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Sexualité et fertilité : Facteurs contextuels et relationnels associés au bien-être sexuel des couples suivis en clinique de fertilité

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Résumé

L'infertilité est reconnue non seulement comme une maladie médicale, mais aussi comme une condition sociale et émotionnelle (Burns et Covington, 2006; Pawar et al., 2020; The Lancet Global Health, 2022). Bien que les études aient, de plus en plus, commencé à étudier l'impact de l'infertilité sur le bien-être psychologique et social (p. ex., Drosdzol et Skrzypulec, 2008; Hasanpoor-Azghdy et al., 2015), les chercheurs en connaissent toujours peu sur le bien-être sexuel des couples qui suivent un traitement de fertilité. Des recherches ont montré que les couples ayant recours à la procréation médicalement assistée (PMA) sont plus susceptibles d'éprouver des difficultés sexuelles que les couples fertiles (Starc et al., 2019). Toutefois, les facteurs qui permettent d'expliquer ces difficultés chez les couples ayant recours à la PMA ont été très peu étudiés à ce jour. Ainsi, en utilisant une approche biopsychosociale de la compréhension de l'infertilité (Gerrity, 2001; Grinion, 2005; Williams et al., 1992) et de la sexualité (Althof et al., 2005; McCabe et al., 2010), cette thèse examine à la fois les facteurs spécifiques à l'infertilité et les facteurs dyadiques sous-jacents au bien-être sexuel des couples infertiles.

Afin de mieux comprendre les facteurs spécifiques à l'infertilité associés à la fonction sexuelle des couples qui ont recours à la PMA, une première étude transversale dyadique a été menée auprès de 185 couples de sexes mixtes en processus de PMA qui ont rempli en ligne l'outil *Fertility Quality of Life Tool* et soit le *Female Sexual Function Index* (femmes) ou le *International Index of Erectile Function* (hommes). L'étude a examiné les facteurs de stress personnels et relationnels, et le désir sexuel, l'orgasme, l'excitation et la satisfaction sexuelle des deux partenaires. Les associations entre les caractéristiques liées au diagnostic de l'infertilité et au traitement et les domaines de fonction sexuelle et la satisfaction sexuelle des deux partenaires

ont également été examinées pour déterminer si ces variables seraient incluses comme covariables dans les analyses principales. Les analyses acheminatoires ont révélé que pour les hommes et les femmes, les facteurs de stress émotionnels liés à l'infertilité étaient associés à leur propre désir sexuel et à celui de leurs partenaires. Pour les femmes, les facteurs de stress émotionnels liés à l'infertilité étaient également associés à une satisfaction sexuelle plus faible chez leur partenaire et les facteurs de stress corps-esprit étaient associés à une excitation sexuelle plus faible chez leur partenaire. Les facteurs de stress relationnels liés à l'infertilité étaient également associés à une excitation et satisfaction sexuelle plus faibles des individus et à une satisfaction sexuelle plus faible chez leur partenaire. Pour les femmes, les facteurs de stress relationnels liés à l'infertilité étaient également associés à leur propre désir sexuel et orgasme. Ces résultats suggèrent que les interventions portant sur les sphères émotionnelles, psychocorporelles et relationnelles des couples en PMA pourraient aider à faciliter l'amélioration de la fonction et de la satisfaction sexuelles et à mieux répondre aux besoins des couples infertiles.

S'appuyant sur les résultats de la première étude, qui suggèrent que l'expérience subjective des couples en matière d'infertilité et de traitement, en particulier les facteurs de stress relationnels, semblent être plus fortement associés à leur santé sexuelle que les facteurs objectifs liés au traitement, le deuxième article visait à étudier les processus relationnels qui sous-tendent le bien-être sexuel des couples. Plus précisément, l'étude a examiné si les perceptions de gestion du stress dyadique (GSD) du partenaire et de la façon dont les deux partenaires gèrent ensemble le stress (GSD commun) sont associées au bien-être sexuel des deux partenaires chez les couples en processus de PMA. Les participants comprenaient 232 couples avec une infertilité médicale qui ont rempli des questionnaires évaluant la gestion du stress dyadique et le bien-être sexuel

(préoccupations sexuelles liées à l'infertilité, détresse sexuelle et satisfaction sexuelle). Les analyses acheminatoires ont révélé que les perceptions que le partenaire utilise plus de stratégies de GSD négatives étaient associées à un bien-être sexuel plus faibles des individus. Les perceptions que le partenaire utilise plus de stratégies de GSD positives étaient associées à une satisfaction sexuelle plus élevée pour les hommes et à des préoccupations sexuelles liées à l'infertilité plus élevées pour les femmes. Les perceptions d'une utilisation plus élevée de GSD commun étaient associées à un bien-être sexuel plus élevé chez les deux partenaires. Pour les hommes, les perceptions d'une utilisation plus élevée de GSD commun étaient également associées à des préoccupations sexuelles liées à l'infertilité plus faibles chez leur partenaire. Les analyses étaient ajustées pour la satisfaction relationnelle. Ces résultats suggèrent que le bien-être sexuel des couples pendant les traitements de fertilité pourrait être facilité en favorisant une gestion de stress dyadique commun plus élevée et soulignent que le contexte interpersonnel entourant la sexualité de ces couples devrait être systématiquement abordé auprès des deux membres du couple.

Mots clés : Infertilité; procréation médicalement assistée; fonction sexuelle; bien-être sexuel; facteurs diagnostiques; caractéristiques du traitement; facteurs de stress liés à l'infertilité; gestion de stress dyadique; relations de couple

Abstract

Infertility is recognized as being not only a medical illness, but also a social and emotional condition (Burns & Covington, 2006; Pawar et al., 2020; The Lancet Global Health, 2022). Although studies have increasingly begun to investigate the impact of infertility on psychological and social well-being (e.g., Drosdzol & Skrzypulec, 2008; Hasanpoor-Azghdy et al., 2015), little remains known about the sexual well-being of couples undergoing fertility treatment. Research has shown that couples seeking assisted reproductive technology (ART) are more likely to experience sexual difficulties than fertile couples (Starc et al., 2019). However, very few studies have examined the factors that may explain these difficulties in couples seeking ART. Hence, using a biopsychosocial approach to the understanding of infertility (Gerrity, 2001; Grinion, 2005; Williams et al., 1992) and sexuality (Althof et al., 2005; McCabe et al., 2010), this thesis examines both infertility-specific and dyadic factors underlying the sexual well-being of infertile couples.

To better understand the infertility-specific factors associated with the sexual function of couples seeking ART, a first dyadic cross-sectional study was conducted with 185 mixed-sex couples seeking ART who completed online the Fertility Quality of Life Tool and either the Female Sexual Function Index (women) or the International Index of Erectile Function (men). The study examined the association between personal and relational stressors and the sexual desire, orgasm, arousal, and sexual satisfaction of couples seeking ART. The associations between diagnosis and treatment-related factors and both partners' domains of sexual function and sexual satisfaction were also examined to determine whether these variables should be included as covariates in the main analyses. Path analyses revealed that for men and women, infertility-related emotional stressors were associated with their own and their partners' lower

sexual desire. For women, experiencing greater infertility-related emotional stressors was also associated with their partner's lower sexual satisfaction and experiencing greater infertility-related mind-body stressors was associated with their partner's lower sexual arousal. Infertility-related relational stressors were also associated with individuals' own lower sexual arousal and satisfaction and their partner's lower sexual satisfaction. For women, experiencing greater relational stressors was also associated with their own lower sexual desire and orgasm. These results suggest that interventions addressing the emotional, mind-body, and relational spheres of couples seeking ART may help facilitate improvements in sexual function and satisfaction and better serve infertile couples' needs.

Building on the results of the first study, which suggest that couples' subjective experience of infertility and treatment, particularly relational stressors, seem to be more strongly associated with their sexual well-being than objective treatment-related factors, the second study aimed to investigate the relational processes that underly couples' sexual well-being. More specifically, the study examined whether perceptions of the partner's dyadic coping (DC) and of how both partners cope together (common DC) are associated with both partners' sexual well-being in couples seeking ART. Participants included 232 couples with medical infertility who completed questionnaires assessing dyadic coping and sexual well-being (infertility-related sexual concerns, sexual distress, and sexual satisfaction). The path analyses revealed that perceptions of partners' use of higher negative DC were associated with individuals' own lower sexual well-being. Perceptions of partners' use of higher positive DC were associated with higher sexual satisfaction for men and greater infertility-related sexual concerns for women. Perceptions of higher use of common DC were associated with both partners' higher sexual well-being. For men, perceptions of higher use of common DC were also associated with their

partner's fewer infertility-related sexual concerns (partner effect). Analyses adjusted for relationship satisfaction. These results suggest that couples' sexual well-being during fertility treatment could be facilitated by promoting greater common DC and highlight that the interpersonal context surrounding these couples' sexuality should be routinely discussed with both members of the couple.

