆਂ ਤਸਵੀਰਾਂ ਲਈਆਂ ਜਾਣਗੀਆਂ ਅਤੇ ਇਹਨਾਂ ਤੋਂ ਇਕ ਕਹਾਣੀ ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ ਜਿਸਨੂੰ ਪ੍ਰਕਾਸ਼ਿਤ ਕੀਤਾ ਜਾਵੇਗਾ. ਇਸ ਪ੍ਰਕਾਸ਼ਿਤ ਕਹਾਣੀ ਨੂੰ ਪਰਵਾਸੀ ਪੰਜਾਬੀਆਂ ਦਰਮਿਆਨ ਦੰਦਾਂ ਦੀ ਸਕਾਰਾਤਮਕ ਸਵੈ-ਸੰਭਾਲ ਦੇ ਰੁਟੀਨ ਨੂੰ ਅਪਣਾਉਨ ਅਤੇ ਬਣਾਈ ਰੱਖਣ ਲਈ ਲਾਜ਼ਮੀ ਗਿਆਨ, ਹੁਨਰ ਅਤੇ ਵਿਹਾਰ ਬਾਰੇ ਜਾਣਕਾਰੀ ਦੇਣ ਲਈ ਵਰਤਿਆ ਜਾਵੇਗਾ।

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿੱਚ ਭਾਗ ਲੈਣ ਵਿਚ ਕਿਸੇ ਕਿਸਮ ਦਾ ਕੋਈ ਨੁਕਸਾਨ ਨਹੀਂ ਹੈ।

Ce projet a été approuvé par le Comité d'éthique de la recherche en santé de l'Université de Montréal.
Projet no XX-XXX-CERES-D/P

ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦੇ ਲਾਭ

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਵਿਅਕਤੀਆਂ ਨੂੰ ਦੰਦਾਂ ਦੀ ਸਕਾਰਾਤਮਕ ਸਵੈ-ਸੰਭਾਲ ਦੇ ਰੁਟੀਨ ਲਈ ਉਚਿਤ ਗਿਆਨ, ਹੁਨਰ ਅਤੇ ਵਿਹਾਰ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੋਵੇਗੀ ਜੋ ਕਿ ਦੰਦਾਂ ਦੇ ਰੋਗਾਂ ਤੋਂ ਬਚਾਉ ਕਰਨ ਲਈ ਸਿਹਤ ਲਈ ਬਹੁਤ ਲਾਹੇਵੰਦ ਹੋਵੇਗੀ। ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਹਰੇਕ ਵਿਅਕਤੀ ਨੂੰ ਇੱਕ ਦੰਦਾਂ ਦਾ ਬੁਰਸ਼, ਇੱਕ ਦੰਦਾਂ ਦੀ ਫਲੋਸ ਅਤੇ ਫਲੋਰਾਇਡ ਟੂਥਪੇਸਟ ਮੁਫਤ ਦਿੱਤਾ ਜਾਵੇਗਾ।

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਲੰਟਰੀ ਸ਼ਮੂਲੀਅਤ ਅਤੇ ਜਾਂ ਇਸਨੂੰ ਛੱਡਣ ਬਾਰੇ ਜਾਣਕਾਰੀ

ਕਿਰਪਾ ਕਰਕੇ ਇਸ ਗੱਲ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰੱਖੋ ਕਿ ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਤੁਹਾਡੀ ਸ਼ਮੂਲੀਅਤ ਤੁਹਾਡੀ ਆਪਣੀ ਇੱਛਾ ਅਨੁਸਾਰ ਹੈ ਤੁਹਾਨੂੰ ਪੂਰਾ ਹੱਕ ਹੈ, ਕਿ ਜੇ ਤੁਸੀਂ ਚਾਹੋ ਤਾਂ ਕਿਸੇ ਵੀ ਸਮੇਂ ਤੁਸੀਂ ਇਸ ਵਿਚ ਭਾਗ ਲੈਣ ਦਾ ਆਪਣਾ ਵਿਚਾਰ ਬਦਲ ਸਕਦੇ ਹੋ। ਇਸ ਜਾਣਕਾਰੀ ਅਤੇ ਸਹਿਮਤੀ ਦਸਤਾਵੇਜ਼ ਤੇ ਦਸਤਖਤ ਕਰ ਕੇ ਤੁਸੀਂ ਆਪਣੇ ਕਾਨੂੰਨੀ ਅਧਿਕਾਰਾਂ ਨੂੰ ਖਾਰਜ ਨਹੀਂ ਕਰ ਰਹੇ ਅਤੇ ਨਾ ਹੀ ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ, ਫੰਡ ਏਜੰਸੀ ਨੂੰ ਉਹਨਾਂ ਦੇ ਸਿਵਲ ਅਤੇ ਪੇਸ਼ੇਵਰ ਜ਼ਿੰਮੇਵਾਰੀਆਂ ਤੋਂ ਮੁਕਤ ਨਹੀਂ ਕਰ ਰਹੇ ਹੋ।

ਗੁਪਤਤਾ ਅਤੇ ਅਗਿਆਤਤਾ

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਵਿਅਕਤੀਆਂ ਬਾਰੇ ਇਕੱਤਰ ਕੀਤੀ ਸਾਰੀ ਜਾਣਕਾਰੀ ਨੂੰ ਇੱਕ ਵੱਖਰੇ ਪਛਾਣ ਨੰਬਰ ਦੇ ਹੇਠ ਦਰਜ ਕੀਤਾ ਜਾਵੇਗਾ। ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਸਾਰੇ ਵਿਅਕਤੀਆਂ ਦੀ ਜਾਣਕਾਰੀ ਨੂੰ ਗੁਪਤ ਅਤੇ ਸੁਰੱਖਿਅਤ ਰੱਖਿਆ ਜਾਵੇਗਾ। ਇਸ ਸਾਰੀ ਜਾਣਕਾਰੀ ਨੂੰ ਇਕ ਪਾਸਵਰਡ ਰਾਹੀਂ ਗੁਪਤ ਅਤੇ ਸੁਰੱਖਿਅਤ ਰੱਖਣ ਦੀ ਜਿੰਮੇਵਾਰੀ ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ ਦੀ ਹੋਵੇਗੀ। ਅਧਿਐਨ ਕਰਨ ਦੇ ਬਾਅਦ ਅਗਲੇ ਸੱਤ ਸਾਲ ਦੇ ਲਈ ਸਾਰੀ ਜਾਣਕਾਰੀ ਸੁਰੱਖਿਅਤ ਰੱਖੀ ਜਾਵੇਗੀ ਅਤੇ ਫਿਰ ਇਸਨੂੰ ਹਮੇਸ਼ਾਂ ਲਈ ਮਿਟਾ ਦਿੱਤਾ ਜਾਵੇਗਾ।

ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਨਾਲ ਸਬੰਧਤ ਸਵਾਲਾਂ ਲਈ

ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਨਾਲ ਸਬੰਧਤ ਕਿਸੇ ਵੀ ਸਵਾਲ ਲਈ ਤੁਸੀਂ ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ, ਨਵਦੀਪ ਕੌਰ ਨਾਲ ਹੇਠ ਲਿਖੇ ਨੰਬਰ ਜਾਂ ਈ-ਮੇਲ ਰਾਹੀਂ ਸੰਪਰਕ ਕਰ ਸਕਦੇ ਹੋ:ਨਵਦੀਪ ਕੌਰ, ਟੈਲੀਫੋਨ ਨੰਬਰ (514) 620-7488 ਜਾਂ ਈ-ਮੇਲ ਪਤਾ navdeep.kaur@umontreal.ca

ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਨਾਲ ਸਬੰਧਤ ਆਪਣੇ ਹੱਕ, ਜ਼ਿੰਮੇਵਾਰੀ ਜਾਂ ਚਿੰਤਾ ਦੇ ਵਿਸ਼ੇ ਬਾਰੇ ਗੱਲ ਕਰਣ ਲਈ, ਤੁਸੀਂ ਮੌਂਟਰਿਅਲ ਯੂਨੀਵਰਸਿਟੀ ਦੀ ਸਿਹਤ ਸਬੰਧਤ ਖੋਜ ਪਰੀਖਣ ਲਈ ਜਿੰਮੇਵਾਰ ਨੈਤਿਕ ਕਮੇਟੀ (CERES) ਨਾਲ ਹੇਠ ਲਿਖੇ ਨੰਬਰ ਅਤੇ ਜਾਂ ਈ-ਮੇਲ ਰਾਹੀਂ ਸੰਪਰਕ ਕਰ ਸਕਦੇ ਹੋ: ਈ-ਮੇਲ ਪਤਾ ਹੈ :ceres@umontreal.ca ਅਤੇ ਟੈਲੀਫੋਨ ਨੰਬਰ :343-6111 ਐਕਸ਼ਟੇਸ਼ਨ ਨੰਬਰ :2604

ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਿਚ ਆਪਣੇ ਸ਼ਮੂਲੀਅਤ ਬਾਰੇ ਕੋਈ ਸ਼ਿਕਾਇਤ ਹੈ ਤਾਂ ਮੌਂਟਰਿਅਲ ਯੂਨੀਵਰਸਿਟੀ ਦੇ ਓਮਬਡਸਮੈਨ ਨੂੰ ਹੇਠ ਲਿਖੇ ਨੰਬਰ ਜਾਂ ਈ-ਮੇਲ ਰਾਹੀਂ ਸੰਪਰਕ ਕਰ ਸਕਦੇ ਹੋ: ਟੈਲੀਫੋਨ ਨੰਬਰ (514) 343-2100 ਈ-ਮੇਲ ਪਤਾ :ombudsman@umontreal.ca

ਸਹਿਮਤੀ ਅਤੇ ਦਸਤਖਤ

ਮੈਂ ਇਸ ਜਾਣਕਾਰੀ ਅਤੇ ਸਹਿਮਤੀ ਫਾਰਮ ਤੇ ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਬਾਰੇ ਦਿੱਤੀ ਜਾਣਕਾਰੀ ਨੂੰ ਚੰਗੀ ਤਰਾਂ ਸਮਝ ਅਤੇ ਪੜ੍ਹ ਲਿਆ ਹੈ ਪ੍ਰਮੁੱਖ ਖੋਜਕਾਰ ਨੇ ਮੇਰੇ ਸਾਰੇ ਸਵਾਲਾਂ ਦੇ ਜਵਾਬ ਦੇ ਦਿੱਤੇ ਹਨ ਅਤੇ ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਜਾਂ ਨਾ ਲੈਣ ਦਾ ਫੈਸਲਾ ਮੇਰੇ ਉੱਤੇ ਛੱਡ ਦਿੱਤਾ ਹੈ। ਮੇਰਾ ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਜਾਂ ਨਾ ਲੈਣ ਦਾ ਫੈਸਲਾ ਅਤੇ ਮੇਰੀ ਇਸ ਵਿਚ ਸ਼ਮੂਲੀਅਤ ਮੇਰੀ ਆਪਣੀ ਇੱਛਾ ਅਨੁਸਾਰ ਹੈ, ਅਤੇ ਜੇ ਮੈਂ ਚਾਹਾਂ ਤਾਂ ਕਿਸੇ ਵੀ ਸਮੇਂ ਇਸ ਵਿਚ ਭਾਗ ਲੈਣ ਦਾ ਵਿਚਾਰ ਬਦਲ ਸਕਦੀ/ ਸਕਦਾ ਹਾਂ । ਮੈ ਇਸ ਖੋਜ ਪ੍ਰਾਜੈਕਟ ਨੂੰ 'ਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਆਪਣੀ ਸਹਿਮਤੀ ਦੇ ਰਿਹਾ/ਰਹੀ ਹਾਂ

ਸਹਿਮਤੀ ਦੇਣ ਵਾਲੇ ਦਾ ਪੂਰਾ ਨਾਮ	ਸਹਿਮਤੀ ਦੇਣ ਵਾਲੇ ਦੇ ਦਸਤਖਤ
	ਤਰੀਖ :

ਖੋਜਕਾਰ ਦੀ ਵਚਨਬੱਧਤਾ ਅਤੇ ਦਸਤਖਤ

ਮੈਨੂੰ ਭਾਗੀਦਾਰ ਕਰਨ ਲਈ ਇਸ ਨੂੰ ਸਹਿਮਤੀ ਫਾਰਮ ਦੇ ਆਧਾਰ 'ਤੇ ਸੰਪਤੀ ਬਾਰੇ ਜਾਣਕਾਰੀ ਨੂੰ ਸਮਝਾਇਆ ਹੈ ਅਤੇ ਮੈਨੂੰ ਉਸ ਨੂੰ / ਉਸ ਨੂੰ ਇਸ ਸਬੰਧ ਵਿਚ ਸੀ, ਸਵਾਲ ਦਾ ਜਵਾਬ ਦਿੱਤਾ ਹੈ, ਜੋ ਕਿ ਤਸਦੀਕ. ਮੈਨੂੰ ਕਿਸੇ ਵੀ ਨਕਾਰਾਤਮਕ ਨਤੀਜੇ ਦੇ ਬਗੈਰ, ਇਸ ਨੂੰ ਸਾਫ ਭਾਗੀਦਾਰ ਕਿਸੇ ਵੀ ਵੇਲੇ ਆਪਣੇ ਸ਼ਮੂਲੀਅਤ ਖਤਮ ਕਰਨ ਲਈ ਹੈ, ਜੋ ਕਿ ਮੁਫ਼ਤ ਹੈ ਕੀਤਾ ਹੈ. ਮੈਨੂੰ ਭਾਗੀਦਾਰ ਲਈ ਇੱਕ ਦਸਤਖਤ ਕੀਤੇ ਅਤੇ ਮਿਤੀ ਕਾਪੀ ਦੇਣ ਲਈ ਸਹਿਮਤ ਹਨ.

ਖੋਜਕਾਰ ਦਾ ਪੂਰਾ ਨਾਮ	ਖੋਜਕਾਰ ਦੇ ਦਸਤਖਤ
	ਤਰੀਖ :

ਤੁਹਾਡੀ ਸ਼ਮੂਲੀਅਤ ਲਈ ਧੰਨਵਾਦ

Ce projet a été approuvé par le Comité d'éthique de la recherche en santé de l'Université de Montréal.
Projet no XX-XXX-CERES-D/P

Appendix O: Questionnaire for RCT in English language

Questionnaire

'Safeguard Your Smile' an oral health literacy intervention promoting positive oral hygiene self-care behavior among Punjabi immigrants: A randomized controlled trial

Principal investigator
Dr. Navdeep Kaur BDS, M.Sc., PhD candidate,
Department of Biomedical Sciences,
Faculty of Medicine, Université de Montreal

Université de Montréal

Date ☐☐ / ☐☐ / ☐☐☐☐ (d d / m m / y y y y)

QUESTIONNAIRE-INTERVENTION GROUP

Identification Code ☐☐☐☐☐☐☐☐☐☐

Section B: Oral Hygiene self-care knowledge

B.1. Specify your level of agreement with the sentence below:
"I have sufficient knowledge about how to take good oral hygiene self-care and prevent gum diseases".

- ☐ Strongly agree
- ☐ Agree
- ☐ Strongly disagree
- ☐ Disagree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree

B.2. Have you ever received any information/knowledge about how to prevent gum diseases and take good oral hygiene self-care ?

☐ Yes (If yes then **specify** from where did you receive the information) ☐ No

B.2. a. Where did you receive the information about how to prevent dental cavities and gum diseases?

- ☐ Dentist/ dental hygienist
- ☐ Hospital nurse
- ☐ Family doctor
- ☐ Community organization
- ☐ **Research Project-"Safeguard Your Smile"**
- ☐ Your family member
- ☐ CLSC/ Pharmacy
- ☐ TV/ Radio/ Newspaper/books/Flyers
- ☐ Other

B.3. What kind of dental information have you received?

☐ Oral hygiene self-care instructions (brushing, flossing etc.) ☐ Post treatment instructions

B.4. Which parts of your mouth should you clean daily?

- ☐ Teeth only
- ☐ Front, back, top of teeth
- ☐ All surfaces of teeth including inter-dental
- ☐ All surfaces of teeth including inter-dental and tongue

B.5. What kind of tooth paste should you use to clean your teeth?

☐ With fluoride ☐ With no fluoride ☐ Any kind

B.6. What kind of tooth brush should you use?

☐ Hard ☐ Medium ☐ Soft ☐ Any kind

Date ☐☐ / ☐☐ / ☐☐☐☐ (d d / m m / y y y y)

Identification Code ☐☐☐☐☐☐☐☐☐☐

B.7. What kind of brushing method/ technique do you use?