Keywords: Infertility; assisted reproductive technology; sexual function; sexual well-being; diagnostic factors; treatment characteristics; infertility-related stressors; dyadic coping; couple relationships

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Liste des abréviations

ART : Assisted reproductive technology

WHO : World Health Organization

WAS : World Association for Sexual Health

APIM : Actor-Partner Interdependence Model

DSM : Diagnostic and Statistical Manual

FSFI : Female Sexual Function Index

IIEF : International Index of Erectile Function

DC : Dyadic coping

FertiQol : Fertility Quality of Life tool

DCI : Dyadic Coping Inventory

DAS : Dyadic Adjustment Scale

FPI : Fertility Problem Inventory

SDS-SF : Sexual Distress Scale-Short Form

GMSEX : Global Measure of Sexual Satisfaction

FIML : Full Information Maximum Likelihood

CFI : Comparative fit index

RMSEA : Root mean square error of approximation

AIC : Akaike Information Criterion

GPPPD : Genito-pelvic pain/penetration disorder

EFT : Emotionally focused therapy

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Introduction

According to the World Health Organization (WHO) and the World Association for Sexual Health (WAS), sexuality is an integral aspect of human life that is influenced by the interaction of a number of biopsychosocial factors. Indeed, human sexuality is associated with individuals' psychological well-being, relationship functioning, and overall quality of life (Byers, 2011; WAS, 2013; WHO, 2002a). Hence, drastic changes within these areas, induced by medical conditions, particularly infertility (Huyghe et al., 2013; Pluchino et al., 2016), could lead to notable decreases in sexual functioning and well-being (Assari et al., 2014; Karabulut & Erci, 2009). Although research has shown that couples seeking assisted reproductive technology (ART) are indeed more likely to experience sexual difficulties than fertile couples (for a review, see Starc et al., 2019), little remains known about the sexual well-being of couples undergoing fertility treatment. Accordingly, using a biopsychosocial approach to the understanding of infertility (Gerrity, 2001; Grinion, 2005; Williams et al., 1992) and sexuality (Althof et al., 2005; McCabe et al., 2010), this thesis aimed to provide a unique portrait of the sexual well-being of couples seeking ART. Rather than focusing exclusively on the medical aspects, as most studies have done to date (for a review, see Tao et al., 2011), this research examined both infertility-specific and dyadic factors underlying the sexual well-being of couples seeking ART.

Biopsychosocial Theory

The biopsychosocial model is widely recognized as the most comprehensive and heuristic approach to understanding and evaluating medical disorders (Gatchel & Haggard, 2014). Biopsychosocial theory, proposed in 1977 by George Engel, offered an alternative perspective to the biomedical approach for understanding human development, health, and illness. The approach addresses the complex interaction among and within the biological, psychological, and

social phenomena unique to each individual (Engel, 1977). It attempts to take into consideration individuals' subjective experiences by attending to the multifaceted dimensions of illness that patients encounter when coping with a persistent, distressing medical condition (Gatchel & Haggard, 2014), rather than confining the understanding of an illness to its physiology. As such, a number of researchers have recommended applying the biopsychosocial model to understanding infertility (Gerrity, 2001; Grinion, 2005; Williams et al., 1992).

The biopsychosocial approach to infertility asserts that the condition should be addressed at the couple level (Pasch & Dunkel-Schetter, 1997) since it affects not only a person's identity but also the couple as whole and their common expectations regarding their future (Forrest & Gilbert, 1992; Gerrity, 2001). The approach, as Gerrity (2001) argues, "allows for the conceptualization of infertility as both an acute life crisis and a nonevent with long-term complications for the individual, their partner, their relationship, and family and friends" (p. 152). Thus, it recognizes that the stressors associated with infertility occur in various intrapersonal and interpersonal aspects of an individual's quality of life (Gerrity, 2001; Grinion, 2005; Williams et al., 1992).

Like infertility, sexual function has been conceptualized as a complex biopsychosocial phenomenon (Thomas & Thurston, 2016), emanating from individuals' personality and biological dispositions to medical illness, as well as the ability to form and maintain intimate relationships (Althof et al., 2005; McCabe et al., 2010). Therefore, it has been suggested that the biopsychosocial approach is also necessary for a better understanding and improvement of sexual difficulties (Thomas & Thurston, 2016). The biopsychosocial model proposes that biological (hormonal changes), psychological (mood symptoms), interpersonal (relationship processes and satisfaction), and sociocultural factors (values and attitudes about sex) affect individuals' sexual

functioning and interact with each other through a dynamic system over time (Thomas & Thurston, 2016). In fact, psychological, interpersonal, and sociocultural factors have been found to play a significant role in making both men and women vulnerable to developing sexual concerns, triggering the onset of sexual difficulties, and maintaining sexual dysfunction in the long term (Brotto et al., 2016). Consequently, this thesis used the biopsychosocial approach to inform its understanding of infertility and sexuality.

Infertility: Overview

Defined as the inability to conceive after one year or more of regular, unprotected vaginal intercourse or the inability to carry a pregnancy to term (Zegers-Hochschild et al., 2009), infertility affects an estimated 12% to 16% of couples in Canada and worldwide (Bushnik et al., 2012; Sun et al., 2019). The prevalence of infertility has significantly increased over the past years (De Faria et al., 2012), with almost double the number of Canadian couples experiencing difficulty conceiving a child since the 1980s (Bushnik et al., 2012). This increase has been attributed, in particular, to a greater delay in childbearing (Boivin et al., 2007).

Infertility is caused by a number of different factors. About one third of cases of infertility can be attributable to male factors and one third to female factors (Practice Committee of the American Society of Reproductive Medicine, 2006). Disorders related to the male reproductive system that may contribute to infertility include hormonal disorders, obstruction of the reproductive tract, testicular failure, and abnormal sperm function and quality (Mayo Clinic, 2021; WHO, 2020). Issues related to the female reproductive system include ovulation disorders, uterine or cervical abnormalities, tubal blockage, endometriosis, and early menopause (Centers for Disease Control and Prevention, 2009; WHO, 2020). One third of infertility cases may also be attributed to a combination of male and female factors or to unexplained factors (about 10%).

Environmental and lifestyle factors such as smoking, excessive alcohol use, and obesity and exercise issues have also been presented as some of the risk factors that could potentially affect men and women's fertility (WHO, 2020).

Given the different causes of infertility, a number of medical treatments have been developed to help couples experiencing fertility difficulties. Fertility drugs can be used to stimulate egg growth and ovulation (Government of Canada, 2013). These are generally used alone or in combination with medical procedures such as surgery, intrauterine insemination (IUI), in vitro fertilization (IVF), and embryo transfer (Government of Canada, 2013). Using donor gametes and embryos is also increasingly common (Raperport et al., 2022), when medical conditions in the woman or the man prevent the couple from conceiving with their own gametes. Unfortunately, although major advances in reproductive medicine during the last quarter of the 20th century have offered couples dealing with fertility issues some hope, these interventions have relatively low success rates and do not lead to immediate results, with approximately 40% of couples undergoing ART still not being able to conceive (Winkelman et al., 2016).

Since the vast majority of people continue to express deeply valued hopes and expectations to have children at some point in their lives (Lampic et al., 2006), the experience of infertility is considered an obstacle to fulfilling the universally desired goal of becoming a parent (Boivin et al., 2007) and therefore, represents a threat to women's *raison d'être* and men's identities (Kirkman, 2001; WHO, 1991). Since having a child is considered to be important in general society (Deshpande & Gupta, 2019; Simionescu et al., 2021), individuals with infertility can also feel a considerable sense of isolation from others, particularly when topics such as pregnancy, childrearing, and childbirth are discussed (Gerrity, 2001). Women dealing with infertility have also reported experiencing discomfort around family and friends, the tendency to

avoid social situations involving pregnant women and families with children, and to feel excluded and less understood by their social network due to their infertility (Hasanpoor-Azghdy et al., 2015; Katz et al., 2002). Thus, infertility is increasingly recognized as being not only a medical illness, but also a social and emotional condition, with significant biopsychosocial consequences to couples (Burns & Covington, 2006; Pawar et al., 2020; The Lancet Global Health, 2022). Indeed, psychosocial studies (to be described below), have shown that negative reactions to infertility and its treatment can have profound effects on individuals' physical, emotional, relational, and sexual well-being.

Sexuality: Overview

Sexual well-being is perceived as a multidimensional construct (Byers, 2011) that encompasses several factors, including general health status, personal experience, and interpersonal relationships (Pluchino et al., 2016; WAS, 2013; WHO, 2002a). Sexual function refers to sexual response including sexual desire, orgasm, arousal, and pain during sexual intercourse for women (Rosen et al., 2000), and to sexual desire, erection, and orgasm for men (Rosen et al., 1997). Sexual satisfaction, however, has been defined by Lawrance and Byers (1995, p. 514) as "an affective response arising from one's subjective evaluation of the positive and negative dimensions associated with one's sexual relationship". This definition recognizes that an individual's sexual satisfaction can be influenced by his or her partner's levels of satisfaction and other partner characteristics, and therefore, underlines the interpersonal and dyadic context in which sexual activity occurs (Rehman et al., 2013).

Sexual function and satisfaction have increasingly been recognized as essential aspects of relationship functioning, quality, and stability, as well as overall health (Byers, 2011; McNulty et al., 2016; Schoenfeld et al., 2017). Whereas sexual satisfaction has been associated with higher

levels of quality of life (for a review, see Shahhosseini et al., 2014), sexual dissatisfaction has been related to a higher frequency of relationship conflicts (Rahmani et al., 2009), relationship dissatisfaction (Bergeron et al., 2008), and separation (De Graaf & Kalmijn, 2006; Yabiku & Gager, 2009). Numerous studies have also revealed a strong association between sexual function and health-related quality of life (Biddle et al., 2009; Leiblum et al., 2006; Thomas & Thurston, 2016).

Sexual distress is also a key component of partners' experience of sexuality. It is defined as negative and distressing emotions (e.g., anxiety, frustration, inadequacy) experienced in relation to one's sexual function and sexual relationship (Hayes, 2008; Santos-Iglesias et al., 2020). Although it is a criterion for the diagnosis of sexual dysfunctions (DSM-5; American Psychiatric Association, 2013), the construct has curiously been largely overlooked within sexuality outcome research (for a review, see Santos-Iglesias et al., 2018), particularly in the context of infertility.

While research has increasingly investigated the factors associated with emotional, relational, and social well-being, few studies have examined the factors associated with sexual adjustment in the context of infertility and ART (for a review, see Starc et al., 2019 and Tao et al., 2011). Given the detrimental effects of sexual problems and dissatisfaction on individual and relational well-being, empirical efforts to identify factors underlying healthy sexual functioning and sexual satisfaction in couples, particularly those at higher risk of developing sexual problems, such as couples seeking ART, are highly justified.

Infertility and Sexual Well-Being

Couples may experience sexual difficulties before an infertility diagnosis and treatment procedures, although it is uncommon that these constitute the cause of infertility. However,

research and clinical writings suggest that experiencing infertility and undergoing ART can lead to changes in couples' sexual well-being. Research suggests that couples seeking fertility treatment due to medical infertility may be at a high risk of experiencing issues related to sexuality (Starc et al., 2019). Yet, despite the intimate link between sexuality and reproduction, sexuality has surprisingly received less attention within research on adjustment to infertility. To date, little remains known about the biopsychosocial factors that may influence the sexual well-being of couples with a diagnosis of infertility or undergoing fertility treatment (for a review, see Tao et al., 2011).

Attempting to conceive involves giving significant attention to sexual activity. Couples report that sexual intercourse for the purpose of procreation and planning sexual activity around ovulation can have a negative impact on their sexual lives, which may become routinized rather than pleasurable and may create significant emotional pressure for both partners (Zhuoran et al., 2018). When couples have been trying to conceive for several months or years, the continuing lack of conception can affect partners' self-concept and role perceptions (Tao et al., 2011), as well as their sexual behavior, frequency of sex, and motivation for sexual activities (Zhuoran et al., 2018). Additionally, during medical fertility treatments, sexual intercourse tends to either be put aside, or become largely task-oriented (Bianchi-Demicheli & Chardonnens, 2003). Couples who are faced with infertility are often given specific instructions from their health team about the conditions, techniques, and timing of their sexual activity. Women and men may therefore initiate sex without necessarily feeling the desire to do so and increasingly experience sexual intercourse as a sense of failure (Marci et al., 2012). Sexuality thus further translates into a desire to conceive or to have a child, rather than an erotic desire, or a pleasure-oriented motivation, which makes spontaneous, intimate, and playful sex more difficult to maintain (Cousineau &

Domar, 2007; Nelson et al., 2008). As a result, men and women struggling with infertility often describe sex as a "mechanical" act and subsequently may report a deflated level of sexual self-esteem (Repokari et al., 2007; Tao et al., 2011). Women experiencing infertility often report negative feelings towards sexual activity (Marci et al., 2012). Furthermore, side effects of hormone medication (e.g., mood swings) can also lead to alterations in women's sexual experiences (Marci et al., 2012). Treatment procedures, including the necessity to produce semen samples on demand, can affect men's sexuality as well, by arousing a sense of anxiety and affecting their masculinity (Coëffin-Driol & Giami, 2004; Ohl et al., 2009). As a result, individuals with infertility and those going through the process of ART often report a reduction in the enjoyment and frequency of sexual activity (Güleç et al., 2011).

A few controlled studies have reported higher levels of sexual dysfunction in women seeking ART (Davari Tanha et al., 2014; Pakpour et al., 2012), mainly impairments in arousal, desire, and orgasm (Gabr et al., 2017; Mirblouk et al., 2016). Relative to controls, higher levels of premature ejaculation (Zare et al., 2017), erectile dysfunction (Gao et al., 2013), and lower desire and orgasmic function (Lotti et al., 2016) have also been reported in men seeking ART. Men and women seeking ART have also been found to experience greater sexual dissatisfaction than fertile controls (Ozkan et al., 2015; Ozturk et al., 2019). A recent study also revealed an increased risk of sexual dysfunction in infertile couples pursuing timed intercourse, without accelerating the time to achieve pregnancy (Dasgupta et al., 2022).

Nonetheless, there appears to be some disparities between studies regarding the effects of infertility or ART on sexual well-being. For instance, a few studies have reported either greater sexual pleasure and more frequent intercourse in couples seeking ART (Ohl et al., 2009; Wischmann et al., 2001) or no change in sexual function (Shahraki et al., 2018) compared with

population norms. Moreover, the prevalence of sexual difficulties in infertile couples reported to date has varied from 11% to 93% in women (Bayar et al., 2014; Carter et al., 2011; Drosdzol & Skrzyopulec, 2008; Keskin et al., 2011; Khademi et al., 2008; Oskay et al., 2010; Pakpour et al., 2012; Purcell-Lévesque et al., 2019; Yeoh et al., 2014) and from 18% to 62% in men (Bayar et al., 2014; Drosdzol & Skrzypulec, 2008; Khademi et al., 2008; Lotti et al., 2012; Purcell-Lévesque et al., 2019; Shindel et al., 2008). These conflicting findings may reflect the significant variation in study design, sample size, and sexual function measures used across studies. However, they may also suggest that there is considerable variability in how infertility and its treatment may affect the sexual well-being of couples seeking ART and highlight the need to further understand contextual factors that may make certain individuals more vulnerable to developing sexual problems than others in the context of infertility.

Infertility-Related Diagnosis and Treatment Characteristics

Diagnosis and treatment-related factors often dictate the timing and frequency of sexual relations (Elia et al., 2010) and have been associated with sexual dissatisfaction in men and women seeking ART (Drosdzol & Skrzypulec, 2009). Therefore, diagnosis and treatment-related variables associated with ART, including the presence of an infertility diagnosis, the cause of infertility (female, male, or combined factors, or unexplained reasons), treatment type (e.g., in vitro fertilization, intrauterine insemination, superovulation therapy) and duration of treatment may play an important role in couples' sexual well-being. Yet, the link between diagnosis and treatment-related factors on the one hand, and sexual function and satisfaction on the other, remains unclear due to the limited number of studies to date, as well as the conflicting findings of existing studies.

While little is known about the association between the presence of an infertility diagnosis and couples' sexual well-being, a few studies have revealed associations between the duration and cause of infertility and couples' sexual well-being. A longer duration of infertility has been associated with lower sexual satisfaction (Drosdzol & Skrzypulec, 2009) and function in women (Amraei et al., 2022; Gabr et al., 2017; Turan et al., 2014) and men (Dong et al., 2022). A quantitative study by Ohl et al. (2009) involving 215 couples seeking fertility treatment found that men and women facing infertility due to male factors (e.g., sperm abnormalities, testicular problems) reported greater difficulty discussing sexual activities than those facing infertility due to female or unexplained factors. Similarly, another quantitative study by Vizheh et al. (2015) involving 123 infertile couples revealed that couples with a male factor infertility reported significantly lower sexual satisfaction than couples with infertility due to other factors. Conversely, a quantitative study by Winkelman et al. (2016) involving only women seeking fertility care revealed that women with infertility related to female factors (e.g., ovulatory or pelvic dysfunction) perceived their infertility to have a more negative impact on their sex lives than women whose infertility was due to male factors. Yet, another study found no associations between the cause of infertility and sexual function (Gabr et al., 2017). The limited use of standardized measures of both sexual functioning and satisfaction could reflect the varying results within previous studies.