☐ Back and forth ☐ Up and down ☐ Short round strokes ☐ Do not know

B.8. Do you know how much minimum time should you take to brush your teeth?

☐ 30 seconds ☐ 1 minute ☐ 2 minutes ☐ 3 minutes

B.9. Do you know if you should brush your teeth softly, using medium pressure or forcefully?

☐ Softly ☐ Using medium pressure ☐ Forcefully

B.10. Do you know when should you generally change your tooth brush?

☐ After 3 months ☐ After 6 months ☐ After one year ☐ Do not know

B.11. Do you know why do we need to floss?

☐ To clean food particles ☐ To clean food particles, bacteria and dental plaque ☐ Do not know

B.12. Do you know what kind of floss do you use?

☐ Waxed ☐ Unwaxed ☐ Any kind ☐ Do not know

B.13. Do you know how to floss your inter-dental areas?

☐ Yes ☐ No

(if yes, please show me how do you floss usually)

B.14. Do you know how much minimum time should you take to floss your teeth?

☐ 30 seconds ☐ 1 minute ☐ 2 minutes ☐ Do not know

B.15. Do you know when should one visit a dentist for a check-up?

☐ Every 3 months ☐ Every 6 months ☐ Once a year ☐ When you have a dental problem

Section C: Oral hygiene self-care behavior

C.1. What things you do to perform your daily oral hygiene self-care?

☐ Tooth brushing with any toothpaste
☐ Tooth brushing with fluoride toothpaste
☐ Tooth brushing with fluoride tooth paste + Floss
☐ Tooth brushing with fluoride tooth paste + Floss + oral mouth rinses
☐ Tooth brushing with fluoride tooth paste + Floss + oral mouth rinses + tongue cleaning

Date ☐☐ / ☐☐ / ☐☐☐☐ (d d / m m / y y y y)

Identification Code ☐☐☐☐☐☐☐☐☐☐

C.2. How often do you brush your teeth?

☐ Once a day ☐ Twice a day ☐ Three times a day ☐ Not everyday

C.3. When do you brush your teeth?

☐ Once in the morning only
☐ Once after waking up and once before going to bed
☐ Once after breakfast and once before going to bed
☐ After each meal

C.4. How much minimum time do you take to brush your teeth?

☐ 30 seconds ☐ 1 minute ☐ 2 minutes ☐ >2 minutes

C.5. How often do you floss your teeth?

☐ Once a day ☐ More than once a day ☐ Not every day

C.6. How much minimum time do you take to floss your teeth?

☐ 30 seconds ☐ 1 minute ☐ 2 minutes ☐ >2 minutes

C.7. How often do you clean your tongue?

☐ Twice a day ☐ Once a day ☐ Sometimes ☐ Never

C.8. How often do you rinse your mouth with a mouth rinse?

☐ Twice a day ☐ Once a day ☐ Sometimes ☐ Never

C.9. With what do you rinse your mouth?

☐ Water ☐ Mouth rinse without alcohol ☐ Any mouth rinse

1. I have gained adequate knowledge related to oral hygiene self-care routine

Strongly agree	Agree	Strongly disagree	Disagree	Somewhat agree	Neither agree nor disagree

2. During my participation in this project I have learned adequate skills related to oral hygiene self- care e.g. proper technique, frequency and duration to brush and floss my teeth.

Strongly agree	Agree	Strongly disagree	Disagree	Somewhat agree	Neither agree nor disagree

3. My oral hygiene self-care behavior has improved than before after participation in this research project.

Strongly agree	Agree	Strongly disagree	Disagree	Somewhat agree	Neither agree nor disagree

4. Information provided in photonovel and intervention were linguistically and culturally appropriate.

Strongly agree	Agree	Strongly disagree	Disagree	Somewhat agree	Neither agree nor disagree

Date ☐☐ / ☐☐ / ☐☐☐☐ (d d / m m / y y y y)

CONTROL GROUP

Identification Code ☐☐☐☐☐☐☐☐☐☐

Section B: Oral Hygiene self-care knowledge

B.1. Specify your level of agreement with the sentence below:
"I have sufficient knowledge about how to take good oral hygiene self-care and prevent gum diseases".

- ☐ Strongly agree
- ☐ Agree
- ☐ Strongly disagree
- ☐ Disagree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree

B.2. Have you ever received any information/knowledge about how to prevent gum diseases and take good oral hygiene self-care ?

☐ Yes (If yes then **specify** from where did you receive the information) ☐ No

B.2. a. Where did you receive the information about how to prevent dental cavities and gum diseases?

- ☐ Dentist/ dental hygienist
- ☐ Hospital nurse
- ☐ Family doctor
- ☐ Community organization
- ☐ Your family member
- ☐ CLSC/ Pharmacy
- ☐ TV/ Radio/ Newspaper/books/Flyers
- ☐ Other

B.3. What kind of dental information have you received?

☐ Oral hygiene self-care instructions (brushing, flossing etc.) ☐ Post treatment instructions

B.4. Which parts of your mouth should you clean daily?

- ☐ Teeth only
- ☐ Front, back, top of teeth
- ☐ All surfaces of teeth including inter-dental
- ☐ All surfaces of teeth including inter-dental and tongue

B.5. What kind of tooth paste should you use to clean your teeth?

☐ With fluoride ☐ With no fluoride ☐ Any kind

B.6. What kind of tooth brush should you use?

☐ Hard ☐ Medium ☐ Soft ☐ Any kind

Date ☐☐ / ☐☐ / ☐☐☐☐ (d d / m m / y y y y)

Identification Code ☐☐☐☐☐☐☐☐☐☐

B.7. What kind of brushing method/ technique do you use?

☐ Back and forth ☐ Up and down ☐ Short round strokes ☐ Do not know

B.8. Do you know how much minimum time should you take to brush your teeth?

☐ 30 seconds ☐ 1 minute ☐ 2 minutes ☐ 3 minutes

B.9. Do you know if you should brush your teeth softly, using medium pressure or forcefully?

☐ Softly ☐ Using medium pressure ☐ Forcefully

B.10. Do you know when should you generally change your tooth brush?

☐ After 3 months ☐ After 6 months ☐ After one year ☐ Do not know

B.11. Do you know why do we need to floss?

☐ To clean food particles ☐ To clean food particles, bacteria and dental plaque ☐ Do not know

B.12. Do you know what kind of floss do you use?

☐ Waxed ☐ Unwaxed ☐ Any kind ☐ Do not know

B.13. Do you know how to floss your inter-dental areas?

☐ Yes ☐ No

(if yes, please show me how do you floss usually)

B.14. Do you know how much minimum time should you take to floss your teeth?

☐ 30 seconds ☐ 1 minute ☐ 2 minutes ☐ Do not know

B.15. Do you know when should one visit a dentist for a check-up?

☐ Every 3 months ☐ Every 6 months ☐ Once a year ☐ When you have a dental problem

Section C: Oral hygiene self-care behavior

C.1. What things you do to perform your daily oral hygiene self-care?

☐ Tooth brushing with any toothpaste
☐ Tooth brushing with fluoride toothpaste
☐ Tooth brushing with fluoride tooth paste + Floss
☐ Tooth brushing with fluoride tooth paste + Floss + oral mouth rinses
☐ Tooth brushing with fluoride tooth paste + Floss + oral mouth rinses + tongue cleaning

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C.2. How often do you brush your teeth?

☐ Once a day ☐ Twice a day ☐ Three times a day ☐ Not everyday

C.3. When do you brush your teeth?

☐ Once in the morning only
☐ Once after waking up and once before going to bed
☐ Once after breakfast and once before going to bed
☐ After each meal

C.4. How much minimum time do you take to brush your teeth?

☐ 30 seconds ☐ 1 minute ☐ 2 minutes ☐ >2 minutes

C.5. How often do you floss your teeth?

☐ Once a day ☐ More than once a day ☐ Not every day

C.6. How much minimum time do you take to floss your teeth?

☐ 30 seconds ☐ 1 minute ☐ 2 minutes ☐ >2 minutes

C.7. How often do you clean your tongue?

☐ Twice a day ☐ Once a day ☐ Sometimes ☐ Never

C.8. How often do you rinse your mouth with a mouth rinse?

☐ Twice a day ☐ Once a day ☐ Sometimes ☐ Never

C.9. With what do you rinse your mouth?

☐ Water ☐ Mouth rinse without alcohol ☐ Any mouth rinse

1. **Have you seen/read the photonovel "Safeguard Your Smile" (SYS) since our last meeting?**
   ☐ Yes (If yes then answer Ques 2 otherwise go to ques 3 directly) ☐ No
2. **Have you gained knowledge about oral hygiene self-care from the SYS photonovel?**
   ☐ Yes ☐ No
3. **Have you done any kind of changes in your oral hygiene self-care behavior (brushing technique, duration and frequency etc.) since our last meeting?**
   ☐ Yes (If yes please specify in the space below) ☐ No

Appendix P : Questionnaire for RCT in Punjabi language

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ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ ਪ੍ਰੋਗਰਾਮ ਸਮਾਪਤੀ ਤੋਂ ਬਾਦ ਵਾਲਾ ਸਰਵੇਖਣ

ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਆਪਣੇ ਗਿਆਨ ਅਤੇ ਹੁਨਰ ਬਾਰੇ ਹੇਠ ਲਿਖੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦਿਉ

B.1 **ਹੇਠ ਲਿਖੀ ਸਤਰ ਨਾਲ ਆਪਣੀ ਸਹਿਮਤੀ ਦਾ ਪੱਧਰ ਦੱਸੋ: "ਮੈਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਕਾਫੀ ਗਿਆਨ ਹੈ।"**

- ☐ ਪੂਰੀ ਤਰਾਂ ਸਹਿਮਤ
- ☐ ਸਹਿਮਤ
- ☐ ਪੂਰੀ ਤਰਾਂ ਨਾ ਸਹਿਮਤ
- ☐ ਨਾ ਸਹਿਮਤ
- ☐ ਕੁਝ ਕੁਝ ਸਹਿਮਤ
- ☐ ਨਾ ਸਹਿਮਤ ਅਤੇ ਨਾ ਹੀ ਅਸਹਿਮਤ

B.2. ਕੀ ਤੁਹਾਨੂੰ ਕਦੇ ਦੰਦਾਂ ਦੀ ਬੀਮਾਰੀ ਤੋਂ ਬਚਾਉ ਜਾਂ **ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੋਈ ਹੈ?**

☐ ਹਾਂ (ਜੇਕਰ ਤੁਹਾਡਾ ਜਵਾਬ "ਹਾਂ" ਹੈ ਤਾਂ ਦੱਸੋ ਕਿੱਥੋਂ?) ☐ ਨਹੀਂ ☐ ਪਤਾ ਨਹੀਂ

B.2. a. **ਤੁਹਾਨੂੰ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਜਾਣਕਾਰੀ ਕਿੱਥੋਂ ਪ੍ਰਾਪਤ ਹੋਈ ਹੈ?**

- ☐ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਕੋਲੋਂ
- ☐ ਨਰਸ ਕੋਲੋਂ
- ☐ ਫੈਮਿਲੀ ਡਾਕਟਰ
- ☐ ਕਮੂਨਿਅਟੀ ਸੰਸਥਾ ਕੋਲੋਂ
- ☐ ਆਪਣੇ ਪਰਿਵਾਰਕ ਮੈਂਬਰ ਕੋਲੋਂ
- ☐ CLSC/ ਫਾਰਮੇਸੀ
- ☐ TV/ ਰੇਡਿਉ/ਅਖਬਾਰ/ ਕਿਤਾਬ/ਰਸਾਲਾ
- ☐ ਹੋਰ
- ☐ **ਖੋਜ ਪ੍ਰੋਜੈਕਟ "ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ"ਰਾਹੀਂ**

B.3. ਤੁਹਾਨੂੰ ਦੰਦਾਂ **ਬਾਰੇ ਕਿਸ ਕਿਸਮ ਦੀ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੋਈ ਹੈ?**

☐ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ☐ ਦੰਦਾਂ ਦੇ ਇਲਾਜ ਤੋਂ ਬਾਅਦ ਦੀ ਜਾਣਕਾਰੀ

B.4. **ਤੁਹਾਡੇ ਅਨੁਸਾਰ** ਮੂੰਹ ਦੇ **ਕਿਹੜੇ** ਹਿੱਸੇ ਤੁਹਾਨੂੰ ਰੋਜ਼ਾਨਾ ਸਾਫ **ਕਰਨੇ ਚਾਹੀਦੇ ਹਨ**?

- ☐ ਕੇਵਲ ਦੰਦ
- ☐ ਦੰਦਾਂ ਦੇ ਬਾਹਰਲੇ, ਅੰਦਰਲੇ ਅਤੇ ਉੱਪਰਲੇ ਹਿੱਸੇ
- ☐ ਦੰਦਾਂ ਦੇ ਸਾਰੇ ਹਿੱਸੇ ਤੇ ਨਾਲੇ ਦੰਦਾਂ ਦੇ ਵਿਚਕਾਰ
- ☐ ਦੰਦਾਂ ਦੇ ਸਾਰੇ ਹਿੱਸੇ ਤੇ ਨਾਲੇ ਦੰਦਾਂ ਦੇ ਵਿਚਕਾਰ ਅਤੇ ਜ਼ੁਬਾਨ

B.5. **ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਸਫਾਈ ਲਈ ਕਿਸ ਕਿਸਮ ਦਾ ਦੰਦਾਂ ਦਾ ਪੇਸਟ ਇਸਤੇਮਾਲ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?**

☐ ਜਿਹਦੇ ਵਿਚ ਫਲੋਰਾਇਡ ਹੋਵੇ ☐ ਜਿਹਦੇ ਵਿਚ ਫਲੋਰਾਇਡ ਨਾ ਹੋਵੇ ☐ ਕੋਈ ਵੀ ਕਿਸਮ ਦਾ

B.6. **ਤੁਹਾਨੂੰ ਕਿਸ ਕਿਸਮ ਦਾ ਦੰਦਾਂ ਦਾ** ਬੁਰਸ਼ **ਇਸਤੇਮਾਲ** ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?

☐ ਸਖਤ ☐ ਪੋਲਾ ☐ ਮੀਡੀਅਮ ☐ ਕੋਈ ਵੀ ਕਿਸਮ ਦਾ

B.7. **ਤੁਸੀਂ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ** ਬੁਰਸ਼ **ਕਰਨ ਦਾ ਕਿਹੜਾ** ਢੰਗ / ਤਕਨੀਕ ਇਸਤੇਮਾਲ ਕਰਦੇ ਹੋ?

☐ ਅੱਗੇ-ਪਿੱਛੇ ☐ ਉਪਰ-ਥੱਲੇ ☐ ਗੋਲ ਰਗੜਨਾ ☐ ਪਤਾ ਨਹੀਂ

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ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ ਪ੍ਰੋਗਰਾਮ ਸਮਾਪਤੀ ਤੋਂ ਬਾਦ ਵਾਲਾ ਸਰਵੇਖਣ

B.8. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਕਰਨ ਲਈ ਕਿੰਨਾਂ ਸਮਾਂ ਲਗਦਾ ਹੈ?

☐ 30 ਸਕਿੰਟ ☐ 1 ਮਿੰਟ ☐ 2 ਮਿੰਟ ☐ 3 ਮਿੰਟ

B.9. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਪੋਲੇ-ਪੋਲੇ, ਮੀਡੀਅਮ ਜਾਂ ਜ਼ਿਆਦਾ ਜ਼ੋਰ ਨਾਲ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?

☐ ਪੋਲੇ-ਪੋਲੇ ☐ ਮੀਡੀਅਮ ਜ਼ੋਰ ਨਾਲ ☐ ਜ਼ਿਆਦਾ ਜ਼ੋਰ ਨਾਲ

B.10. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਦਾ ਬੁਰਸ਼ ਕਿੰਨੇ ਸਮੇਂ ਬਾਅਦ ਬਦਲਣਾ ਚਾਹੀਦਾ ਹੈ?

☐ 3 ਮਹੀਨੇ ਬਾਅਦ ☐ 6 ਮਹੀਨੇ ਬਾਅਦ ☐ 1 ਸਾਲ ਬਾਅਦ ☐ ਪਤਾ ਨਹੀਂ

B.11. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਫਲੋਸ ਕਿਉਂ ਕਰਨੀ ਚਾਹੀਦੀ ਹੈ ?