Other studies have investigated the associations between certain aspects of fertility treatment and the sexual well-being of both men and women. However, the number of studies focusing on specific treatment characteristics tends to be low. Research on the association between treatment type and couples' sexual well-being is very limited. Using a custom survey, Ohl et al. (2009) found that intrauterine insemination was associated with more timed intercourse

and higher sexual frequency than in vitro fertilization. However, another quantitative study by Lo et al. (2022), using the Female Sexual Function Index (FSFI) and the International Index of Erectile Function (IIEF-5) in a sample of 75 couples undergoing intrauterine insemination and 160 couples undergoing in vitro fertilization, found that both groups reported similar rates of sexual dysfunction. With respect to fertility medication, a qualitative study suggested that while fertility drugs had a positive impact on some men and women's sexual desire, it had a negative impact or no impact on the sexuality of other participants (Bokaie et al., 2015). Regarding treatment duration, couples who undergo treatments for longer periods of time (4 to 6 years) have been found to report lower pleasure in sexual activities than couples who undergo treatment for 0 to 2 years (Ohl et al., 2009) and to find the medical process more intrusive to their relationship (Ohl et al., 2009). These studies, however, considered only a limited set of infertility and treatment factors and failed to consider the association between these factors and the sexual function and satisfaction of both members of couples seeking ART, which seems essential to better understand and help couples deal with the impact of infertility and treatments. The limited research on the associations between diagnosis and treatment-related factors and sexual function and satisfaction and its associated shortcomings, in addition to conflicting findings highlight the need for further research investigating whether these variables may make certain couples seeking ART more vulnerable to experiencing lower sexual well-being than others.

Infertility-Related Stressors

A large body of research as well as clinical writings demonstrate that the burden associated with infertility and its treatment generates personal and relational stressors that persist over time (Cousineau & Domar, 2007). These stressors may also be consequential to couples' sexual function and satisfaction.

Personal Stressors. Personal stressors refer to the impact of infertility on individuals' emotions, physical health, cognitions, and behaviours (Boivin et al., 2011). Both qualitative (e.g., Hasanpoor-Azghdy et al., 2014; Onat & Beji, 2012a) and quantitative studies (e.g., Che & Cleland, 2002; Drosdzol & Skrzypulec, 2008; Lau et al., 2008) have highlighted the general stressfulness of an infertility diagnosis, involving feelings of disbelief and surprise, denial, anger, isolation, guilt, and grief, as well as failure. Women with an infertility diagnosis have also been found to experience higher levels of depression, role conflict, anxiety, and emotional and psychiatric disorders than fertile women (Alhassan et al., 2014; Matsubayashi et al., 2004; Noorbala et al., 2009). Infertile men have also been found to experience higher levels of psychological distress, depression, and anxiety than fertile men (Drosdzol & Skrzypulec, 2008; Dyer et al., 2009; Gao et al., 2013). Moreover, studies that have included both men and women have suggested that overall, compared to fertile individuals, infertile men and women tend to exhibit higher levels of depression and anxiety (Fassino et al., 2002), and a lower level of overall quality of life (Drosdzol & Skrzypulec, 2008; Lau et al., 2008).

Fertility drugs can also cause a number of side effects, including hot flashes, abdominal discomfort, and ovarian enlargement (Grinion, 2005), and many other fertility tests and treatments can be physically invasive and painful (Njogu et al., 2022). Consequently, fertility treatment can be experienced as a gradual, long process that may include several unsuccessful cycles of treatment, and concomitantly, the experience of numerous losses (Hasanpoor-Azghdy et al., 2014; WHO, 2002b). Waiting to hear if fertilization has occurred and anticipating embryo transfer results, known as the two-week waiting period, have been reported as particularly stressful situations (Rooney & Domar, 2018), which can create a serious strain for couples. The physical and emotional effects of fertility treatments, the high expenses of the treatments, and the

rigorous schedule and recovery related to treatments often overtake other aspects of couples' lives. As such, both men and women also report cognitive or behavioural disturbances as a result of infertility, including feeling a loss of control over their lives, difficulty concentrating on their daily occupations, and delayed long-term goals (Glover et al., 2009).

These disruptions to multiple facets of couples' lives have been shown to limit their ability to engage in everyday tasks (Collins et al., 2019; Cousineau & Domar, 2007), including sexual activities, whereby couples report reductions in the frequency of sexual activity (Oskay et al., 2010), which could affect their sexual function and satisfaction. A number of quantitative studies have also demonstrated an association between greater symptoms of depression or anxiety and higher sexuality-related infertility stress, defined as loss of enjoyment of sex, lower sexual self-esteem, and pressure to schedule sexual relations due to infertility (Newton et al., 1999; Peterson et al., 2007) and poorer sexual function (Amraei et al., 2022; Ho et al., 2020; Shahraki et al., 2018). However, these previous studies have not all included both partners within their analyses or examined whether other emotional, physical, cognitive and behavioral disruptions are related to sexual well-being during infertility and its treatment. Given the complex nature of the associations between infertility and sexuality (Marci et al., 2012), it seems essential to consider the infertility-specific emotional and physical stressors, as well as the cognitive and behavioral disruptions (i.e., infertility-related personal stressors) underlying men and women's sexual function and satisfaction to better inform infertility management and improve couples' quality of life.

Relational Stressors. In addition to being associated with emotional distress, several studies have also stressed the threat that infertility represents to relationships (Dyer et al., 2002; Onat & Beji, 2012a; Tao et al., 2011). Partners can experience infertility and treatment

differently (Nagórska et al., 2019), which can lead to conflicts between partners, including misunderstandings between partners regarding their inability to conceive (Nyarko & Amu, 2015). Couples also often face difficult decisions during treatment, including determining if and when treatment should be discontinued. A quantitative study by Péloquin et al. (2018) involving 279 couples enrolled in fertility treatments revealed that blame attributions related to infertility may also be associated with couples' adjustment to infertility. More specifically, their study revealed that men's self-blame was associated with their own lower relationship satisfaction, whereas partner blame in women was related to their own and their partner's lower relationship satisfaction (Péloquin et al., 2018). The stress associated with the diagnosis and treatment of infertility may thus impinge on the stability of relationships (Nyarko & Amu, 2015), forcing partners to reevaluate their affiliation with their chosen partners and may also lead them to feel unworthy of their partners (Gerrity, 2001).

Several quantitative studies have demonstrated that infertility has been linked to various relationship issues, including communication issues (Schmidt et al., 2005; Sormunen et al., 2018) and lower relationship adjustment (for a review, see Tao et al., 2011; Valsangkar et al., 2011; Zeren et al., 2019). Yet, other studies have found that infertility can bring partners closer together, with some infertile couples reporting higher relationship satisfaction than fertile couples (Drosdzol & Skrzypulec, 2009; Holter et al., 2006; Onat & Beji, 2012b; Sauvé et al., 2018), suggesting that couples may vary in how they adjust to infertility.

Since relationship and sexual satisfaction are intricately intertwined (Beaulieu et al., 2022; McNulty et al., 2016), researchers have suggested that one of the main influences on relational benefit for infertile couples may be a satisfying sexual relationship (Schmidt et al., 2005). Researchers that have examined relationship adjustment in the context of infertility have

not systematically included sexuality-related variables within their analyses. However, the challenges that infertility and treatment can exert on couple relationships could potentially influence some couples' sexual well-being, which could lead to a more significant strain for couples and thus, also explain the inconsistent findings within the literature on the effect of infertility on intimate relationships. Supporting this hypothesis, in fertile couples, lower cohesion, intimacy, and relationship satisfaction have been associated with poorer sexual function (Brotto et al., 2016). In the few studies examining factors associated with sexual outcomes in individuals experiencing infertility, lower perceived intimacy and greater relational concerns (e.g., about the impact of infertility on the relationship) have been linked to lower sexual satisfaction (Luk & Loke, 2019) and function (Facchin et al., 2019). However, these studies either only involved one member of couples seeking ART or did not consider the effects of infertility-related relational stressors, which refer to the specific impact of infertility and treatment on different components of the couple relationship (e.g., communication, commitment), on individuals' own and their partners' sexual well-being. Thereby, our understanding of the associations between the challenges related to ART and couples' sexual function and satisfaction remains limited.

Dyadic Factors

Although infertility is believed to be a life crisis for both men and women (Onat & Beji, 2012a), it has been suggested that men and women may experience infertility and its treatments differently (Laffont & Edelmann, 1994), with women being more adversely affected than men (Abbey et al., 1991; De Faria et al., 2012; Peterson et al., 2006; Wischmann et al., 2001). Therefore, studies have generally focused on women's perspective and very little remains known about men's experiences. However, most sexual expression is interpersonal (Harvey et al., 2005)

and infertility has an impact on the couple as a whole (De Faria et al., 2012), beyond its individual members (Sauvé et al., 2018). Yet, the vast majority of research on human sexuality and relationship quality in the context of infertility has failed to address the biopsychosocial crisis from an interpersonal angle, taking into consideration both partners' perspectives as well as relational dynamics and intra-dyadic (relational factors) that might play a major role in couples' sexual well-being. Hence, a number of questions remain concerning the relationship processes that may reduce or foster sexual disturbances in couples seeking ART.

Partner Effects. Partners are considered to be inherently interdependent in cultivating a mutually satisfying sexual relationship (Rosen & Bergeron, 2019), which may become significantly more challenging for both members of the couple when a partner is faced with an illness (Brotto et al., 2016). Some of the quantitative studies to date examining partner effects with respect to various outcome variables in samples of infertile couples have indicated that the quality of life in infertile couples was associated with not only one's own depressive symptoms but also their partner's level of depressive symptoms (Maroufizadeh et al., 2018) and that a partner's resilience was significantly associated with their partner's quality of life (Ha & Ban, 2020). Similarly, Yamanaka-Altenstein et al. (2022) found that men's infertility-related distress was associated with their partner's psychological distress in a sample of 116 infertile couples. Maroufizadeh et al. (2019) also revealed that women's perceived stress was associated with their partner's poorer relationship satisfaction in a sample of 141 infertile couples. A quantitative study by Peterson et al. (2008) investigated the associations between partner coping (active-avoidance, active-confronting or meaning-based coping) and individual distress in a sample of 1169 women and 1081 Danish men prior to beginning ART. The study's results revealed that a partner's use of active-avoidance coping was associated with a higher level of personal,

relational, and social distress for men and women, a woman's use of active-confronting coping was associated with higher relationship distress in men, whereas a partner's use of meaning-based coping was associated with lower relationship distress in men and higher social distress in women (Peterson et al., 2008). Péloquin et al. (2022) also found that men's attachment avoidance was related to their partner's lower relationship satisfaction via their own and their partner's lower use of positive dyadic coping strategies in a sample of 97 couples seeking medically assisted reproduction. These studies highlight the relevance of examining partner effects in the context of infertility.

Only a few studies, however, have examined sexuality-related variables in samples including both partners of couples experiencing infertility or have explored the associations between partners' responses and experiences in the context of infertility and its treatment. A quantitative study by Purcell-Lévesque et al. (2019) has examined the associations between attachment insecurities and sexual functioning in 88 women and 45 couples seeking fertility treatments who completed the Experiences in Close Relationships, the Arizona Sexual Experiences Scale, and the Global Measure of Sexual Satisfaction. Their dyadic analyses revealed that attachment-related anxiety in women was associated with their lubrication difficulties whereas men's attachment-related anxiety was related to their difficulties in reaching erection and orgasm (Purcell-Lévesque et al., 2019). They also found a partner effect, that men's attachment-related avoidance was associated with their partner's difficulty in achieving orgasms (Purcell-Lévesque et al., 2019). Another study by Nakić Radoš et al. (2020) examined infertility-related stress, specifically sexual concerns, and both partners' sexual satisfaction. The quantitative study included 94 couples experiencing infertility who completed the New Sexual Satisfaction Scale and the Fertility Problem Inventory. Their dyadic analyses revealed that

women's and men's greater infertility-related sexual concerns were associated with their own and their partner's lower levels of sexual satisfaction.

Whereas the results of these few studies are informative, very few have used infertility-specific measures of sexuality or considered the role of infertility-specific personal and relational factors in couples' sexual well-being or relational processes that may be associated with couples' sexual concerns and sexual satisfaction. Yet, they support the pertinence of using dyadic designs and the potential associations between a partner's experience, particularly their coping efforts, and their partner's quality of life, distress, as well as their sexual satisfaction.

Dyadic Coping. The biopsychosocial approach to sexual functioning highlights that psychosocial variables (e.g., availability of one's partner, partner support, and relationship quality) play an integral role in individuals' sexual well-being (Thomas & Thurston, 2016). Similarly, the biopsychosocial theory of infertility has suggested a number of important factors that could potentially mediate the detrimental effects incurred by infertility, including partner support and coping (Gerrity, 2001).

The goal of dyadic coping, in particular, is to promote couples' functioning through mutual closeness, intimacy, trust, and a sense of "we-ness" (Bodenmann, 2005; Bodenmann et al., 2010). Given that these aspects are considered to build the basis for satisfaction in sexual activities (Bodenmann, 2000; Bodenmann et al., 2006) and that flexibility and variability of coping are considered important in the context of infertility (Gerrity, 2001), it seems that a closer examination of how couples cope together with infertility and treatment and its associations with couples' sexual well-being is necessary in order to better understand the sexual experiences of couples seeking ART.

Dyadic coping refers to the interplay between the stress signals of one partner and the coping reactions of the other (Bodenmann, 1997; Bodenmann et al., 2005). It is a multidimensional construct, comprised of positive, negative, and common dyadic coping (Bodenmann, 2008). Positive dyadic coping strategies involve providing problem- or emotion-focused support to one's partner to help him or her in coping (supportive dyadic coping) and taking over responsibilities to alleviate the stress of one's partner (delegated dyadic coping; Bodenmann et al., 2018). A third way through which positive dyadic coping occurs is joint (common) dyadic coping, which refers to the joint efforts of both members of the couple to work together when faced with a stressful situation (Bodenmann et al., 2018; Papp & Witt, 2010), as well as the sharing of feelings and mutual commitment (Papp & Witt, 2010). Negative dyadic coping strategies however, include hostile, ambivalent and superficial efforts to support one's partner (Bodenmann et al., 2018).

Although dyadic coping encompasses support from one's partner in addition to stress communication, it comprises more than partner support (Chaves et al., 2019). In fact, dyadic coping refers to both partners being involved and committed to each other's satisfaction and well-being, as well as engaging in common problem-solving strategies (Bodenmann, 2005; Chaves et al., 2019). Dyadic coping thus aims to restore and maintain the well-being of both partners and reduce couples' stress levels (Bodenmann, 2005; Bodenmann et al., 2010). It is indeed considered to be a major predictor of how couples deal with chronic illness and has been associated with health-related, psychosocial, and relational outcomes (Berg & Upchurch, 2007; for a review, see Falconier et al., 2015). Greater positive dyadic coping has been related to higher relationship satisfaction (Bodenmann et al., 2006; Levesque et al., 2014; Wunderer & Schneewind, 2008), whereas a more frequent use of negative dyadic coping strategies has been

associated with the experience of higher distress (Bodenmann, 2000; Papp & Witt, 2010). Dyadic coping has also been correlated with partners' level of perceived relationship quality, stability, and communication behavior (Bodenmann, 2000; Bodenmann & Cina, 2000). However, despite the growing acknowledgment of the need to consider coping through a dyadic framework (Berg & Upchurch, 2007; Papp & Witt, 2010), little remains known about the association between dyadic coping and the sexual well-being of couples seeking ART.

In the context of infertility, a few studies have examined coping strategies from an individualistic perspective, including gender differences in how men and women cope with infertility (Peterson et al., 2006; Peterson et al., 2011; Schmidt et al., 2005). Studies have shown an association between individual coping strategies, particularly avoidance coping, and personal, relationship, and social distress at the individual and partner level for infertile couples (Levin et al., 1997; Péloquin et al., 2022; Peterson et al., 2006; Peterson et al., 2009), but not sexual problems or distress. However, in the context of infertility, which is experienced as a dyadic stressor (Berghuis & Stanton, 2002), joint coping efforts are also very common.