☐ ਦੰਦਾਂ ਵਿਚ ਦੰਦਾਂ ਵਿਚ ਫਸੇ ਖਾਣੇ ਨੂੰ ਸਾਫ ਕਰਨ ਲਈ ☐ ਦੰਦਾਂ ਵਿਚ ਦੰਦਾਂ ਵਿਚ ਫਸੇ ਖਾਣੇ ਬੈਕਟੀਰੀਆ ਅਤੇ ਪਲਾਕ ਨੂੰ ਸਾਫ ਕਰਨ ਲਈ ☐ ਪਤਾ ਨਹੀਂ

B.12. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਕਿਸ ਕਿਸਮ ਫਲੋਸ ਇਸਤੇਮਾਲ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?

☐ ਵੈਕਸ ਵਾਲੀ ☐ ਬਿਨਾਂ ਵੈਕਸ ☐ ਕੋਈ ਵੀ ਕਿਸਮ ☐ ਪਤਾ ਨਹੀਂ

B.13. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਫਲੋਸ ਕਿਵੇਂ ਇਸਤੇਮਾਲ ਕਰੀਦੀ ਹੈ?

☐ ਹਾਂ (ਜੇਕਰ ਹਾਂ ਤਾਂ 1-2 ਦੰਦਾਂ ਵਿਚ ਫਲੋਸ ਕਰਕੇ ਦਿਖਾਉ) ☐ ਨਹੀਂ

B.14. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਆਪਣੇ ਦੰਦਾਂ ਦੇ ਜੋੜਾਂ ਵਿਚਕਾਰ ਫਲੋਸ ਕਰਨ ਲਈ ਕਿੰਨਾਂ ਸਮਾਂ ਲਗਦਾ ਹੈ?

☐ 30 ਸਕਿੰਟ ☐ 1 ਮਿੰਟ ☐ 2 ਮਿੰਟ ☐ ਪਤਾ ਨਹੀਂ

B.15. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਕੋਲ ਚੈੱਕ-ਅਪ ਕਰਵਾਉਣ ਲਈ ਕਦੋਂ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ?

☐ 3 ਮਹੀਨੇ ਬਾਦ ☐ 6 ਮਹੀਨੇ ਬਾਦ ☐ ਸਾਲ ਵਿਚ ਇਕ ਵਾਰੀ ☐ ਜਦੋਂ ਦੰਦਾਂ ਦੀ ਮੁਸ਼ਕਿਲ ਹੋਵੇ

ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਆਪਣੇ ਵਿਵਹਾਰ ਬਾਰੇ ਹੇਠ ਲਿਖੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦਿਉ

C.1. ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਲਈ ਤੁਸੀਂ ਕੀ ਕੁਝ ਕਰਦੇ ਹੋ?

☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਕਿਸੇ ਵੀ ਕਿਸਮ ਦੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ
☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ
☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ+ ਫਲੋਸ
☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ+ ਫਲੋਸ+ ਕੁਰਲੀ
☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ+ ਫਲੋਸ+ ਕੁਰਲੀ+ ਜ਼ੁਬਾਨ ਦੀ ਸਫਾਈ

Date
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Identification Code
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ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ ਪ੍ਰੋਗਰਾਮ ਸਮਾਪਤੀ ਤੋਂ ਬਾਦ ਵਾਲਾ ਸਰਵੇਖਣ

C.2. ਤੁਸੀਂ ਦਿਨ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ ਬੁਰਸ਼ ਕਰਦੇ ਹੋ?
☐ 1 ਵਾਰ ☐ 2 ਵਾਰ ☐ 3 ਵਾਰ ☐ ਰੋਜ਼ਾਨਾ ਨਹੀਂ

C.3. ਤੁਸੀਂ ਰੋਜ਼ਾਨਾ ਕਿਸ ਸਮੇਂ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਕਰਦੇ ਹੋ?
☐ ਸਵੇਰੇ ਇਕ ਵਾਰੀ
☐ ਸਵੇਰੇ ਜਾਗਣ ਤੋਂ ਬਾਅਦ ਇਕ ਵਾਰੀ ਅਤੇ ਫੇਰ ਇਕ ਵਾਰੀ ਰਾਤੀਂ ਸੌਣ ਤੋਂ ਪਹਿਲਾਂ
☐ ਹਰ ਵਾਰ ਖਾਣਾ ਖਾਣ ਤੋਂ ਬਾਅਦ

C.4. ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਕਰਨ ਲਈ ਕਿੰਨਾਂ ਸਮਾਂ ਲਗਦਾ ਹੈ?
☐ 30 ਸਕਿੰਟ ☐ 1 ਮਿੰਟ ☐ 2 ਮਿੰਟ ☐ >2 ਮਿੰਟ

C.5. ਤੁਸੀਂ ਦਿਨ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ ਫਲੋਸ ਕਰਦੇ ਹੋ?
☐ 1 ਵਾਰ ☐> ਵਾਰ ☐ ਰੋਜ਼ਾਨਾ ਨਹੀਂ

C.6. ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਦੇ ਜੋੜਾਂ ਵਿਚਕਾਰ ਫਲੋਸ ਕਰਨ ਲਈ ਕਿੰਨਾਂ ਸਮਾਂ ਲਗਦਾ?
☐ 30 ਸਕਿੰਟ ☐ 1 ਮਿੰਟ ☐ 2 ਮਿੰਟ ☐ >2 ਮਿੰਟ

C.7. ਤੁਸੀਂ ਦਿਨ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ ਜ਼ੁਬਾਨ ਦੀ ਸਫਾਈ ਕਰਦੇ ਹੋ?
☐ ਦਿਨ ਵਿਚ 1 ਵਾਰ ☐ ਦਿਨ ਵਿਚ 2 ਵਾਰ ☐ ਕਦੇ ਕਦੇ ☐ ਕਦੀ ਨਹੀਂ

C.8. ਤੁਸੀਂ ਦਿਨ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ ਕੁਰਲੀ ਕਰਦੇ ਹੋ?
☐ ਦਿਨ ਵਿਚ 1 ਵਾਰ ☐ ਦਿਨ ਵਿਚ 2 ਵਾਰ ☐ ਕਦੇ ਕਦੇ ☐ ਕਦੀ ਨਹੀਂ

C.9. ਤੁਸੀਂ ਕੁਰਲੀ ਕਰਣ ਲਈ ਕੀ ਇਸਤੇਮਾਲ ਕਰਦੇ ਹੋ?
☐ ਪਾਣੀ ☐ ਮਾਉਥਵਾਸ਼ ਬਿਨਾਂ ਅਲਕੋਹਲ ਦੇ ☐ ਕੋਈ ਵੀ ਮਾਉਥਵਾਸ਼

੧ ਮੈਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਲਾਹੇਵੰਦ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੋਈ ਹੈ।

ਪੂਰੀ ਤਰਾਂ ਸਹਿਮਤ	ਸਹਿਮਤ	ਪੂਰੀ ਤਰਾਂ ਨਾ ਸਹਿਮਤ	ਅਸਹਿਮਤ	ਕੁਝ ਕੁਝ ਸਹਿਮਤ	ਨਾ ਸਹਿਮਤ ਅਤੇ ਨਾ ਹੀ ਅਸਹਿਮਤ

੨ ਮੈਂ ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਆਪਣੀ ਸ਼ਮੂਲਿਅਤ ਦੌਰਾਨ ਆਪਣੇ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਹੀ ਤਰੀਕੇ ਨਾਲ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਗੱਲਾਂ ਸਿੱਖੀਆਂ ਹਨ ਜਿਵੇਂ ਕਿ ਸਹੀ ਤਰੀਕੇ ਅਤੇ ਕਿੰਨਾ ਸਮਾਂ ਆਪਣੇ ਦੰਦਾਂ ਨਾਲ ਬੁਰਸ਼ ਅਤੇ ਫਲੋਸ ਕਰਨਾ ਆਦਿ.

ਪੂਰੀ ਤਰਾਂ ਸਹਿਮਤ	ਸਹਿਮਤ	ਪੂਰੀ ਤਰਾਂ ਨਾ ਸਹਿਮਤ	ਅਸਹਿਮਤ	ਕੁਝ ਕੁਝ ਸਹਿਮਤ	ਨਾ ਸਹਿਮਤ ਅਤੇ ਨਾ ਹੀ ਅਸਹਿਮਤ

੩ ਮੇਰਾ ਆਪਣੇ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਵਿਵਹਾਰ ਵਿਚ ਪਹਿਲਾਂ ਨਾਲੋਂ ਕਾਫੀ ਸੁਧਾਰ ਹੋਇਆ ਹੈ।

ਪੂਰੀ ਤਰਾਂ ਸਹਿਮਤ	ਸਹਿਮਤ	ਪੂਰੀ ਤਰਾਂ ਨਾ ਸਹਿਮਤ	ਅਸਹਿਮਤ	ਕੁਝ ਕੁਝ ਸਹਿਮਤ	ਨਾ ਸਹਿਮਤ ਅਤੇ ਨਾ ਹੀ ਅਸਹਿਮਤ

4. ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਰਾਹੀਂ ਦਿੱਤੀ ਗਈ ਜਾਣਕਾਰੀ ਮੇਰੀ ਭਾਸ਼ਾ ਅਤੇ ਮੇਰੇ ਸਭਿਆਚਾਰ ਅਨੁਕੂਲ ਸੀ ।

ਪੂਰੀ ਤਰਾਂ ਸਹਿਮਤ	ਸਹਿਮਤ	ਪੂਰੀ ਤਰਾਂ ਨਾ ਸਹਿਮਤ	ਅਸਹਿਮਤ	ਕੁਝ ਕੁਝ ਸਹਿਮਤ	ਨਾ ਸਹਿਮਤ ਅਤੇ ਨਾ ਹੀ ਅਸਹਿਮਤ

ਤੁਹਾਡਾ ਇਸ ਖੋਜ ਪ੍ਰੋਜੈਕਟ ਵਿਚ ਸ਼ਮੂਲਿਅਤ ਲਈ ਧੰਨਵਾਦ !

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ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ ਪ੍ਰੋਗਰਾਮ ਸਮਾਪਤੀ ਤੋਂ ਬਾਦ ਵਾਲਾ ਸਰਵੇਖਣ

ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਆਪਣੇ ਗਿਆਨ ਅਤੇ ਹੁਨਰ ਬਾਰੇ ਹੇਠ ਲਿਖੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦਿਉ

B.1 **ਹੇਠ ਲਿਖੀ ਸਤਰ ਨਾਲ ਆਪਣੀ ਸਹਿਮਤੀ ਦਾ ਪੱਧਰ ਦੱਸੋ: "ਮੈਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਕਾਫੀ ਗਿਆਨ ਹੈ।"**

- ☐ ਪੂਰੀ ਤਰਾਂ ਸਹਿਮਤ
- ☐ ਸਹਿਮਤ
- ☐ ਪੂਰੀ ਤਰਾਂ ਨਾ ਸਹਿਮਤ
- ☐ ਨਾ ਸਹਿਮਤ
- ☐ ਕੁਝ ਕੁਝ ਸਹਿਮਤ
- ☐ ਨਾ ਸਹਿਮਤ ਅਤੇ ਨਾ ਹੀ ਅਸਹਿਮਤ

B.2. ਕੀ ਤੁਹਾਨੂੰ ਕਦੇ ਦੰਦਾਂ ਦੀ ਬੀਮਾਰੀ ਤੋਂ ਬਚਾਉ ਜਾਂ **ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੋਈ ਹੈ?**

☐ ਹਾਂ (ਜੇਕਰ ਤੁਹਾਡਾ ਜਵਾਬ "ਹਾਂ" ਹੈ ਤਾਂ ਦੱਸੋ ਕਿੱਥੋਂ?) ☐ ਨਹੀਂ ☐ ਪਤਾ ਨਹੀਂ

B.2. a. **ਤੁਹਾਨੂੰ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਜਾਣਕਾਰੀ ਕਿੱਥੋਂ ਪ੍ਰਾਪਤ ਹੋਈ ਹੈ?**

- ☐ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਕੋਲੋਂ
- ☐ ਨਰਸ ਕੋਲੋਂ
- ☐ ਫੈਮਿਲੀ ਡਾਕਟਰ
- ☐ ਕਮੂਨਿਅਟੀ ਸੰਸਥਾ ਕੋਲੋਂ
- ☐ ਆਪਣੇ ਪਰਿਵਾਰਕ ਮੈਂਬਰ ਕੋਲੋਂ
- ☐ CLSC/ ਫਾਰਮੇਸੀ
- ☐ TV/ ਰੇਡਿਉ/ਅਖਬਾਰ/ ਕਿਤਾਬ/ਰਸਾਲਾ
- ☐ ਹੋਰ

B.3. ਤੁਹਾਨੂੰ **ਦੰਦਾਂ ਬਾਰੇ ਕਿਸ ਕਿਸਮ ਦੀ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੋਈ ਹੈ?**

☐ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ☐ ਦੰਦਾਂ ਦੇ ਇਲਾਜ ਤੋਂ ਬਾਅਦ ਦੀ ਜਾਣਕਾਰੀ

B.4. **ਤੁਹਾਡੇ ਅਨੁਸਾਰ** ਮੂੰਹ ਦੇ **ਕਿਹੜੇ** ਹਿੱਸੇ ਤੁਹਾਨੂੰ ਰੋਜ਼ਾਨਾ ਸਾਫ **ਕਰਨੇ ਚਾਹੀਦੇ ਹਨ**?

- ☐ ਕੇਵਲ ਦੰਦ
- ☐ ਦੰਦਾਂ ਦੇ ਬਾਹਰਲੇ, ਅੰਦਰਲੇ ਅਤੇ ਉੱਪਰਲੇ ਹਿੱਸੇ
- ☐ ਦੰਦਾਂ ਦੇ ਸਾਰੇ ਹਿੱਸੇ ਤੇ ਨਾਲੇ ਦੰਦਾਂ ਦੇ ਵਿਚਕਾਰ
- ☐ ਦੰਦਾਂ ਦੇ ਸਾਰੇ ਹਿੱਸੇ ਤੇ ਨਾਲੇ ਦੰਦਾਂ ਦੇ ਵਿਚਕਾਰ ਅਤੇ ਜ਼ੁਬਾਨ

B.5. **ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਸਫਾਈ ਲਈ ਕਿਸ ਕਿਸਮ ਦਾ ਦੰਦਾਂ ਦਾ ਪੇਸਟ ਇਸਤੇਮਾਲ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?**

☐ ਜਿਹਦੇ ਵਿਚ ਫਲੋਰਾਇਡ ਹੋਵੇ ☐ ਜਿਹਦੇ ਵਿਚ ਫਲੋਰਾਇਡ ਨਾ ਹੋਵੇ ☐ ਕੋਈ ਵੀ ਕਿਸਮ ਦਾ

B.6. **ਤੁਹਾਨੂੰ ਕਿਸ ਕਿਸਮ ਦਾ ਦੰਦਾਂ ਦਾ** ਬੁਰਸ਼ **ਇਸਤੇਮਾਲ** ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?

☐ ਸਖਤ ☐ ਪੋਲਾ ☐ ਮੀਡੀਅਮ ☐ ਕੋਈ ਵੀ ਕਿਸਮ ਦਾ

B.7. **ਤੁਸੀਂ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ** ਬੁਰਸ਼ **ਕਰਨ ਦਾ ਕਿਹੜਾ** ਢੰਗ / ਤਕਨੀਕ ਇਸਤੇਮਾਲ ਕਰਦੇ ਹੋ?

☐ ਅੱਗੇ-ਪਿੱਛੇ ☐ ਉਪਰ-ਥੱਲੇ ☐ ਗੋਲ ਰਗੜਨਾ ☐ ਪਤਾ ਨਹੀਂ

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ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ ਪ੍ਰੋਗਰਾਮ ਸਮਾਪਤੀ ਤੋਂ ਬਾਦ ਵਾਲਾ ਸਰਵੇਖਣ

B.8. **ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ** ਬੁਰਸ਼ ਕਰਨ ਲਈ ਕਿੰਨਾਂ ਸਮਾਂ ਲਗਦਾ ਹੈ?