A quantitative study by Chaves et al. (2019) examined the role of dyadic coping in the association between the impact of infertility and dyadic and emotional adjustment to infertility. The study involved 67 couples with infertility who completed self-report questionnaires assessing infertility-related stress, dyadic coping, dyadic adjustment, and depression and anxiety symptoms. The analyses revealed that for men, a higher perceived impact of infertility was associated with lower levels of dyadic coping by oneself, which was in turn associated with lower relationship adjustment (Chaves et al., 2019). For infertile women, a higher perceived impact of infertility was associated with lower scores for dyadic coping by the partner, which were associated with their lower relationship adjustment (Chaves et al., 2019). Another

quantitative study by Molgora et al. (2019) examined the effect of each partner's dyadic coping style on their own and their partner's relationship adjustment in a sample of 167 couples undergoing ART. Participants completed self-report questionnaires examining relationship adjustment and dyadic coping. Their results also revealed that both women and partners' scores on positive dyadic coping styles (common, emotion-focused, problem-focused, and delegated dyadic coping) were associated with higher relationship adjustment (Molgora et al., 2019). While none of these studies specifically examined the association between dyadic coping and couples' sexual well-being, the findings of these studies highlight the necessity of considering the role of dyadic coping in couples dealing with infertility and its potential implications for couple relationships, including their sexual well-being.

Dyadic Coping and Sexual Well-Being. Dyadic coping is assumed to be closely linked to sexual well-being and to potentially mitigate the negative effects of stress on sexual desire (Bodenmann et al., 2010). Research conducted in community samples and other health-related samples are in line with these findings. Indeed, greater dyadic coping, but not individual coping, has been associated with higher sexual satisfaction and more frequent orgasms in a sample of female students (Bodenmann et al., 2010; Bodenmann et al., 2019). Dyadic coping, together with individual coping, has also been found to predict how satisfying sexuality is experienced with one's partner (Bodenmann et al., 2010). In couples coping with prostate cancer, low levels of healthy mutual communication between partners (which is integral to dyadic coping) have been associated with greater sexual dissatisfaction (Badr & Taylor, 2009). Women suffering from metastatic breast cancer who report low levels of mutual constructive communication with their partners have also been found to experience more depressive symptoms associated with their sexual problems (Milbury & Badr, 2013). Two recent quantitative studies have also revealed

associations between lower levels of positive and higher levels of negative dyadic coping and sexual dissatisfaction in a community sample of men and women (Wawrziczny et al., 2021), and between higher perceptions of common dyadic coping and lower sexual distress in new parent couples (Tutelman et al., 2021). Studies have also shown that dyadic coping is a stronger predictor than individual coping of relationship functioning, satisfaction, and sexual behavior (Bodenmann et al., 2010; Herzberg, 2012, Papp & Witt, 2010).

In light of these findings, as well as the interdependence of individuals in romantic relationships (Papp & Witt, 2010), dyadic coping can be expected to play a significant role in couples' adjustment to infertility (Chaves et al., 2019), including their sexual well-being. However, to our knowledge, no study to date has examined the role of dyadic coping in the sexual well-being of both members of couples seeking ART. Moreover, given the positive contributions of dyadic coping to romantic relationship satisfaction and increasing evidence supporting its role in understanding adjustment in infertile couples (Breitenstein et al., 2018; Chaves et al, 2019; Coëffin-Driol & Giami, 2004; Martins et al., 2014; Martins et al., 2011), empirical efforts to examine not only the role of infertility-specific factors but also of relational factors and processes, such as dyadic coping, in the sexual well-being of couples facing infertility seem highly justified.

Thesis Objectives

The present thesis aimed to extend our knowledge of the sexual well-being of infertile couples seeking ART. Whereas most previous research in the context of infertility has largely focused on individual perspectives, this thesis uses a dyadic perspective to understand the sexual well-being of both partners. Moreover, given the methodological flaws of earlier studies on the sexual well-being of infertile couples (e.g., failure to use infertility-specific or standardized

measures to assess sexuality, failure to consider both partners' perspectives), there is a need to further understand the role of contextual and intra-dyadic factors in the sexual well-being of couples seeking ART. To that aim, in line with the biopsychosocial framework, this thesis attempted to provide an in-depth examination of the infertility-specific (personal and relational), and dyadic (dyadic coping) factors underlying the sexual well-being of couples facing medical infertility and seeking fertility treatment, through two dyadic studies. By examining infertility-specific variables as well as relational factors that may be associated with both partners' sexual well-being, these studies' bear important research and clinical implications, allowing us to better capture the dyadic nature of these couples' sexual experiences and the factors associated with greater sexual difficulties. Moreover, they guide interventions to help couples seeking ART better manage the burden associated with infertility and treatment procedures on their sexual lives.

Study 1

The main objective of the first study was to explore the associations between infertility-specific personal and relational stressors, and both partners' sexual function (desire, orgasm, arousal) and satisfaction. The associations between diagnosis and treatment-related factors (i.e., presence of a diagnosis, cause of infertility, use of fertility medication, duration of conceiving difficulties, treatment type and duration) and both partners' domains of sexual function (desire, orgasm, arousal) and sexual satisfaction were also examined to determine whether these variables should be included as covariates in the main analyses.

We hypothesized that experiencing higher levels of infertility-related personal and relational stressors would be associated with lower sexual desire, orgasm, arousal, and satisfaction for the individual and for his or her partner. Gender differences in these associations

were also examined, although no a priori hypotheses were put forward for lack of previous research. This first study has been published in the *Journal of Sexual Medicine.*

Study 2

The second study aimed to investigate the associations between dyadic coping and infertility-related sexual concerns, sexual distress, and sexual satisfaction in couples seeking ART. An individual's perceptions of what their partner does to help them cope with a stressful situation (i.e., dyadic coping by the partner) and how they cope together as a couple (i.e., common dyadic coping) have been found to be stronger predictors of an individual's relationship satisfaction than an individual's own efforts to help their partner cope, which may deplete their personal resources and amplify their stress (Falconier et al., 2015; Rusu et al., 2020). Therefore, we were particularly interested in individuals' perceptions of common dyadic coping and of positive and negative dyadic coping strategies used by their partner. The associations between these perceptions and both partners' sexual well-being (infertility-related sexual concerns, sexual distress, and sexual satisfaction) were examined to better capture the dyadic context of couples' sexuality in the context of infertility and fertility treatment.

Based on prior research on dyadic coping and relationship adjustment (Bodenmann et al., 2006; Papp & Witt, 2010; Rusu et al., 2020; also see Falconier et al., 2015 for a review), we hypothesized that an individual's perceptions that their partner helps them cope with stress using supportive strategies and by taking over some of their responsibilities (positive dyadic coping) or that they are able to cope as a couple efficiently with stress (common dyadic coping) would be associated with fewer infertility-related sexual concerns, lower sexual distress, and higher sexual satisfaction for the individual and for their partner. We hypothesized that an individual's perceptions that their partner helps them cope with stress using hostile, ambivalent, or superficial

strategies (negative dyadic coping) would be associated with greater infertility-related sexual concerns, higher sexual distress, and lower sexual satisfaction for the individual and for their partner. Given the close link between dyadic coping and relationship satisfaction (for a review, see Falconier et al., 2015) and between relationship and sexual satisfaction (Henderson et al., 2009), the analyses adjusted for relationship satisfaction in order to isolate the effect of dyadic coping on couples' sexual well-being. Gender differences in these associations were also examined although no a priori hypotheses were put forward due to the inconsistencies of past studies on the sexual well-being of couples faced with infertility. This second study was accepted for publication at the journal *Family Relations*.

The first study combined data from two larger research projects involving couples seeking ART. The first project was designed to explore the psychological, relational and sexual well-being of couples seeking treatment for infertility (N = 83) and the second gathered data regarding patient, treatment, and clinic factors predicting treatment burden and treatment non-compliance in couples seeking ART (N =102). The first study of this thesis therefore included a total of 185 couples. The 102 participants involved in the second project on the factors associated with treatment burden were also included in the final sample of the second study presented in this thesis (N = 232). Both studies utilized similar designs and recruitment procedures. Moreover, both studies included similar inclusion criteria 1) seeking treatment for infertility in a fertility clinic at the time of participation, 2) being involved in a romantic relationship, 3) being 18 years of age or older, 4) both partners participating in the study, and 5) participants having a good spoken and written comprehension of French or English. The only additional criterion included in the second study was that couples needed to be within six months of seeking any type of assisted reproductive services at a fertility clinic.

Article 1

Sexual Function and Satisfaction in Couples with Infertility:

A Closer Look at the Role of Personal and Relational Stressors

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Running head: SEXUAL HEALTH IN COUPLES WITH INFERTILITY

TITLE: Sexual Function and Satisfaction in Couples with Infertility: A Closer Look at the Role of Personal and Relational Characteristics

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Abstract

Background. Research to date suggests that couples undergoing assisted reproductive technology (ART) are at a high risk of experiencing sexual difficulties.

Aim. This dyadic cross-sectional study aimed to provide a better understanding of the infertility-specific personal (i.e., emotional, mind-body) and relational stressors associated with the sexual desire, orgasm, arousal, and sexual satisfaction of couples seeking ART.