☐ 30 ਸਕਿੰਟ ☐ 1 ਮਿੰਟ ☐ 2 ਮਿੰਟ ☐ 3 ਮਿੰਟ

B.9. **ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਪੋਲੇ-ਪੋਲੇ, ਮੀਡੀਅਮ ਜਾਂ ਜ਼ਿਆਦਾ ਜ਼ੋਰ ਨਾਲ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?**

☐ ਪੋਲੇ-ਪੋਲੇ ☐ ਮੀਡੀਅਮ ਜ਼ੋਰ ਨਾਲ ☐ ਜ਼ਿਆਦਾ ਜ਼ੋਰ ਨਾਲ

B.10. **ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਦਾ ਬੁਰਸ਼ ਕਿੰਨੇ ਸਮੇਂ ਬਾਅਦ ਬਦਲਣਾ ਚਾਹੀਦਾ ਹੈ?**

☐ 3 ਮਹੀਨੇ ਬਾਅਦ ☐ 6 ਮਹੀਨੇ ਬਾਅਦ ☐ 1 ਸਾਲ ਬਾਅਦ ☐ ਪਤਾ ਨਹੀਂ

B.11. **ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਫਲੋਸ ਕਿਉਂ ਕਰਨੀ ਚਾਹੀਦੀ ਹੈ ?**

☐ ਦੰਦਾਂ ਵਿਚ ਦੰਦਾਂ ਵਿਚ ਫਸੇ ਖਾਣੇ ਨੂੰ ਸਾਫ ਕਰਨ ਲਈ ☐ ਦੰਦਾਂ ਵਿਚ ਦੰਦਾਂ ਵਿਚ ਫਸੇ ਖਾਣੇ ਬੈਕਟੀਰੀਆ ਅਤੇ ਪਲਾਕ ਨੂੰ ਸਾਫ ਕਰਨ ਲਈ ☐ ਪਤਾ ਨਹੀਂ

B.12. **ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਕਿਸ ਕਿਸਮ ਫਲੋਸ ਇਸਤੇਮਾਲ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?**

☐ ਵੈਕਸ ਵਾਲੀ ☐ ਬਿਨਾਂ ਵੈਕਸ ☐ ਕੋਈ ਵੀ ਕਿਸਮ ☐ ਪਤਾ ਨਹੀਂ

B.13. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਕਿ ਫਲੋਸ **ਕਿਵੇਂ ਇਸਤੇਮਾਲ ਕਰੀਦੀ ਹੈ?**

☐ ਹਾਂ (ਜੇਕਰ ਹਾਂ ਤਾਂ 1-2 ਦੰਦਾਂ ਵਿਚ ਫਲੋਸ ਕਰਕੇ ਦਿਖਾਉ) ☐ ਨਹੀਂ

B.14. ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ **ਆਪਣੇ ਦੰਦਾਂ ਦੇ ਜੋੜਾਂ ਵਿਚਕਾਰ ਫਲੋਸ** ਕਰਨ ਲਈ ਕਿੰਨਾਂ ਸਮਾਂ ਲਗਦਾ ਹੈ?

☐ 30 ਸਕਿੰਟ ☐ 1 ਮਿੰਟ ☐ 2 ਮਿੰਟ ☐ ਪਤਾ ਨਹੀਂ

B.15. **ਕੀ ਤੁਹਾਨੂੰ ਪਤਾ ਹੈ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਕੋਲ ਚੈੱਕ-ਅਪ ਕਰਵਾਉਣ ਲਈ ਕਦੋਂ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ?**

☐ 3 ਮਹੀਨੇ ਬਾਦ ☐ 6 ਮਹੀਨੇ ਬਾਦ ☐ ਸਾਲ ਵਿਚ ਇਕ ਵਾਰੀ ☐ ਜਦੋਂ ਦੰਦਾਂ ਦੀ ਮੁਸ਼ਕਿਲ ਹੋਵੇ

ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਆਪਣੇ ਵਿਵਹਾਰ ਬਾਰੇ ਹੇਠ ਲਿਖੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦਿਉ

C.1. **ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਲਈ ਤੁਸੀਂ ਕੀ ਕੁਝ ਕਰਦੇ ਹੋ?**

☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਕਿਸੇ ਵੀ ਕਿਸਮ ਦੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ
☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ
☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ+ ਫਲੋਸ
☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ+ ਫਲੋਸ+ ਕੁਰਲੀ
☐ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ+ ਫਲੋਸ+ ਕੁਰਲੀ+ ਜ਼ੁਬਾਨ ਦੀ ਸਫਾਈ

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ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ ਪ੍ਰੋਗਰਾਮ ਸਮਾਪਤੀ ਤੋਂ ਬਾਦ ਵਾਲਾ ਸਰਵੇਖਣ

C.2. ਤੁਸੀਂ ਦਿਨ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ ਬੁਰਸ਼ ਕਰਦੇ ਹੋ?
☐ 1 ਵਾਰ ☐ 2 ਵਾਰ ☐ 3 ਵਾਰ ☐ ਰੋਜ਼ਾਨਾ ਨਹੀਂ

C.3. ਤੁਸੀਂ ਰੋਜ਼ਾਨਾ ਕਿਸ ਸਮੇਂ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਕਰਦੇ ਹੋ?
☐ ਸਵੇਰੇ ਇਕ ਵਾਰੀ
☐ ਸਵੇਰੇ ਜਾਗਣ ਤੋਂ ਬਾਅਦ ਇਕ ਵਾਰੀ ਅਤੇ ਫੇਰ ਇਕ ਵਾਰੀ ਰਾਤੀਂ ਸੌਣ ਤੋਂ ਪਹਿਲਾਂ
☐ ਹਰ ਵਾਰ ਖਾਣਾ ਖਾਣ ਤੋਂ ਬਾਅਦ

C.4. ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼ ਕਰਨ ਲਈ ਕਿੰਨਾਂ ਸਮਾਂ ਲਗਦਾ ਹੈ?
☐ 30 ਸਕਿੰਟ ☐ 1 ਮਿੰਟ ☐ 2 ਮਿੰਟ ☐ >2 ਮਿੰਟ

C.5. ਤੁਸੀਂ ਦਿਨ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ ਫਲੋਸ ਕਰਦੇ ਹੋ?
☐ 1 ਵਾਰ ☐> ਵਾਰ ☐ ਰੋਜ਼ਾਨਾ ਨਹੀਂ

C.6. ਤੁਹਾਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਦੇ ਜੋੜਾਂ ਵਿਚਕਾਰ ਫਲੋਸ ਕਰਨ ਲਈ ਕਿੰਨਾਂ ਸਮਾਂ ਲਗਦਾ?
☐ 30 ਸਕਿੰਟ ☐ 1 ਮਿੰਟ ☐ 2 ਮਿੰਟ ☐ >2 ਮਿੰਟ

C.7. ਤੁਸੀਂ ਦਿਨ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ ਜ਼ੁਬਾਨ ਦੀ ਸਫਾਈ ਕਰਦੇ ਹੋ?
☐ ਦਿਨ ਵਿਚ 1 ਵਾਰ ☐ ਦਿਨ ਵਿਚ 2 ਵਾਰ ☐ ਕਦੇ ਕਦੇ ☐ ਕਦੀ ਨਹੀਂ

C.8. ਤੁਸੀਂ ਦਿਨ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ ਕੁਰਲੀ ਕਰਦੇ ਹੋ?
☐ ਦਿਨ ਵਿਚ 1 ਵਾਰ ☐ ਦਿਨ ਵਿਚ 2 ਵਾਰ ☐ ਕਦੇ ਕਦੇ ☐ ਕਦੀ ਨਹੀਂ

C.9. ਤੁਸੀਂ ਕੁਰਲੀ ਕਰਣ ਲਈ ਕੀ ਇਸਤੇਮਾਲ ਕਰਦੇ ਹੋ?
☐ ਪਾਣੀ ☐ ਮਾਉਥਵਾਸ਼ ਬਿਨਾਂ ਅਲਕੋਹਲ ਦੇ ☐ ਕੋਈ ਵੀ ਮਾਉਥਵਾਸ਼

੧ ਕੀ ਤੁਸੀਂ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਦਾ " ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ" ਨਾਂ ਦਾ ਕਿਤਾਬਚਾ ਦੇਖਿਆ/ਪੜਿਆ ਹੈ?
☐ ਹਾਂ (ਜੇਕਰ ਤੁਹਾਡਾ ਜਵਾਬ "ਹਾਂ" ਹੈ ਤਾਂ ਪ੍ਰਸ਼ਨ ੨ ਦਾ ਉੱਤਰ ਦਿਉ ਨਹੀਂ ਤਾਂ ਪ੍ਰਸ਼ਨ ੩ ਦਾ ਉੱਤਰ ਦਿਉ) ☐ ਨਹੀਂ

੨ ਕੀ ਤੁਹਾਨੂੰ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ "ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ" ਨਾਂ ਦੇ ਕਿਤਾਬਚੇ ਤੋਂ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੋਇਆ ਹੈ?
☐ ਹਾਂ ☐ ਨਹੀਂ

੩. ਸਾਡੀ ਪਿਛਲੀ ਮੁਲਾਕਾਤ ਤੋਂ ਬਾਦ ਕੀ ਤੁਹਾਡਾ ਆਪਣੇ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਵਿਵਹਾਰ ਵਿਚ ਕਿਸੇ ਕਿਸਮ ਦਾ ਬਦਲਾਵ ਹੋਇਆ ਹੈ ਜਿਵੇਂ ਕਿ ਸਹੀ ਤਰੀਕੇ ਅਤੇ ਕਿੰਨਾ ਸਮਾਂ, ਕਿੰਨੀ ਵਾਰੀ ਆਪਣੇ ਦੰਦਾਂ ਨਾਲ ਬੁਰਸ਼ ਅਤੇ ਫਲੋਸ ਕਰਨਾ ਆਦਿ?
☐ ਹਾਂ (ਜੇਕਰ ਤੁਹਾਡਾ ਜਵਾਬ "ਹਾਂ" ਹੈ ਤਾਂ ਉਸ ਬਦਲਾਵ ਬਾਰੇ ਹੇਠਾਂ ਲਿਖੋ) ☐ ਨਹੀਂ

Appendix Q : Questionnaire for Photonovel evaluation

Questionnaire- Photonovel evaluation

"'Safeguard Your Smile"' photonovel promoting adequate oral hygiene self-care knowledge and skills among Punjabi immigrants

Principal investigator
Dr. Navdeep Kaur BDS, M.Sc., PhD candidate,
Department of Biomedical Sciences,
Faculty of Medicine, Université de Montreal

Date ☐☐ / ☐☐ / ☐☐☐☐ (d d / m m / y y y y)

Identification Code ☐☐

Section A: Socio-demographic information

A.1. What is your gender? ☐ Male ☐ Female

A.2. How old are you? ☐☐ years

A.3. Where were you born? (Specify your country of birth) .....

A.4. What languages can you speak, read and write?

☐ French+English+Punjabi ☐ English+Punjabi ☐ Punjabi and other..... ☐ Punjabi only

A.5. What is the highest level of education that you have completed?

☐ No schooling ☐ Elementary school ☐ High school ☐ College / Technical ☐ University

A.6. What is your occupational status?

☐ Full time worker
☐ Part time worker
☐ Occasional worker
☐ Self employed
☐ Retired
☐ Medically disabled
☐ Homemaker / Caregiver
☐ Out of work ☐☐ years / ☐☐ months

A.7. Do you have any dental insurance coverage?

☐ Yes ☐ No ☐ Not sure

Section B: Evaluation of photonovel

B.1. Do you agree that contents of the "Safeguard Your Smile" photonovel are easy to understand?

☐ Strongly agree
☐ Agree
☐ Strongly disagree
☐ Disagree
☐ Neutral/Neither agree nor disagree

B.2. Do you agree that "Safeguard Your Smile" photonovel is developed by someone who knows Punjabi community well?

☐ Strongly agree
☐ Agree
☐ Strongly disagree
☐ Disagree
☐ Neutral/Neither neither agree nor disagree

Questionnaire-photonovel evaluation

Thank you for your participation

Date
☐☐ / ☐☐ / ☐☐☐☐
d d m m y y y y

Identification Code ☐☐

B.3. How much time it took you to read the "Safeguard Your Smile" photonovel?

☐ ..... minutes

B.4. Does it matter that, when you read "Safeguard Your Smile" photonovel the people in story are like you?

☐ Yes ☐ No ☐ Somewhat

B.5. Is the "Safeguard Your Smile" photonovel a reflection on your own cultural oral health values?

☐ Yes ☐ No ☐ Somewhat

B.6. Do you agree that "Safeguard Your Smile" photonovel is good tool to learn oral hygiene self-care knowledge?

☐ Strongly agree
☐ Agree
☐ Strongly disagree
☐ Disagree
☐ Neutral/Neither agree nor disagree

B.7. Do you think that after reading the "Safeguard Your Smile" photonovel you have gained knowledge and skills on how to take good oral hygiene self-care?

☐ Yes ☐ No ☐ Somewhat

B.8. Do you think it helps to have oral health materials like this to read and gain knowledge if you do not speak French/ English languages well?

☐ Yes ☐ No ☐ Somewhat

B.9. Will you recommend "Safeguard Your Smile" photonovel to other members of Punjabi community?

☐ Yes ☐ No ☐ Maybe

B.10. Do you have any other suggestions/opinions/comments about "Safeguard Your Smile" photonovel?

Questionnaire-photonovel evaluation

Thank you for your participation

Appendix R: TS-READALD oral health literacy measurement tool

Date ☐☐ / ☐☐ / ☐☐☐☐ (d d / m m / y y y y)

Post intervention-OHL

Identification Code ☐☐☐☐☐☐☐☐☐☐

TS-READALD ORAL HEALTH LITERACY MEASUREMENT TOOL

Stage 1: Routing test

White	Correct	Incorrect	Not answered
Denture			
Abscess			
Restoration			
Fistula			
Temporo-mandibular			
Total score			

Score 0 or 1 → **Green cards (Low OHL stage 2)**
Score 2 or 3 → **Blue cards (Average OHL stage 2)**
Score 4 or 5 → **Yellow card (High OHL stage 2)**

Stage 2:

Green(Low)	Correct	Incorrect	Not answered
Braces			
Plaque			
Pulp			
Extraction			
Total score			
Blue (Average)	Correct	Incorrect	Not answered
Enamel			
Genetics			
Sealant			
Halitosis			
Cellulitis			
Incipient			
Total score			
Yellow (High)	Correct	Incorrect	Not answered
Hyperemia			
Hypoplasia			
Analgesia			
Total score			

Routing test stage 1	White	
Low stage 2	Green	
Average stage 2	Blue	
High stage 2	Yellow	
	Raw score	

Raw score	
Scaled score	

1

Date ☐☐ / ☐☐ / ☐☐☐☐ (d d / m m / y y y y)

Identification Code ☐☐☐☐☐☐☐☐☐☐

TS-REALD ORAL HEALTH LITERACY MEASUREMENT TOOL

Score of the routing test is added to stage 2 score in order to obtain the raw score and the scaled total score is obtained by translating score from the scaled score translational table provided below : (Source Stucky et al. 2011)

Routing test stage 1	White	
Low stage 2	Green	
Average stage 2	Blue	
High stage 2	Yellow	
	Raw score	

Raw score	
Scaled score	

SCALED SCORE TRANSLATIONAL TABLE OF TS-REALD

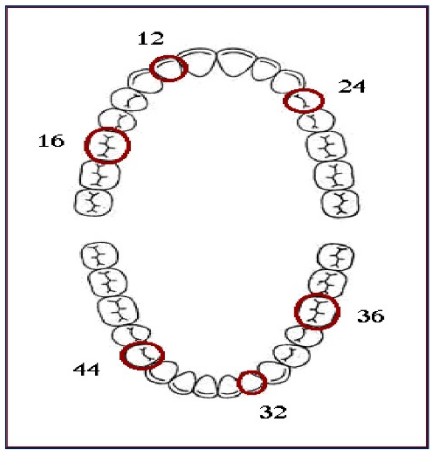
Low OHL		Average OHL		High OHL	
Raw score	**Scaled score**	**Raw score**	**Scaled Score**	**Raw score**	**Scaled score**
0	**27**	**--**	**--**	**--**	**--**
1	**31**	**--**	**--**	**--**	**--**
2	**35**	**2**	**39**	**--**	**--**
3	**38**	**3**	**43**	**--**	**--**
4	**41**	**4**	**45**	**4**	**56**
5	**45**	**5**	**48**	**5**	**61**
--		**6**	**51**	**6**	**64**
--		**7**	**54**	**7**	**68**
--		**8**	**57**	**8**	**73**
--		**9**	**61**	**--**	**--**

Dashes indicate unattainable scores based on the Two-stage REALD scoring rules. (Source of scaled score translational table: Stucky et al. 2011).

Scaled score ≤ 60 represent poor oral health literacy and scores ≥ 60 represent high oral health literacy (Mills 2011).

Appendix S: Loe and Sillness Indices

Loe and Sillness indices



Six Ramfjord teeth to be examined to assess plaque scores

Loe and Sillness Plaque Index (PI)

Criteria	Scores
No dental plaque seen in the gingival area	0
Dental plaque present on the free gingival margin	1
Moderate accumulation of dental plaque at the gingival margin seen by naked eye	2
Abundant dental plaque in the gingival margin seen by naked eye	3

Loe and Sillness Gingival Index (GI)

Criteria	Scores
No gingival inflammation	0
Mild inflammation-slight change in colour of gingiva	1
Moderate inflammation-moderate glazing, redness, edema and hypertrophy, tendency to bleed	2
Severe inflammation, marked redness and hypertrophy, tendency to spontaneous bleeding	3

Appendix T: Safeguard Your Smile Photonovel in Punjabi

ਆਪਣੀ ਮੁਸਕਾਨ ਦੀ ਰਾਖੀ ਕਰੋ

ਆਉ ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਸਹੀ ਸਵੈ-ਸੰਭਾਲ ਕਰਨੀ ਸਿੱਖੀਏ

ਡਾ. ਨਵਦੀਪ ਕੌਰ

ਬੀ.ਡੀ.ਐੱਸ, ਐਮ.ਐੱਸ.ਸੀ, ਪੀ.ਐੱਚ.ਡੀ ਕੈਂਡੀਡੇਟ

ਡਾਕਟਰੀ ਵਿਭਾਗ, ਮੌਂਟ੍ਰਿਅਲ ਯੂਨੀਵਰਸਿਟੀ

Université de Montréal

ਸਿੱਖ ਵੂਮਨ ਐਸੋਸਿਏਸ਼ਨ ਔਫ ਮੌਂਟਿਰ੍ਅਲ ਦੀ ਪ੍ਰਬੰਧਕ ਕਮੇਟੀ ਦੇ ਵਿਚਾਰਾਂ, ਸ਼ਮੂਲੀਅਤ ਅਤੇ ਸਹਿਯੋਗ ਲਈ ਧੰਨਵਾਦ।


ਲਉ ਜੀ ਪੰਮੀ ਵੀ ਆ ਗਈ!
ਸਤਿ ਸ੍ਰੀ ਅਕਾਲ ਪੰਮੀ,ਅੱਜ ਤੂੰ ਕਿਵੇਂ ਲੇਟ ਹੋ ਗਈ?
ਸਤਿ ਸ੍ਰੀ ਅਕਾਲ ਅੱਜ ਮੈਂ ਆਪਣੀ ਸੱਸ ਨੂੰ ਏਅਰਪੋਰਟ ਤੋਂ ਲੈਣ ਗਈ ਸੀ ਅਤੇ ਰਸਤੇ ਵਿਚ ਟਰੈਫਿਕ ਜਾਮ ਹੋਣ ਕਾਰਣ ਲੇਟ ਹੋ ਗਈ।
ਕੀ ਤੁਹਾਡੀ ਸੱਸ ਘੁੰਮਣ ਫਿਰਣ ਗਏ ਸੀ?
ਨਹੀ,ਅਸਲ ਵਿਚ ਮੇਰੀ ਸੱਸ ਇੰਡਿਆ ਆਪਣੇ ਦੰਦਾਂ ਦਾ ਇਲਾਜ ਕਰਵਾਉਣ ਗਏ ਸੀ। ਤੁਹਾਨੂੰ ਤਾਂ ਪਤਾ ਹੈ ਕਿ ਇੱਥੇ ਕੈਨੇਡਾ ਵਿਚ ਦੰਦਾਂ ਦਾ ਇਲਾਜ ਕਿੰਨਾ ਮਹਿੰਗਾ ਹੁੰਦਾ ਹੈ।
ਮੈਨੂੰ ਤਾਂ ਆਪ ਦੰਦਾਂ ਦੀ ਬੜੀ ਮੁਸ਼ਕਿਲ ਹੈ ਪਰ ਮੇਰੇ ਕੋਲ ਇੰਸ਼ੋਰੈਂਸ ਨਹੀਂ ਹੈ ਅਤੇ ਮੈਂ ਖਰਚੇ ਤੋਂ ਡਰਦੀ ਕੈਨੇਡਾ ਵਿਚ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਕੋਲ ਨਹੀਂ ਜਾਂਦੀ।

ਵੀਰਾ, ਮੈਂਨੂੰ ਵੀ ਦੰਦਾਂ ਦੀ ਬੜੀ ਮੁਸ਼ਕਿਲ ਹੈ ਪਰ ਮੈਂ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਕੋਲ ਜਾਣ ਤੋਂ ਡਰਦੀ ਹਾਂ ਕਿਉਂਕਿ ਮੈਂਨੂੰ ਇਕ ਵਾਰ ਮਾੜਾ ਤਜਰਬਾ ਹੋਇਆ ਸੀ।

ਪਿਛਲੇ ਕੁਝ ਸਮੇਂ ਤੋਂ ਬੁਰਸ਼ ਕਰਣ ਵੇਲੇ ਮੇਰੇ ਮਸੂੜਿਆਂ ਤੋਂ ਕਈ ਵਾਰ ਖੂਨ ਆਉਂਦਾ ਹੈ ਅਤੇ ਮੂੰਹ ਚੋਂ ਬੋ ਜਿਹੀ ਵੀ ਆਉਂਦੀ ਹੈ ਪਰ ਮੈਂ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਕੋਲ ਜਾਣ ਤੋਂ ਡਰਦੀ ਹਾਂ।

ਰਾਣੀ ਭੈਣਜੀ ਮੈਂਨੂੰ ਵੀ ਬਿਲਕੁਲ ਤੁਹਾਡੇ ਵਾਂਗ ਹੀ ਦੰਦਾਂ ਦੀ ਮੁਸ਼ਕਿਲ ਸੀ,ਪਰ ਜਦੋਂ ਮੈਂ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਕੋਲ ਗਈ ਤਾਂ ਉਹਨੇ ਪਹਿਲਾਂ ਮੇਰੇ ਦੰਦਾਂ ਦੀ ਸਫਾਈ ਕੀਤੀ ਅਤੇ ਫਿਰ ਮੈਂਨੂੰ ਦੰਦਾਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਬਾਰੇ ਬੜੀ ਚੰਗੀ ਤਰਾਂ ਸਮਝਾਇਆ।

ਮੈਂ ਆਪਣੇ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਦੀ ਸਲਾਹ ਅਨੁਸਾਰ ਰੋਜ਼ਾਨਾ ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਚੰਗੀ ਤਰਾਂ ਸਵੈ-ਸੰਭਾਲ ਕਰਦੀ ਹਾਂ ਅਤੇ ਹੁਣ ਮੈਂਨੂੰ ਦੰਦਾਂ ਦੀ ਕੋਈ ਮੁਸ਼ਕਿਲ ਨਹੀਂ ਹੈ।

ਵੀਰਾ, ਕੀ ਤੁਸੀਂ ਆਪਣੇ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਦੁਆਰਾ ਦਿੱਤੀ ਜਾਣਕਾਰੀ ਸਾਡੇ ਸਾਰਿਆਂ ਨਾਲ ਸਾਂਝੀ ਕਰ ਸਕਦੇ ਹੋ?

ਹਾਂਜੀ ਜ਼ਰੂਰ,ਸਭ ਤੋਂ ਪਹਿਲਾਂ ਮੈਂਨੂੰ ਮੇਰੇ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਨੇ ਇਹ ਦੱਸਿਆ ਕਿ ਆਮ ਤੌਰ ਤੇ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੇ ਰੋਗ "ਪਲਾਕ" ਦੇ ਕਾਰਣ ਸ਼ੁਰੂ ਹੁੰਦੇ ਹਨ।

ਵੀਰਾ ਇਹ "ਪਲਾਕ" ਕੀ ਹੁੰਦੀ ਹੈ?

ਪਲਾਕ
ਥੁੱਕ,ਭੋਜਨ ਅਤੇ ਜਰਾਸੀਮਾਂ (ਬੈਕਟੀਰੀਆ) ਦੇ ਇਕੱਠ ਤੋਂ ਬਣਦੀ ਹੈ। ਇਹ ਇਕ ਲੇਸਲੀ ਅਤੇ ਰੰਗਹੀਨ ਪਰਤ ਵਾਂਗ ਹੁੰਦੀ ਹੈ, ਜੋ ਕਿ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਨੂੰ ਬੁਰਸ਼ ਕਰਨ ਤੋਂ ਬਾਅਦ ਤਕਰੀਬਨ 8-10 ਘੰਟੇ ਬਾਅਦ ਦੁਬਾਰਾ ਜੰਮਦੀ ਹੈ।

ਇਸ ਪਲਾਕ ਨੂੰ ਜੇ ਰੋਜ਼ਾਨਾ ਸਾਫ ਨਾ ਕੀਤਾ ਜਾਵੇ ਤਾਂ ਇਹ ਸਖਤ ਹੋ ਕੇ ਕਰੇੜਾ ਬਣ ਜਾਂਦੀ ਹੈ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀਆਂ ਬੀਮਾਰੀਆਂ ਦਾ ਖਤਰਾ ਵਧਾ ਸਕਦੀ ਹੈ। ਨਵੀਂ ਖੋਜ ਮੁਤਾਬਿਕ ਮਸੂੜਿਆਂ ਦੇ ਰੋਗ ਕਈ ਹੋਰ ਬੀਮਾਰੀਆਂ ਜਿਵੇਂ ਕਿ ਸ਼ੂਗਰ, ਦਿਲ ਦੀ ਬਿਮਾਰੀ ਅਤੇ ਨਿਮੂਨੀਆ ਨਾਲ ਵੀ ਸੰਭੰਧਿਤ ਹਨ, ਇਸ ਲਈ ਪਲਾਕ ਤੇ ਸ਼ੁਰੂ ਤੋਂ ਹੀ ਕਾਬੂ ਪਾਉਣਾ ਬੜਾ ਜ਼ਰੂਰੀ ਹੈ।

ਵੀਰਾ ਕੀ ਤੁਸੀਂ ਸਾਨੂੰ ਦੱਸ ਸਕਦੇ ਹੋ ਕਿ ਅਸੀਂ ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਕਿਵੇਂ ਕਰ ਸਕਦੇ ਹਾਂ?

ਹਾਂਜੀ ਮੀਨੂੰ, ਜੋ ਕੁਝ ਮੇਰੇ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਨੇ ਮੈਨੂੰ ਦੱਸਿਆ, ਉਹ ਮੈਂ ਤੁਹਾਨੂੰ ਸਾਰਿਆਂ ਨੂੰ ਦੱਸ ਸਕਦੀ ਹਾਂ।

ਦੰਦਾਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਲਈ ਤਿੰਨ ਗੱਲਾਂ ਬਹੁਤ ਹੀ ਜ਼ਰੂਰੀ ਹਨ। ਸਭ ਤੋਂ ਪਹਿਲੀ ਗੱਲ ਹੈ ਕਿ ਤੁਸੀਂ ਰੋਜ਼ਾਨਾ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਸਹੀ ਤਰੀਕੇ ਨਾਲ ਦੋ ਵਾਰ ਜ਼ਰੂਰ ਬੁਰਸ਼ ਕਰੋ।

ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਸਹੀ ਤਰੀਕੇ ਨਾਲ ਬੁਰਸ਼ ਕਰਨ ਲਈ ਸਭ ਤੋਂ ਪਹਿਲਾਂ ਆਪਣੇ ਬੁਰਸ਼ ਨੂੰ 45 ਡਿਗਰੀ ਦੇ ਕੋਣ ਤੇ ਆਪਣੇ ਦੰਦਾਂ ਅਤੇ ਮਸੂੜਿਆਂ ਦੀ ਲਾਈਨ ਉੱਤੇ ਰੱਖਕੇ, ਬੁਰਸ਼ ਨੂੰ ਅੱਗੇ-ਪਿੱਛੇ ਕਰਦਿਆਂ ਆਪਣੇ ਸਾਰੇ ਦੰਦਾਂ ਨੂੰ ਪੋਲੇ-ਪੋਲੇ ਪਰ ਚੰਗੀ ਤਰਾਂ ਸਾਫ ਕਰੋ।

ਰੋਜ਼ਾਨਾ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਤਕਰੀਬਨ 2 ਮਿੰਟ ਲਾ ਕੇ ਇਕ ਵਾਰ ਸਵੇਰੇ ਨਾਸ਼ਤੇ ਤੋਂ ਬਾਅਦ ਅਤੇ ਇਕ ਵਾਰ ਰਾਤ ਨੂੰ ਸੌਂਣ ਤੋਂ ਪਹਿਲਾਂ ਸਹੀ ਤਰੀਕੇ ਨਾਲ ਬੁਰਸ਼ ਕਰਣਾ ਲਾਜ਼ਮੀ ਹੈ।

ਦੂਸਰੀ ਬਹੁਤ ਜ਼ਰੂਰੀ ਗੱਲ ਇਹ ਹੈ ਕਿ ਤੁਸੀਂ ਆਪਣੀ ਜਬਾਨ ਨੂੰ ਆਪਣੇ ਦੰਦਾਂ ਦੇ ਬੁਰਸ਼ ਜਾਂ ਜਬਾਨ ਸਾਫ ਕਰਨ ਵਾਲੇ ਸਕਰੇਪਰ ਨਾਲ ਰੋਜ਼ਾਨਾ ਇਕ ਵਾਰ ਜ਼ਰੂਰ ਸਾਫ ਕਰੋ।

ਵੀਰਾ ਕੀ ਸਾਨੂੰ ਕੋਈ ਖਾਸ ਕਿਸਮ ਦਾ ਬੁਰਸ਼ ਜਾਂ ਦੰਦਾਂ ਦਾ ਪੇਸਟ ਵਰਤਨਾ ਚਾਹੀਦਾ ਹੈ?

ਹਾਂਜੀ, ਸਾਨੂੰ ਨਰਮ ਕਿਸਮ ਦਾ ਦੰਦਾਂ ਦਾ ਬੁਰਸ਼ ਅਤੇ ਫਲੋਰਾਈਡ ਵਾਲਾ ਦੰਦਾਂ ਦਾ ਪੇਸਟ ਹੀ ਵਰਤਨਾ ਚਾਹੀਦਾ ਹੈ।

ਵੀਰਾ ਸਾਨੂੰ ਦੰਦਾਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਲਈ ਹੋਰ ਕੀ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ?