Methods. The sample included 185 mixed-sex couples seeking ART. Participants completed online the Fertility Quality of Life tool and either the Female Sexual Function Index or the International Index of Erectile Function. Data were analyzed using path analyses based on the Actor-Partner Interdependence Model.

Outcomes. Individuals' own and their partners' sexual function (desire, orgasm, arousal domains) and sexual satisfaction.

Results. For men and women, infertility-related emotional stressors were associated with their own and their partner's lower sexual desire. For women, experiencing greater infertility-related emotional stressors was also associated with their partner's lower sexual satisfaction. While experiencing greater infertility-related mind-body stressors was not associated with men and women's own sexual desire, arousal, orgasm, and satisfaction, for women, it was associated with their partner's lower sexual arousal. Lastly, for men and women, infertility-related relational stressors were associated with their own lower sexual arousal, as well as with their own and their partner's lower sexual satisfaction. For women, experiencing greater relational stressors was also associated with their own lower sexual desire and orgasm.

Clinical Implications. Interventions addressing the emotional, mind-body, and relational spheres of couples seeking ART may help facilitate improvements in sexual function and satisfaction and

better serve their needs.

Strengths and Limitations. This study included a large sample of couples. Our sample was heterogeneous with regards to couples' cause of infertility and treatment stage. The use of an infertility-related measure allowed us to better capture personal and relational stressors specific to couples seeking ART. Given the cross-sectional design of our study, causality between infertility-related stressors and sexual function and satisfaction cannot be inferred. Our sample included predominantly White, mixed-sex individuals with a high level of education, which may reduce the generalizability of our findings.

Conclusion. Couples' subjective experience of infertility and treatment (personal and relational stressors) seems to be strongly associated with their sexual health, allowing us to identify potential targets of intervention with couples seeking ART.

Keywords: Infertility; assisted reproductive technology; sexual function; sexual satisfaction; infertility-related stressors; couple relationships

Sexual Function and Satisfaction in Couples with Infertility: A Closer Look at the Role of Personal and Relational Stressors

Infertility is defined as the inability to conceive after one year of regular unprotected vaginal intercourse or to carry a pregnancy to term[1] and affects 12% to 16% of couples worldwide.[2,3] The diagnosis and treatment of infertility is associated with significant personal and relational stressors,[4] including psychological distress[5] and disruptions in daily activities.[6] Research has also shown that couples seeking assisted reproductive technology (ART) are more likely to experience sexual difficulties than fertile couples.[7]

Sexual function and satisfaction are recognized as essential aspects of relationship adjustment and health-related quality of life.[8,9] Sexual function refers to sexual response including desire, orgasm, and arousal during sexual intercourse in women[10] and men.[11] Sexual satisfaction, however, is defined as the "affective response arising from one's subjective evaluation of the positive and negative dimensions associated with one's sexual relationship".[12,p.268] While research has increasingly investigated the factors associated with psychological, relational and social well-being, few studies have examined the factors associated with sexual adjustment in the context of infertility.[7,13] Moreover, studies have largely focused on women's perspectives, neglecting to consider that infertility affects the couple as a unit and the dyadic nature of sexuality. A better understanding of the role of infertility-specific personal and relational stressors in the sexual function and satisfaction of couples is warranted to help them manage the burden associated with infertility and treatment procedures.

Sexual Health of Couples Seeking ART

Issues related to sexuality are crucial aspects of the lives of couples seeking ART. While attempting to conceive involves giving significant attention to sexual activity, during fertility

treatments, vaginal intercourse tends to be put aside or becomes task-oriented for some couples.[14] Individuals seeking ART are often given instructions from healthcare teams about the timing of sexual activity to increase chances of conception. Some couples thus reveal that sex may become "mechanical" and subsequently report lower sexual self-esteem and a loss of control over their sex lives.[15]

A few controlled studies have reported higher levels of sexual dysfunction in women seeking ART,[16,17] mainly impairments in arousal, desire, and orgasm.[18,19] Relative to controls, higher levels of premature ejaculation,[20] erectile dysfunctions,[21] and lower desire and orgasmic function[22] have also been reported in men seeking ART. Individuals seeking ART have also been found to experience greater sexual dissatisfaction than fertile controls.[23,24] However, other studies have reported either greater sexual pleasure and more frequent intercourse in couples seeking ART[25,26] or no change in sexual function[27] compared with population norms. These conflicting findings suggest that there is considerable variability in how infertility and its treatment may affect the sexual experiences of couples seeking ART.

Diagnosis and treatment-related factors often dictate the timing and frequency of sexual relations,[28] but previous studies have yielded inconsistent results regarding their associations with the sexual health of individuals seeking ART. One study found no association between the cause of infertility and sexual function,[18] whereas others have found that individuals facing infertility due to male factors experienced greater difficulty discussing sexual activities[25] and lower sexual satisfaction,[29] and that women with infertility related to female factors indicated a more negative impact on their sex lives due to infertility.[30] Similar rates of sexual dysfunction were also reported among couples using in vitro fertilization and intrauterine insemination,[31] although one study reported that the latter was associated with higher sexual frequency.[25.] These

conflicting findings suggest that sexual difficulties experienced by couples seeking ART may not necessarily stem from objective diagnosis or treatment characteristics and highlight the need for further research to investigate other variables that may better account for the sexual health of these couples.

Infertility-Related Stressors

Research has found that the burden associated with infertility and its treatment generates personal (emotional, physical, cognitive, behavioral) and relational stressors that persist over time[6] and may be consequential to couples' sexual function and satisfaction.

Personal Stressors

A number of studies have demonstrated the association between greater symptoms of depression or anxiety and higher sexual infertility stress[32] and poorer sexual function.[27,33] However, these previous studies have not examined whether other emotional, physical, cognitive, and behavioral disruptions are related to sexual health during infertility and its treatment. There is significant stress associated with the experience of infertility and treatment,[34,35] that often elicits feelings of anger, isolation, grief, guilt, and personal failure for men and women.[36] Beyond emotional stressors, the experience of infertility and its treatment can become a substantial physical burden. Several diagnostic and treatment procedures can be perceived as physically invasive and cause physical discomfort and pain.[6] Women taking ART medication have also reported physical side effects, including hot flashes, vaginal dryness, dizziness, and fatigue.[37]

The physical and emotional effects, expenses, rigorous schedule and recovery related to treatments often overtake other aspects of couples' lives. As such, both men and women report feeling a loss of control over their lives and difficulty concentrating on their daily occupations

and long-term goals.[38] These disruptions to multiple facets of their lives have been shown to limit their ability to engage in everyday tasks,[6,39] including sexual activities, whereby couples report reductions in the frequency of sexual activity,[40] which could affect their sexual function and satisfaction.

Some studies have suggested that men and women may experience infertility-related personal stressors differently,[41] with women reporting more adverse effects on their self-esteem, stress, depression, and anxiety[42] and negative consequences on their quality of life[43] and sexual life.[44] Other studies, however, have reported no gender differences in the quality of life of couples coping with infertility.[4] Given the complex nature of the associations between infertility and sexuality,[45] it seems essential to consider the infertility-specific emotional and physical stressors, as well as the cognitive and behavioral disruptions underlying both men and women's sexual function and satisfaction to better inform infertility management and improve couples' quality of life.

Relational Stressors

In addition to being associated with personal distress, studies have highlighted the threat that infertility represents to intimate relationships.[4,13,46] Couples often face difficult decisions during treatment, including determining whether treatment should be discontinued, and deal with the financial burden that accompanies fertility treatments.[47] Moreover, infertility may force individuals to reevaluate their affiliation with their chosen partner and may also result in them feeling unworthy of their partner.[48] Several studies have demonstrated an association between infertility and more relationship and communication issues,[49] self and partner blame,[50] and lower relationship adjustment.[51] Studies have also reported lower relationship satisfaction in couples coping with infertility compared to controls,[52] as well as fears of abandonment or breakup.[53] The

findings regarding the associations between infertility and relationship adjustment are inconsistent however, as some studies have reported that infertility can bring partners closer together, with some infertile couples reporting a better relationship than fertile couples.[54,55,56,57]

Couples often engage in sex as a way to express their feelings of intimacy, affection, and closeness with their partner.[15] Luk and Loke[58] found that one third of women and men facing infertility reported being unable to show their feelings to their partner out of fear of making them upset. Men have been found to be less willing to discuss their problem of infertility,[59] and to share their feelings and negative emotions with their partner, whereas women have been found to be more concerned about the effect of infertility on their closeness with their partner[58] and to be less satisfied with the level of expressed affection within their relationship.[60] Given that in fertile populations, lower cohesion, intimacy and relationship satisfaction are associated with poorer sexual function,[61] these additional challenges of ART on relationships (e.g., difficulties in communication, commitment and affection, pressure related to sexual intercourse) may have stronger consequences for couples' sexual function and satisfaction.