ਤੀਸਰੀ ਗੱਲ ਜੋ ਕਿ ਬਹੁਤ ਹੀ ਜ਼ਰੂਰੀ ਹੈ, ਉਹ ਹੈ ਫਲੋਸ ਕਰਨੀ। ਫਲੋਸ ਵੇਖਣ ਨੂੰ ਧਾਗੇ ਵਾਂਗ ਹੁੰਦੀ ਹੈ ਅਤੇ ਇਸ ਨੂੰ ਦੋ ਦੰਦਾਂ ਦੇ ਜੋੜਾਂ ਵਿਚਕਾਰ ਪਲਾਕ ਅਤੇ ਫਸੇ ਖਾਣੇ ਨੂੰ ਸਾਫ ਕਰਨ ਲਈ ਵਰਤਿਆ ਜਾਂਦਾ ਹੈ।

ਵੀਰਾ, ਮੈਂ ਫਲੋਸ ਵਰਤਿਆ ਸੀ ਪਰ ਆਹ ਦੇਖ, ਮੇਰੇ ਇਹਨਾਂ ਮਸੂੜਿਆਂ ਵਿਚ ਵੱਜ ਗਿਆ।

ਫਲੋਸ ਨੂੰ ਮਸੂੜਿਆਂ ਤੋਂ ਵੱਜਣ ਤੋਂ ਬਚਾਉਣ ਲਈ ਮੈਂ ਤੁਹਾਨੂੰ ਫਲੋਸ ਕਰਨ ਦਾ ਸਹੀ ਤਰੀਕਾ ਦੱਸਦੀ ਹਾਂ ਜਿਹੜਾ ਕਿ ਮੈਨੂੰ ਮੇਰੇ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਨੇ ਦੱਸਿਆ ਹੈ।

ਤਕਰੀਬਨ 18 ਇੰਚ ਲੰਮਾ ਫਲੋਸ ਦਾ ਧਾਗਾ ਲਉ ਅਤੇ ਇਹਦੇ ਦੋਹਾਂ ਸਿਰਿਆਂ ਨੂੰ ਆਪਣੇ ਦੋਹਾਂ ਹੱਥਾਂ ਦੀਆਂ ਵਿਚਕਾਰਲੀਆਂ ਉਂਗਲਾਂ ਤੇ ਲਪੇਟ ਲਉ ਤਾਂ ਜੋ ਤਕਰੀਬਨ 2-3 ਇੰਚ ਲੰਮਾ ਫਲੋਸ ਦਾ ਪੀਸ ਰਹਿ ਜਾਵੇ।

ਫਿਰ ਇਸ ਫਲੋਸ ਦੇ ਪੀਸ ਨੂੰ ਆਪਣੇ ਅੰਗੂਠੇ ਅਤੇ ਪਹਿਲੀਆਂ ਉਂਗਲਾਂ ਨਾਲ ਫੜਕੇ ਆਪਣੇ ਦੰਦਾਂ ਦੇ ਜੋੜਾਂ ਦੇ ਵਿਚਕਾਰ ਫਸਾ ਕੇ ਹੇਠਾਂ ਵਲ ਨੂੰ ਪੋਲੇ ਜਿਹੇ ਖਿੱਚਣਾ ਹੈ। ਸਾਰੇ ਦੰਦਾਂ ਦੇ ਜੋੜਾਂ ਵਿਚਕਾਰ ਫਲੋਸ ਕਰਨ ਲਈ ਤਕਰੀਬਨ 2 ਮਿੰਟ ਦਾ ਸਮਾਂ ਲਗਦਾ ਹੈ।

ਦੂਸਰਾ ਤਰੀਕਾ ਹੈ ਕਿ ਤੁਸੀਂ ਹੋਲਡਰ ਲੱਗੀ ਫਲੋਸ (ਫਲੋਸਰ) ਨਾਲ ਵੀ ਅਸਾਨੀ ਨਾਲ ਫਲੋਸ ਕਰ ਸਕਦੇ ਹੋ। ਇਕ ਹੋਰ ਗੱਲ ਦਾ ਖਾਸ ਖਿਆਲ ਰੱਖਣਾ ਹੈ ਕਿ ਹਰੇਕ ਦੰਦਾਂ ਦੇ ਜੋੜਾਂ ਵਿਚਕਾਰ ਫਲੋਸ ਦਾ ਸਾਫ ਹਿੱਸਾ ਹੀ ਇਸਤੇਮਾਲ ਕਰਨਾ ਹੈ। ਆਖਿਰੀ ਗੱਲ, ਦਿਨ ਵਿਚ ਦੋ ਵਾਰ ਚੰਗੇ ਮਾਊਥਵਾਸ਼ ਨਾਲ ਕੁਰਲੀ ਕਰਨੀ ਵੀ ਜਰੂਰੀ ਹੈ।

ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਚੰਗੀ ਸਵੈ-ਸੰਭਾਲ ਲਈ ਇਹ ਗੱਲਾਂ ਯਾਦ ਰੱਖੋ:

1. ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਰੋਜ਼ਾਨਾ ਦਿਨ ਵਿਚ ਦੋ ਵਾਰ ਫਲੋਰਾਇਡ ਵਾਲੇ ਦੰਦਾਂ ਦੇ ਪੇਸਟ ਨਾਲ ਬੁਰਸ਼ ਕਰੋ।
2. ਰੋਜ਼ਾਨਾ ਦਿਨ ਵਿਚ ਇਕ ਵਾਰ ਫਲੋਸ ਕਰੋ।
3. ਰੋਜ਼ਾਨਾ ਇਕ ਵਾਰ ਆਪਣੀ ਜਬਾਨ ਸਾਫ ਕਰੋ।
4. ਦਿਨ ਵਿਚ ਦੋ ਵਾਰ ਮਾਊਥਵਾਸ਼ ਨਾਲ ਕੁਰਲੀ ਕਰੋ।
5. ਚੰਗੀ ਖੁਰਾਕ ਖਾਉ।
6. ਹਰ 6 ਮਹੀਨੇ ਬਾਅਦ ਦੰਦਾਂ ਦੇ ਡਾਕਟਰ ਤੋਂ ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਜਾਂਚ ਕਰਾਉ।

ਮੇਰੀ ਯੋਜਨਾ

ਮੇਰਾ ਟੀਚਾ ਹੈ ਕਿ ਮੈਂ ਅਗਲੇ 12 ਹਫਤੇ ਰੋਜ਼ਾਨਾ ਦੋ ਵਾਰ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ ਬੁਰਸ਼, ਇਕ ਵਾਰ ਫਲੌਸ,ਇਕ ਵਾਰ ਜ਼ੁਬਾਨ ਦੀ ਸਫਾਈ ਅਤੇ ਦੋ ਵਾਰ ਕੁਰਲੀ ਕਰਾਂਗਾ/ਕਰਾਂਗੀ। ਇਸ ਲਈ ਮੈਂ ਆਪਣੇ ਲਈ ਹੇਠ ਲਿਖੀ ਯੋਜਨਾ ਬਣਾਈ ਹੈ:
ਮੈਂ ਹਰ ਰੋਜ਼ 2 ਵਾਰ ਆਪਣੇ ਦੰਦਾਂ ਨੂੰ 2 ਮਿੰਟ ਲਈ ਬੁਰਸ਼, ਇਕ ਵਾਰੀ 2 ਮਿੰਟ ਲਈ ਫਲੌਸ, 1 ਵਾਰੀ ਜ਼ੁਬਾਨ ਦੀ ਸਫਾਈ ਅਤੇ 2 ਵਾਰੀ ਕੁਰਲੀ ਕਰਾਂਗਾ/ਕਰਾਂਗੀ।

ਕਦੋਂ?.....

ਕਿੱਥੇ?.....

ਕਿਹੜੀ ਚੀਜ਼/ਗੱਲ ਮੈਨੂੰ ਇਸਦਾ ਚੇਤਾ ਕਰਵਾਏਗੀ?.....

ਜੇਕਰ ਕਿਸੇ ਕਾਰਣ ਮੈਂ ਬੁਰਸ਼,ਫਲੌਸ, ਜ਼ੁਬਾਨ ਸਾਫ ਜਾਂ ਕੁਰਲੀ ਨਾ ਕਰ ਸਕਾਂ ਤਾਂ ਫਿਰ ਮੇਰੀ ਹੇਠ ਲਿਖੀ ਯੋਜਨਾ ਹੋਵੇਗੀ:

ਕਦੋਂ?.....

ਕਿੱਥੇ?.....

ਹਸਤਾਖਰ..... ਮਿਤੀ.....

ਅਗਲੇ 12 ਹਫਤੇ ਤੁਸੀਂ ਆਪਣੇ ਦੰਦਾਂ ਦੀ ਸਵੈ-ਸੰਭਾਲ ਕਰਨ ਤੋਂ ਬਾਅਦ ਇਸ ਕੈਲੰਡਰ ਵਿਚ ਹਰ ਰੋਜ਼ ਇਕ ਸਹੀ ਦਾ ਨਿਸ਼ਾਨ ਲਾ ਦਿਉ।

ਮੇਰਾ ਕੈਲੰਡਰ

	ਹਫਤਾ 1	ਹਫਤਾ 2	ਹਫਤਾ 3	ਹਫਤਾ 4	ਹਫਤਾ 5	ਹਫਤਾ 6	ਹਫਤਾ 7	ਹਫਤਾ 8	ਹਫਤਾ 9	ਹਫਤਾ 10	ਹਫਤਾ 11	ਹਫਤਾ 12
ਸੋਮਵਾਰ												
ਮੰਗਲਵਾਰ												
ਬੁੱਧਵਾਰ												
ਵੀਰਵਾਰ												
ਸ਼ੁਕਰਵਾਰ												
ਸ਼ਨੀਵਾਰ												
ਐਤਵਾਰ												
ਹਫਤੇ ਵਿਚ ਕਿੰਨੀ ਵਾਰੀ												

Appendix U: Safeguard Your Smile Photonovel in Punjabi

SAFEGUARD YOUR SMILE

Lets learn how to do good oral hygiene self-care

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We are thankful to the executive committee members of the Sikh Women Association of Montreal for their particpation.


LOOK PAMMI IS HERE!
SAT SRI AKAL PAMMI, HOWCOME YOU GOT LATE TODAY?
SAT SRI AKAL, I WENT TO PICK UP MY MOTHER IN LAW FROM AIRPORT AND GOT STUCK IN TRAFFIC DUE TO RUSH HOUR.
DID YOUR MOTHER IN LAW GO FOR A VACATION ?
NO IN FACT MY MOTHER IN LAW HAD LOTS OF DENTAL PROBLEMS AND SHE WENT TO INDIA TO GET HER DENTAL TREATMENT DONE SINCE YOU KNOW IT IS SO EXPENSIVE HERE IN CANADA.
I CAN UNDERSTAND, I HAVE MANY DENTAL PROBLEMS BUT SINCE I HAVE NO DENTAL INSURANCE AND DENTAL TREATMENT IS QUITE EXPENSIVE, I DON'T GO TO DENTIST HERE IN CANADA.


VEERA,I HAVE DENTAL PROBLEMS ALSO BUT I AM SO SCARED TO GO TO DENTIST SINCE ONCE I HAD A BAD EXPERIENCE.
WHILE BRUSHING, SOMETIMES I HAVE BLEEDING FROM MY GUMS AND MY MOUTH SMELLS BAD ALSO BUT STILL I AM SCARED TO GO TO A DENTIST.
SISTER RANI, I HAD SIMILAR DENTAL PROBLEMS LIKE YOU BUT WHEN I WENT TO DENTIST, FIRST HE DID CLEANING OF MY TEETH AND THEN EXPLAINED ME IN DETAIL ABOUT HOW TO DO ORAL HYGIENE SELF -CARE AT HOME.
EVER SINCE I DAILY DO ORAL HYGIENE SELF-CARE AND I DO NOT HAVE DENTAL PROBLEMS ANY MORE.
VEERA, COULD YOU SHARE THE KNOWLEDGE THAT YOUR DENTIST GAVE TO YOU WITH ALL OF US?

SURE,THE FIRST THING THAT MY DENTIST TOLD ME WAS THAT MAIN CAUSE OF THE COMMON GUM PROBLEMS SUCH AS GINGIVITIS IS DENTAL PLAQUE.

VEERA, WHAT IS DENTAL PLAQUE?

DENTAL PLAQUE IS FORMED WITH SALIVA, BACTERIA AND FOOD PARTICLES.IT IS A COLOURLESS THIN LAYER WHICH FORMS EVERY 8-10 HOURS AFTER TOOTH BRUSHING.

IF THIS DENTAL PLAQUE IS NOT REMOVED DAILY, IT HARDENS TO FORM CALCULUS AND INCREASES RISK OF GUM DISEASES.RECENT RESEARCH HAS ASSOCIATED DENTAL PLAQUE WITH OTHER DISEASES SUCH AS DIABETES, HEART DISEASE AND PNEUMONIA. THUS IT IS VERY IMPORTANT TO CONTROL DENTAL PLAQUE.

VEERA COULD YOU TELL US HOW CAN WE DO ORAL HYGIENE SELF-CARE AT HOME?

SURE, I CAN SHARE THE KNOWLEDGE THAT MY DENTIST GAVE ME.

IT IS VERY IMPORTANT TO DO THREE THINGS DAILY. FIRST THING IS THAT YOU MUST PROPERLY BRUSH YOUR TEETH TWICE EVERYDAY.

THE PROPER TECHNIQUE TO BRUSH YOUR TEETH IS THAT YOU PLACE YOUR TOOTH BRUSH AT AN ANGLE OF 45 DEGREES AT YOUR GUM LINE AND THEN MOVE YOUR TOOTH BRUSH BACK AND FORTH GENTLY CLEANING ALL SURFACES OF YOUR TEETH.

IT IS VERY IMPORTANT TO BRUSH YOUR TEETH DAILY FOR AT LEAST 2 MINUTES ONCE AFTER BREAKFAST AND ONCE BEFORE GOING TO BED.

SECOND IMPORTANT THING IS THAT YOU MUST CLEAN YOUR TONGUE AT LEAST ONCE DAILY EITHER WITH YOUR TOOTH BRUSH OR USE A TONGUE SCRAPER TO CLEAN IT.


VEERA, WHAT KIND OF TOOTH BRUSH OR TOOTH PASTE SHOULD WE USE?
WE SHOULD USE SOFT KIND OF TOOTH BRUSH AND A TOOTH PASTE HAVING FLUORIDE IN IT.
VEERA WHAT ELSE SHOULD WE DO FOR PROPER ORAL HYGIENE SELF-CARE?
THIRD VERY IMPORTANT THING IS TO FLOSS YOUR TEETH DAILY. FLOSS LOOKS LIKE A THREAD AND IS USED TO CLEAN DENTAL PLAQUE AND FOOD PARTICLES STUCK IN BETWEEN AREAS OF YOUR TEETH.
VEERA, I TRIED USING FLOSS BUT LOOK I HURT MY GUMS HERE WITH IT
TO AVOID HURTING YOUR GUMS WHILE FLOSSING, I WILL TEACH YOU PROPER TECHNIQUE OF USING FLOSS THAT MY DENTIST SHOWED ME.


TAKE ALMOST 18 INCHES LONG PIECE OF A DENTAL FLOSS AND ROLL ITS ENDS AROUND MIDDLE FINGER OF YOUR EACH AND THEN HOLD ALMOST 1-2 INCHES OF IT WITH YOUR THUMBS AND FIRST FINGERS.
NEXT, STICK THIS FLOSS IN BETWEEN YOUR TWO TEETH AND GENTLY SLIDE IT DOWN ALONG TOOTH SURFACE AWAY FROM YOUR GUM LINE.
MAKE SURE TO ALWAYS USE A CLEAN PART OF THE FLOSS TO CLEAN EACH AREA IN BETWEEN YOUR TEETH. IT TAKES ALMOST 2 MINUTES TO FLOSS ALL OF YOUR TEETH.
LAST IMPORTANT THING IS THAT RINSE YOUR MOUTH TWICE EVERYDAY WITH A GOOD MOUTH RINSE .
REMEMBER FOR GOOD ORAL HYGIENE SELF-CARE
1. Brush your teeth twice daily with a fluoridated tooth paste.
2. Floss your teeth once daily.
3. Clean your tongue once daily either with your tooth brush or tongue scraper.
4. Rinse your mouth twice daily with a mouth rinse.
5. Eat healthy and balanced diet.
6. Visit your dentist once every six months for a check-up.

My action plan

My goal is that for next 12 weeks, every day I will brush my teeth twice a day, floss once a day, clean my tongue once a day and rinse my mouth twice a day and I have made following action plan for myself:

My action plan is that for next 12 weeks, every day I will I will brush my teeth for 2 minutes twice a day, floss for 2 minutes once a day, clean my tongue once a day and rinse my mouth twice a day.

When?.....

Where?.....

What cue will remind me of it?.....

If due to some reason, I am not able to follow my routine then my coping plan will be:

When?.....

Where?.....

Signature..... Date.....

Check mark this calender once daily after completing your routine of oral hygiene self care

My Calendar

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Monday												
Tuesday												
Wednesday												
Thursday												
Friday												
Saturday												
Sunday												
How many times in a week												

Appendix V: Brochure given to control group participants

Brushing

Ideally, you should brush your teeth after every meal because it's in the minutes following a meal that bacteria starts to attack your teeth. Brushing before bed is probably most important because it limits the damage caused by bacteria during the night. A toothbrush lasts about three months, beyond which its effectiveness cannot be guaranteed. You can ask your dentist or dental hygienist for advice on choosing a toothbrush suited to your needs and for information about the best way to brush your teeth (there are several). Don't forget that a good brushing should last about three minutes.

Dental floss

Floss enables you to dislodge debris, plaque and bacteria that cannot be removed by brushing alone. But for some people, dental floss is not the ideal choice (e.g. if there are wide spaces between your teeth). There are other accessories that enable you to clean areas that a toothbrush cannot reach. Ask your dentist or dental hygienist for advice on the best accessory for you and information on the appropriate way to use it.

Fluoride

Fluoride is a natural substance that protects teeth from cavities. The most common sources of fluoride are the following: toothpastes, certain mouthwashes and the water of some municipalities. In children, an adequate amount of fluoride from a very early age prevents cavities. But be careful, because an excessive amount of fluoride can cause another problem, dental fluorosis.

A proper amount of fluoride prevents cavities without causing dental fluorosis.

Choose dental products, such as toothpaste, that contain fluoride (or sodium fluoride).

Contact your municipality to find out if the water that runs from your taps is fluorinated.

If the level of fluoride in your water is insufficient, or if you have doubts as to the amount of fluoride that your child is receiving, talk to your doctor or dentist about the possibility of giving a fluoride supplement. Do not make the decision yourself without seeking medical advice. For more information on oral health, visit the CDA site at www.cda-adc.ca

To protect your oral health...

...and prevent cavities, plaque build-up and gingivitis, follow the advice below.

Brush your teeth and tongue at least twice a day, using a toothbrush with soft bristles and a toothpaste containing sodium fluoride.

Floss every day.

Adopt a healthy diet. Avoid sugar; it is the worst enemy of dental health.

Examine your mouth regularly in order to detect any problems (abnormal bleeding, bad breath, lesions, unusual appearance of the gums, etc.).

Visit your dentist regularly.

Source of contents of this brochure is:

http://www.jeancoutu.com/en/health/health-tips/oral-health-hygiene-for-life/

Oral health: hygiene for life

Dental plaque, cavities and gingivitis can be treated; more importantly, they can be prevented with sound oral hygiene.

Oral health is an important part of general health. Teeth and gums are essential for eating, chewing, talking, etc. Furthermore, a healthy smile contributes to a nice appearance and promotes self-esteem. By giving your mouth the appropriate care, you will help maintain the health of your teeth and gums for as long as possible.

Plaque and tartar

Plaque is an invisible film loaded with food and bacterial debris that builds up on your teeth every day. With time, plaque hardens and turns into tartar. Only a dentist can remove tartar during a professional cleaning. Plaque is the leading cause of cavities and gum disease like gingivitis. Brushing and flossing are two basic solutions to remove plaque and prevent tartar build-up. The best way to ensure that plaque does not become a problem is to remove it every day.

Gingivitis

Gingivitis is a minor inflammation of the gums caused by plaque build-up. Signs of gingivitis may include bleeding gums when brushing or flossing, red or swollen gums, and bad breath. Several factors contribute to the development of gingivitis, including smoking, stress, hormonal changes (such as those occurring during pregnancy), and certain diseases. For example, if you are diabetic, your risk of developing gingivitis is three times higher. If gingivitis is not adequately treated, it can cause more serious problems. Certain antiseptic mouthwashes, sold with or without a prescription, can prevent the appearance or progression of gingivitis. Talk to your dentist or pharmacist. Choose a tooth paste recognized by the Canadian Dental Association. (CDA) for prevention of cavities and gingivitis.

Appendix W: Linear mixed model -The WOCF table)

Linear mixed model -Worst Outcome Carried Forward –WOCF table						
Outcome variable	**Time Point (Pre-versus Post) Control group**		**Randomized group Assignment (Control versus Intervention) Pre-intervention**		**Randomized Group Assignment Interaction with Time Post-intervention**	
	Effect (95% CI)	**Significance**	**Effect (95% CI)**	**Significance**	**Effect (95% CI)**	**Significance**
Oral hygiene self-care knowledge	0.56 (0.64-1.04)	0.0269	0.21 (-0.39-0.81)	0.4886	3.44 (2.74-4.13)	<0.0001
Oral hygiene self-care behaviour	0.34 (0.09-0.77)	0.1225	-0.13 (-0.708-0.441)	0.6472	2.80 (2.18-3.41)	<0.0001
OHL Score	0.60 (-0.26-1.45)	0.1681	0.63 (-2.05-3.31)	0.6431	5.02 (3.81-6.23)	<0.0001
Plaque Index	-0.08 (-0.18-0.01)	0.0808	0.04 (-0.10-0.19)	0.5632	-0.79 (-0.92 - -0.65)	<0.0001
Gingival Index	-0.03 (-0.13-0.07)	0.5517	0.11 (-0.08-0.30)	0.2619	-0.78 (-0.92 - -0.64)	<0.0001

Annexure 1

Authorization by co-authors of the manuscripts included in this thesis

We certify that we have participated and contributed sufficiently for the completion of the manuscript (s) and have agreed to have our names listed as a co-author. All persons who have made contributions to this work, but are not co-authors are mentioned in the acknowledgement.

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Signatures

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Annexure 2

Publication 1

Reducing health inequalities: a hard nut to crack

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Health inequalities are one of the major concerning issues for public health (160). Even in developed countries like US and Canada, burden of diseases is high among vulnerable populations and till date health inequalities continue to persist (161). Although Canada was pioneer in issuing two landmark documents: i) Lalonde's report (162) delineating that health inequalities are linked both to individual as well as environmental factors and ii) the Ottawa Charter (163) for health promotion, yet there has been little progress in policy uptake of such ideas to tackle existing health inequalities in Canada.

"Inverse care law"

Common sense dictates that improvement in health through interventions or policies contributes in reducing inequalities. However, Macintyre has pointed that "the impact of a well-intended intervention or a policy on health is not the same as the impact on health inequalities"(164). Furthermore, there is a "tension between goals of generating health gain and the reduction of inequalities" (165). Watt suggested that a focus of interventions on individual behaviour change only and not addressing social determinants has limited impact in reducing health inequalities

and may sometimes even exacerbate them (166, 167). This argument has been supported by "inverse care law" i.e. in general those in most need of benefiting from an intervention are least likely to receive it since the capacity to obtain benefit of intervention may be limited among the disadvantaged group than advantaged group (168). Thus, although some interventions may increase overall health benefits yet paradoxically they may even exacerbate inequalities by having greater impact on better off people (164, 168-171).

How health inequalities can be reduced?

Lately, there has been a consensus view in literature that in order to reduce inequalities it is critical to address various health determinants of health such as biological, social, economic, political, environmental, behavioural and cultural (172). Distinctly, such efforts require policy changes that are directly concerned with employment, education and income. For example, it involves investment in education, social security and development of labor market policies to ameliorate position of disadvantaged groups (173). Thus, some researchers argue that upstream interventions can potentially reduce inequalities in health as compared to downstream interventions (170, 174). Furthermore, a recent systematic review has reported that downstream preventive interventions increase inequalities than upstream interventions (175).

Many readers may be familiar with following story by Saul Allinsky, a twentieth century social reformer: "Imagine a large river with a high waterfall. At the bottom of this waterfall hundreds of people are working frantically trying to save those who have fallen down the waterfall, many

of them drowning. As the people along the shore are trying to rescue as many as possible, one individual looks up and sees a seemingly never-ending stream of people falling down the waterfall and begins to run upstream. One of other rescuers shouts, "Where are you going? There are so many people who need help here." To which the man replied, "I'm going upstream to find out why so many people are falling into the river "(176). My purpose to narrate this story is to underscore the perspective that tackling inequalities requires addressing the root causes of inequalities through both downstream as well as upstream interventions.

Baum has proposed the “nutcracker effect” demonstrating the requisite of concurrent “bottom up” action from community and “top down” action from stakeholders to crack the hard nut of inequalities (177). White has advised that to reduce inequalities a single component of intervention will not be enough, conversely it requires range of methods e.g. policies change, educational methods etc. (178). Acheson et al. suggested that if future health inequalities are to be reduced, it is essential to carry out a wide range of policies to achieve both a general improvement in health and a greater impact on the less well-off (168). Mitchie et al. recommended that behavioral change interventions that are tailored to the needs of the target population and differentially benefit disadvantaged groups can potentially contribute in reducing health inequalities (179). According to Watt, it requires a holistic, participatory and intersectoral approach of collaborated efforts from all sectors to effectively reduce health inequalities (180).

Reducing health inequalities: a hard nut to crack

Sadly, despite of adequate knowledge and understanding, till date reducing health inequalities remains a challenge for public health practitioners (181). In fact, various factors such as political agendas, the complexity involved and scantily understood processes of social determinants impede progress in reducing health inequalities (173). Thus, the hard fact that various health determinants exist outside the health sector makes health inequalities a hard nut to crack (177). Noteworthy, in United Kingdom the "Black Report" provided an evidence related to the extent and causes of inequalities but it was shunned due to political reasons thus proving that undoubtedly knowledge is essential but not enough to ensure an action (168).

Although challenging, yet tackling health inequalities should not be viewed as impossible. In their article , De Leeuw and Clavier have well quoted Rudolf Virchow's statement, "politics and medicine do go hand in hand" while emphasizing a need to form and implement new and better kinds of health policies for a broader health reform (182). In a nutshell, well planned and coordinated actions between government, health sector and various other sectors to form and implement better kinds of health policies can potentially reduce health inequalities and to achieve the goal of health for all.

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Publication 2

Role of Dentist and Oral Health Literacy in Screening and Preventing Osteoporosis: An Overview

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2015-03-01

Abstract

Osteoporosis is a skeletal disorder that is characterized by decreased bone mass density and increased susceptibility to fractures. It is known as a "silent epidemic" and substantially impacts individuals as well as the health care resources. This article provides an overview of the environmental and nutritional preventive factors of osteoporosis and how dentists and oral health literacy can be instrumental in screening and preventing osteoporosis. Dentists are in a privileged position to contribute in osteoporosis screening by employing intraoral and panoramic radiography that is routinely used in dental practice. In addition, oral health literacy's effective communication strategies should be integrated to educate patients about preventive and health promoting measures of osteoporosis. Furthermore, dentists should adopt multidisciplinary approach particularly by collaborating with physician to refer patients for further evaluations and to provide appropriate recommendations.

Keywords: osteoporosis; dentist; oral health literacy; prevention; panoramic radiography

Introduction

The World Health Organization refers to osteoporosis as "characterized by low bone mass and micro-architectural deterioration of bone tissue, leading to increase in fragility and a fracture risk".1 According to National Osteoporosis Foundation, almost 54 million Americans have osteoporosis causing substantial economic impact on healthcare resources.2 It is estimated that 1.5 million Canadians have osteoporosis that costs health care resources approximately $2.3 billion per year.3 Osteoporosis is a major public health problem worldwide that considerably impacts patient's autonomy and health care resources therefore its early diagnosis, prevention and management are indispensable. This article provides an overview of the environmental and nutritional preventive factors of osteoporosis and how dentists and oral health literacy can play a role in the screening and prevention of osteoporosis.

Risk factors of osteoporosis

The National Osteoporosis Foundation has determined the controllable and uncontrollable risk factors that contribute in development of osteoporosis.2 The uncontrollable risk factors are the family history of osteoporosis, female gender, age factor (>50 years), menopausal stage and low body weight and framework.2 And the controllable risk factors include insufficient calcium and vitamin D intake, excessive coffee, smoking and alcohol intake.2 Although many risk factors of osteoporosis have been identified however, a large body of literature has documented estrogen deficiency in post-menopausal women as the most common risk factor of osteoporosis.4 In brief, estrogen deficiency stimulates the formation of inflammatory cytokines such as interleukin 1, 2

and 6 and prostaglandin E2 that further generates osteoclasts, the bone resorptive cells and causes osteoporosis.4 Preventive treatment of osteoporosis aims to reduce bone loss by including healthy diet and physical activity.5 In this paper we have focused on the preventable factors of osteoporosis by grouping them under 1) environmental and 2) nutritional preventive factors of osteoporosis as described below:

1) Environmental preventive factors of osteoporosis

1.1 Influence of sunlight

Vitamin D is synthesized in skin when exposed to ultraviolet radiations of sunlight that facilitates the absorption of calcium. Research studies have linked reduced sunlight exposure to vitamin D deficiency that predisposes to increased risk of osteoporosis.6 Sunlight aids in conversion of vitamin D from its inactive form (7-dehydrocholesterol) to its most active form that aids in the intestinal absorption of calcium.7 As per results of a meta-analysis, 23 percent risk of vertical fractures8 and 25 percent of hip fractures could be reduced by adequate intake of calcium and vitamin D.9 In this light, in places where sunlight exposure is limited it is important to incorporate approximately, 800 IU of vitamin D in one's daily diet to prevent osteoporosis.10

1.2 Influence of fluoridation

The American dietetic association has affirmed that the optimum levels of fluoride intake influence bone health positively.11 Due to its effects on stimulating osteoblastic activity and inhibiting bone crystal dissolution, there had been considerable interest in the use of

pharmacologic doses of sodium fluoride for the treatment of osteoporosis.12 It was demonstrated that slow released sodium fluoride administered for four years prevents vertebral fractures.12 Another study explored if increased level of water fluoridation has any effects and concluded that water fluoridation level of 4ppm promotes bone formation0.13 Although few studies have linked the effects of fluoride to bone mineral density however, its role and efficacy in reducing fractures needs further clarity.11

2) Nutritional preventive factors of osteoporosis

2.1 Calcium and vitamin D

Nutritional factors that contribute in prevalence of osteoporosis include the insufficient intake of calcium and vitamin D. It is recommended that for optimum bone health, it is imperative that adults 40 years of age or over shall incorporate 1000 mg to 1200 mg of calcium (diet or supplements) in their daily diet.10 It is proposed that dietary foods that are rich in calcium such as calcium fortified orange juice, milk, cheese, nuts, yogurt etc are beneficial in maintaining one's bone health.2 Additionally, adults above 40 years and those who have limited sun exposure should take 800 IU of vitamin D daily either through diet or supplements.10

2.2 Coffee, alcohol and cigarette smoking

Bone is a complex tissue and requires increase intake of bone building nutrients and less consumption of substances that adversely affect bone health. A meta-analysis reported that smoking is associated with increased risk of bone fractures.14 This increased fracture

susceptibility is due to deleterious systemic effects of smoking causing reduced muscle strength and affecting balance that leads to increased risk of falls.15 Furthermore, smoking is responsible for delayed fracture healing since nicotine is a vasoconstrictor and toxic effects of smoking cause tissue hypoxia inhibiting callous formation.15 That is why, it is highly recommended to stop smoking during both pre and post-operative periods of orthopedic surgeries.15 Another study reported that smoking causes reduced radial bone density in menopausal women16 and reduced femoral bone density in elderlies and decreases intestinal absorption of calcium.17 Likewise, a meta-analysis suggested that excessive alcohol intake is a risk factor for osteoporosis and hip fracture.18 Although effects of caffeine on bone health have been studied yet majority of the evidence does not support that caffeine has any significant adverse effects on the bone health.19

Along with nutritional diet, exercise routine is recommended to prevent osteoporosis particularly spinal extensor strengthening program as well as balance and low impact strength training are considered beneficial in reducing rapid bone loss in postmenopausal women.20 In a nutshell, it is recommended that healthy diet intake, no smoking and limited consumption of alcohol and physician approved exercise routine are essential in optimizing the quality of one's bone health.5

Role of dentists in screening of osteoporosis

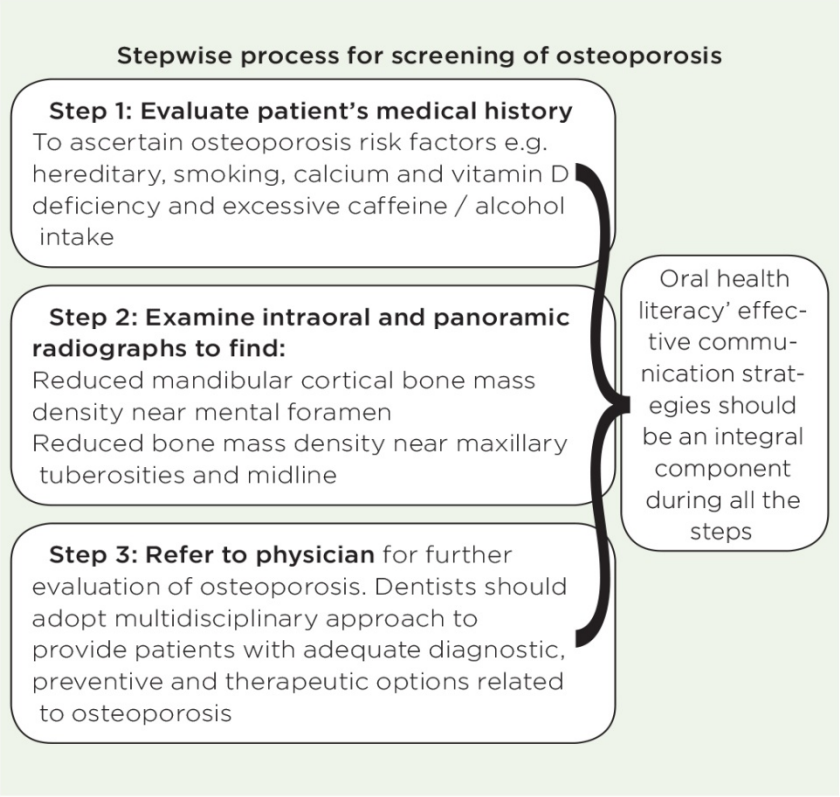
Dentists can contribute in osteoporosis screening by integrating few simple screening steps in their routine dental practice. First step is to ask in detail patient's medical history to ascertain

any osteoporosis risk factors such as hereditary risk factor, smoking, calcium and vitamin D deficiency, excessive caffeine or alcohol intake, etc.2 Osteoporosis causes reduced bone mass density throughout one's body including maxillary and mandibular bones leading to resorption of alveolar ridges and reduced cortical width.21

Although, bone scan tests such as DXA (Dual Energy X-ray Absorptiometry) are considered as "gold standard" to diagnose osteoporosis however, research shows that intraoral and panoramic radiographs used by dentists in their routine dental practice are also functional in examining mandibular bone density.22-25 Thus, the second step is that dentists can employ intraoral and panoramic images to examine the bone mass density of mandibular cortical bone. Several studies have reported that the panoramic and intraoral images of patients showing reduced mandibular bone mass density and thinner cortex in mental foramen area28 indicate systemic risk of osteoporosis.22-27 Horner et al. demonstrated that the reduced cortex (< 3 mm) at the mandibular foramen is correlated with low bone mass density at the forearm, femoral neck and spine.29 Results of a study conducted by Taguchi et al. indicated that 60 percent of their patients who had mandibular cortical width<3mm when referred for DXA evaluations were confirmed having osteoporosis.30 Thus dentists should refer patients with reduced cortex (< 3 mm) to physician for further evaluation for systemic osteoporosis.24 Recent research reported that the bone mineral density of maxillary sites such as maxillary midline and tuberosity has strong correlation with bone mineral density of spine.31

As a third step, dental professionals should adopt multidisciplinary approach by collaborating particularly with physician to refer patients for further evaluation of systemic osteoporosis. In

addition, collaborating with various specialists such as nutritionist, rehabilitation can be useful to provide adequate referrals and recommendations for preventive measures.32 Following figure provides a stepwise procedure that should be followed by dentist for osteoporosis screening:



Role of oral health literacy in preventing osteoporosis

Patient compliance to prevention and treatment is associated with effective communications between health care provider and patients.33 Several studies have proved that key element to improve health outcomes is that provided information should enhance patient's knowledge and understanding so that they can effectively use this information to improve their health.34,35

Thus, dentists can integrate the oral health literacy's effective communication strategies during osteoporosis screenings to create awareness related to osteoporosis amongst their patients.

Healthy People 2010 has defined oral health literacy as, "the degree to which individuals have the capacity to obtain, process, and understand the basic health information and services needed to make oral health related decisions".36 Recent research has proved that people with limited oral health literacy use less preventive services, have poorer treatment compliance and have higher rates of hospitalization.37 Oral health literacy is critical in empowering patients to build the knowledge and skills to self-manage chronic disease and to make informed health promoting or preventive decisions.38

Dentists can integrate the communication strategies of oral health literacy to create awareness and understanding about osteoporosis among their patients so that they could use this information to make appropriate health promoting and preventive decisions. The basic information to provide should include the nature of osteoporosis and its consequences, what options of treatment are available, preventive dietary and exercise routine and prevention of falls and fractures. Particularly, dentists must collaborate with their patient's physician to prevent any oral complications related to certain osteoporosis medications such as bisphosphonate that may cause bis-phosphonated osteonecrosis.39 A consultation with patient's physician can educate patient, if and when required to discontinue bisphosphonate therapy to prevent any oral complications during dental therapy.39

Recognizing and by being sensitive to patient' diverse communication needs dentist should present information in small sentences to transmit the knowledge related to preventive measures of osteoporosis.40 Another effective way is to use the 'teach back technique' in which dentists can ask patient to repeat the given instructions to confirm if the patient has well understood the provided information.40 It is recommended that the dentist must give full attention to their patients by maintaining eye contact and by encouraging patients to discuss and ask any questions related to their health concerns.40 In addition, verbal information can be supplemented by written information without any medical/ dental jargons and acronyms.41 Furthermore, teaching by using visual means such as line drawings, pictograms, illustrations, videos etc. can be beneficial in explaining details of preventive measures of osteoporosis.42 Additionally, a telephone extension number to call and clarify any further questions related to prevention, evaluations, treatment options available or medications can be provided. Following is a summary of the effective oral health literacy communication strategies that should be used to help patients understand better.

Oral health literacy's effective communication strategies:

- Recognize and be sensitive to patient' diverse communication needs
- Present preventive information in small sentences
- Provide full attention to patient through eye contact
- Use "teach back technique" to confirm if patient has understood the provided information
- Supplement verbal information with written information with no medical/ dental jargons and acronyms
- Use pictograms/ illustrations/ videos for better understanding of patients

- Provide a telephone extension number to call and clarify any further questions
- Include the basic preventive information for example nature of disease and its consequences, what options of treatment are available, preventive dietary and exercise routine of preventing falls and fractures

Conclusions

Although panoramic radiographs cannot be used to diagnose systemic osteoporosis but it is functional in pre-screening of osteoporosis and the cases having less than 3 mm of bone density should be referred to physician for further diagnosis of systemic osteoporosis. In addition, oral health literacy's effective communication strategies should be used to educate patients about health promoting and preventive measures to maintain and promote their bone health. Furthermore, dental professionals should adopt multidisciplinary approach and collaborate with various specialists to provide their patients with adequate diagnostic, preventive and therapeutic options related to osteoporosis. In conclusion, by integrating osteoporosis screenings, oral health literacy effective communication strategies and consultations in a forum of multidisciplinary team members, dentists can play a significant role in screening osteoporotic patients who might benefit from timely diagnosis and treatment. **Oral Health Journal**

Conflict of interest: No conflict of interest is declared

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Oral Health welcomes this original article.

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Publication 3

Ethical considerations for a multicenter research

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Abstract

Multicenter research is an effective paradigm for biomedical research and offers advantages such as large sample size, cost-effectiveness and enhances external validity. Concurrently, multicenter research may raise various ethical and practical concerns since practices vary across involved research centers primarily due to varied local laws and available technology. Although, there is a widespread debate about the ethical considerations for a multicenter research, yet

limited literature exists on this topic. The main purpose of this paper is to review and summarize the existent literature on the topic of ethical considerations for multicenter research. Our search and review of the existent literature revealed that in general the main ethical considerations for a multicenter research are 1) ethics board review process, 2) informed consent process, 3) protection of confidentiality and vulnerability 4) data monitoring and 5) best practices. This paper concludes that each multicenter research situation is unique, so "one size fits all" approach is not possible to be prescriptive in how to conduct an ethically sound multicenter research. However, it is recommended to foster partnerships and have open communications among the involved researchers and ethics review boards to gain a clear understanding beforehand about the context specific and ambiguous local situations and issues to design and conduct an effective multicenter research.

Keywords: Multicenter research, ethical considerations, best practices, guidelines

Introduction

"Multicenter research refers to a research conducted according to a single research protocol but at more than one site and is carried out by more than one investigator and may have its research centers located in the same country or in another country "(183). Multicenter research has many advantages such as likelihood of having large sample size, is cost-effective and enhances external validity (184). Concurrently, such research may raise various ethical and practical concerns since practices vary across involved research sites, due to variation in local laws and

available technology (185-187).

Although four principal international ethical research documents; the Declaration of Helsinki(188), the Council for International Organizations of Medical Sciences (CIOMS) (189), Canada's Tri-council Policy Statement (TCPS2) (190)and the UNESCO's (191) universal declaration on bioethics and human rights have been generated yet there exists widespread debate about multicenter research guidelines (192). Even if there is general agreement on basic key elements of multicenter research, the implementation policies of the involved research centers may vary considerably (192). Furthermore, there is scarcity of literature pertaining to ethical considerations regarding multiple and complex features of multicenter research. The main purpose of this paper is to review and summarize the existent literature on the topic of ethical considerations for multicenter research.

Main ethical considerations for a multicenter research

Canada's three major granting agencies; the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC), and the Social Sciences and Humanities Research Council (SSHRC) have developed a Tri-Council Policy Statement (TCPS2) entitled "Ethical conduct for research involving humans"(193). The chapter 8 of the TCPS2 on "Multi-Jurisdictional Research" describes standards, procedures and considerations for governing research involving human participants (including the establishment of a research ethics board) at Canadian institutions and international multicenter research (190). In this paper,

we have primarily focused on the Canadian ethical considerations concerning multicenter research. Our in-depth search and review of existent literature has revealed that in general the main ethical considerations for a multicenter research are 1) ethics board review process, 2) informed consent process, 3) protection of confidentiality and vulnerability 4) data monitoring and 5) best practices. Following is brief description of the main issues and ethical considerations for multicenter research:

1) Ethics board review process

All research projects seeking approval from the Research Ethics Board (REB) need to submit a formal application along with other relevant documents such as research protocol, consent forms etc. The main role of the REB is to evaluate and ensure before providing approval that good ethical practices e.g. subjects remain informed, and their consent is valid etc. will be followed at research centers. For multicenter research, institutionally based REBs were put in place to protect the rights, safety and well-being of potential research participants, particularly in light of issues unique to geographically isolated populations. However, involved institutionally based REBs sometimes require minor or even major modifications depending on different concerns and interests of the involved board members (187, 194). Although it is critical yet getting approval from all the REB's involved in multicenter research is quite cumbersome and may pose challenges since it costs energy, time and money and may discourage researchers due to delays in starting their research activities.

At the provincial level within Canada, the Quebec Ministry of Health and Social Services has developed a mechanism for the ethical review and monitoring of multicenter research(23). Recently, it is replaced by another document entitled, "Cadre de référence des établissements publics du réseau de la santé et des services sociaux pour l'autorisation d'une recherche menée dans plus d'un établissement (195). Furthermore, the Ministère de la Santé et des Services Sociaux (MSSS) and the Fonds de recherche du Québec Santé (FRQS) and the four integrated university health networks (RUIS) maintain that any research project conducted at multicenter within the Health and Social Services network (RSSS) would undergo a single ethics review and that would be recognized by the other institutions involved in the project (195). It is a useful document that provides detailed description of various elements to consider while determining which REB to ask to act as the primary REB (195). The TCPS 2(190) has specified following 3 models for the ethics review involving multiple REBs in multicenter research:

i) The REBs at each involved center shall conduct an independent research ethics review and provide their separate decisions.

ii) Two or more regional, provincial or national institutions may participate to create one joint REB or to appoint an external REB, to which may delegate as research ethics review.

iii) Multiple institutions may enter official agreements for the ethics review of research proposals. The key to determine which of the above-mentioned model shall be context sensitive. It is responsibility of researchers to ensure that the reviewing REB is provided with as much context concerning the local situation where research will be conducted since not all REB members may be familiar with the location.

2) Informed consent process

Globally, to obtain free and informed consent from research participants is central to the ethical research practice and there is a consensus about its components. According to the TCPS 2 Article 4.1 particularly, in cases where written consent is not possible (especially among populations having limited literacy) it is crucial to specify the procedure of how will consent be obtained. However, sometimes its application may be challenging particularly when, multicenter research is conducted across different cultures and the participants speak different language than researchers (186). Interestingly, in 2001, a study was conducted in Bangladesh to examine participants understanding of iron supplementation in a community-based study. This study showed that even if informed consent was obtained after a detailed explanation of the study, many participants did not fully understand that they were free to refuse to participate, or they could choose to leave the study, about half thought that participation was part of a health care routine (196). The results of this study raise a question about the use of the doctrine of informed consent that whether the word "informed" is indeed applied in actions in research involving different cultures and languages?

Furthermore, the concept of autonomy may differ across locales, rendering it more difficult to decide who must be involved in the informed consent process and whose consent to participate must be sought (186). Depending upon the sites at which the study is to be conducted, involved researchers may require the consent of local leaders or family elder in addition to that of the individual. Also, in certain cases if the research is based on publicly available information and

does not pose any privacy risk and for observational studies conducted for evaluation and improvement purposes. Despite of taking all necessary measures another challenge concerning informed consent could arise since some words of informed consent may be difficult to translate exactly from one language to other (186). An option is to hire or arrange for a translator and ensure that that the translator is unbiased (so that they will provide accurate translated information without altering the sense intended by the research study participant). Also, ensure that the translator holds the information in confidence and signs a non-disclosure agreement. Thus, it is primary responsibility of researcher to ensure that the participants have completely understood and are completely "informed" about everything in the consent form(186) .

3) Protection of confidentiality and vulnerability

Researchers are ethically obligated to protect confidentiality and vulnerability of the study participants. The procedure to protect the confidentiality of the database and the privacy of the participants varies across centres due to protection procedures afforded by local law and available technology. Consequently, the risks of participation in each study may also vary across different centres. For example, in United States (US) a certificate of confidentiality protects the identity of individuals participating in studies in which highly personal information is gathered (e.g. drug, alcohol use and sexual behavior)(197). A certificate of confidentiality protects such data from being accessed by attorneys, courts, and law enforcement officials for use in civil, criminal, and administrative proceedings (197). However, a multicenter study which includes

centers outside US may not have this privilege to provide such protection of database having personal information.

While any breach of confidentiality is serious, a breach of confidentiality in highly stigmatized populations (e.g. HIV-positive study participants) can lead to significantly increased vulnerability. In addition, women in strongly patriarchal societies can be put at serious risk if their male partners take offense about their study participation or learn of negative health issues about her due to her study participation. Behavioral and social science research may cause emotional and psychological distress among subjects who learn negative information about their health status particularly in developing countries among vulnerable population groups (e.g. low levels of literacy, economically depressed or disadvantaged, ethnic/religious/cultural minority, children, etc.). Thus, understanding, protection of confidentiality and vulnerability should be an issue of concern for researchers working with such vulnerable groups.

4) Data monitoring

According to the TCPS 2 article 5.7, researchers must first obtain approval from the REB for the data linkage (198). The fundamental reason to establish a data and safety monitoring plan is to enhance subject safety, confidentiality and data credibility. In order for a study to be REB approved, the research plan must make adequate provisions for monitoring the data collected to ensure the safety and confidentiality of subjects (199). It is important to specify that who will be responsible for data and safety monitoring for example a data monitoring committee can be

useful (200). Furthermore, clear description of the number of people who will be responsible for data monitoring and data collection and analysis plan is essential(199, 200). It is also critical to describe the study stopping rules regarding the potential outcomes of the study that are likely to have a major impact on the rights or welfare of research participants. If there is a potential for conflicts of interest (financial or otherwise) that might bias the data-monitoring process, state how will they be managed or eliminated (23). On May 5-8 May 2013 in Montreal, the world conferences on research integrity were organized to promote exchange of information and to discuss ways to promote research integrity and harmonize efforts to foster responsible research practices (201). The draft statement sets out 20 responsibilities for individual and institutional partners, including agreeing goals and avoiding "agreements that unduly or unnecessarily restrict dissemination of data, findings, or other research products"(201).

5) Best practices

The Good Clinical Practice (GCP) guidelines, developed by an International Conference on Harmonization(ICH) group(202) covers aspects of designing, conducting, recording and reporting trials that involve the participation of human subjects. The guidelines were developed in consideration of good clinical practices of the European Union, Japan, and the United States, Australia, Canada, the Nordic countries and the World Health Organization (WHO) and thus the GCP guidelines have been adopted by many countries (202). Its main goal is to protect the rights, safety and well-being of research subjects and is consistent with the principles that have their origin in the Declaration of Helsinki. It also includes the process of free and informed

consent by subjects taking part in research projects; the scientific integrity of the protocol and research data; the knowledge, qualifications and expertise of the research team; the confidentiality of records and data regarding subjects; quality assurance(202).

Conclusion

Each research situation is unique, so "one size fits all" approach is not possible to be prescriptive in how to design and conduct ethically sound multicenter research. In general, it is recommended to foster participation (203) and have open communications amongst researchers and local REB's involved at multi-centers to come to an agreement at the outset regarding research protocol (204) about the use, management, sharing and ownership of data, intellectual property, informed consent and research records. Thus, it is critical for involved researchers and members of local REB to gain beforehand a clear understanding about the context specific and ambiguous local situations and issues to design and conduct an effective multicenter research.

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Conflict of interest

Authors of this article declare having no conflict of interest.

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