In the few studies examining relational factors associated with sexual outcomes in individuals experiencing infertility, lower perceived intimacy, relationship satisfaction, and greater relational concerns have been linked to lower sexual satisfaction[58] and function.[62] However, these studies either only involved one member of couples seeking ART, did not use an infertility-related measure of relational concerns, or did not consider the effects of these stressors on individuals' own as well as their partner's sexual health.

The limited research on infertility-related relational stressors and couples' sexual health and the limitations of previous studies, in addition to conflicting findings regarding the relationship adjustment of couples coping with infertility highlight the need for further research

investigating these associations to better determine the factors that may make certain couples seeking ART more vulnerable to developing sexual problems than others.

Partner Effects

Infertility is a life crisis for both men and women,[4] that is associated with significant personal and relational stressors for both partners. Partners are considered to be inherently interdependent in cultivating a mutually satisfying sexual relationship,[63] which may become significantly more challenging for both members of the couple when a partner is faced with an illness.[61] Only a few studies have examined sexual function in samples of couples experiencing infertility.[7] These studies have generally focused on the prevalence of sexual dysfunctions, used heterogeneous measures to assess sexual response, including non-validated measures of sexual function, and failed to address partners' sexual health, limiting our understanding of the sexual experiences of couples as a whole. Nakić Radoš et al.[64] have examined the association between infertility and sexuality from a dyadic perspective and have found that women's and men's greater sexual concerns were associated with their partner's lower levels of sexual satisfaction. This study however, did not consider infertility-specific personal as well as relational factors associated with sexual function and satisfaction. Nevertheless, studies to date underscore the importance of involving both members of the couple when examining the sexual health of couples coping with infertility.

The Present Study

The aim of this dyadic study was to examine the associations between infertility-related personal (i.e., emotional, mind-body) and relational stressors and both partners' sexual function (desire, orgasm, arousal) and satisfaction. We hypothesized that experiencing higher levels of infertility-related emotional, mind-body (physical burden of treatment, disruptions in daily life)

and relational stressors would be associated with lower sexual desire, orgasm, arousal, and satisfaction for the individual and for their partner. Gender differences in the associations between these infertility-related stressors and domains of sexual function and satisfaction were also examined. No a priori hypotheses were put forward, however, due to the inconsistencies of previous research and the paucity of research on gender differences in sexual health in the context of infertility.

Methods

The present cross-sectional study combined data from two larger research studies involving couples seeking ART. The first study was designed to explore the psychological, relational and sexual well-being of couples seeking treatment for infertility and the second gathered data regarding patient, treatment, and clinic factors predicting treatment burden and treatment non-compliance in couples seeking ART. Both studies utilized similar designs, recruitment procedures, and inclusion criteria, with the exception that couples needed to be within six months of seeking any type of assisted reproductive services at a fertility clinic to participate in the second study. The studies have been approved by the universities' review boards and the fertility clinics partaking in the studies.

Participants

Couples seeking assisted reproductive services at the time of their participation were recruited for the study. Inclusion criteria included 1) being involved in a romantic relationship, 2) being 18 years of age or older, 3) both partners participating in the study, and 4) participants having a good spoken and written comprehension of French or English. Single mothers and individuals in same-sex relationships were excluded for the purpose of this study. While we recognize same-sex or same-gendered couples may also experience involuntary childlessness,

their experiences and needs could significantly differ from those of mixed-sex couples seeking ART, given the additional barriers that they may face (e.g. stigma).[65] Moreover, this study focused on medical infertility given the closer link between infertility treatment and sexual practices (e.g., ritualized, procreative approaches to sex) for couples experiencing medical infertility.[45] The measure used to assess infertility-related personal and relational stressors in this study was also designed to address medical infertility and has not been validated with couples who are using ART for other reasons than medical infertility.

The initial sample consisted of 219 mixed-sex couples seeking ART. However, as is generally recommended to ensure that the main outcome measures represent a valid assessment of couples' sexual function and satisfaction,[66,67] couples (n = 34) in which one or both members did not indicate engaging in sexual activity over the past four weeks were excluded from the analyses. Of the couples excluded, only 6.1% were still waiting for an infertility diagnosis, whereas this proportion was significantly higher (25%) for couples included in the study, $X^2(1,217) = 5.83$, $p = .016$. A significant difference was also observed in terms of age, $F(1, 208) = 5.59$, $p = .019$; $\eta_p^2 = .03$ and treatment duration, $F(1, 206) = 5.40$, $p = .021$; $\eta_p^2 = .03$, with excluded couples being older (excluded men: $M = 36.21$, $SD = 4.52$ and women: $M = 33.03$, $SD = 3.96$; included men: $M = 33.56$, $SD = 4.91$ and women: $M = 31.86$, $SD = 4.71$) and in treatment for longer (excluded couples: $M = 2.15$, $SD = 1.62$; included couples: $M = 1.71$, $SD = 1.29$). The final sample consisted of 185 couples. Couples' demographic and clinical information are presented in Table 1.

Procedure

Participants were recruited in person (40.5%) or through advertisements placed in various fertility clinics and posted on several infertility-related association websites and social media in

Canada and the United States (59.5%). Participants were contacted by a research assistant by phone or email for online recruitment or in-person at their fertility clinic to provide them with information regarding the study procedure and ensure that both partners were interested in participating. They were screened by a research assistant by telephone or in-person to verify their eligibility for the study. Both partners were asked to complete the consent form and separate online questionnaires via a secure online platform. Couples received compensation of either $15 in gifts cards or a $20 cheque for their participation, depending on the study they took part in. The participant flow chart is presented in Figure 1.

Measures

Demographic and medical information (presence of a diagnosis, cause of infertility, use of fertility medication, duration of conceiving difficulties, treatment type and duration), and details about participants' relationships (duration of relationship and cohabitation) were collected using a self-report investigator made questionnaire.

Infertility-Related Stressors

The Fertility Quality of Life tool[68] (FertiQol) assesses the burden of infertility and treatment on diverse life areas. The scale includes 36 items. The present study focused on the items assessing the experience of 1) personal (emotional and mind-body) and 2) relational infertility-related stressors. The emotional domain (6 items) measures the extent to which individuals experience negative emotions (e.g., sadness, resentment) in relation to their fertility problems. Sample items include "does treatment negatively affect your mood?" and "do you fluctuate between hope and despair because of fertility problems?". The mind-body domain (6 items) assesses the impact of infertility on physical health (e.g., pain), cognitions (e.g., poor concentration) and behavior (e.g., disruptions in daily activities). Sample items include "are you

bothered by fatigue because of fertility problems?" and "do your fertility problems interfere with your day-to-day work or obligations?". The relational domain (6 items) measures the extent to which intimate relationships have been affected by fertility problems. Sample items include "do you find it difficult to talk to your partner about your feelings related to infertility?" and "have fertility problems had a negative impact on your relationship with your partner?". Items are rated on various 5-point Likert-type scales. Subscale scores range from 0-100, with higher scores indicating that infertility had a lower impact on personal and relational domains. The instrument is considered a reliable (Cronbach's alpha ranging from .72 to .92) and sensitive tool of the impact of infertility on different life domains.[68] In the current sample, the internal consistency of the emotional, mind-body, and relational domains (α ranging from .73 to .86 for women, α ranging from .69 to .85 for men) was satisfactory.

Domains of Sexual Function

Women's sexual function was measured using the Female Sexual Function Index[10] (FSFI), a 19-item self-report measure of sexual function over the last month, in five different areas: desire (2 items), arousal (4 items), orgasm (3 items), lubrication (4 items), pain (3 items). Each item is rated on a 5 or 6-point scale. This study focused on the desire, arousal, and orgasm subscale scores of the FSFI. Individual domain scores are obtained by adding the scores of individual items that comprise the domain and multiplying the sum by the domain factor. Sample items include "over the past 4 weeks, how often did you feel sexual desire or interest?" and "over the past 4 weeks, how would you rate your level of sexual arousal?". Subscale scores range from 0 (or 1) to 6, with higher scores indicating better sexual function. The scale has been shown to have good psychometric properties, including high test-retest reliability for each domain, good construct and divergent validity, and a high degree of internal consistency (α = .82 or higher).[10]

The FSFI was found to have a high level of internal consistency in the current sample (α ranging from .86 to .90 for domain scores).

Male sexual function was measured using the International Index of Erectile Function[11] (IIEF), a 15-item self-report measure of sexual function in three different areas: erectile function (6 items), orgasmic function (2 items), sexual desire (2 items). Each item is rated on a 5 or 6-point scale. This study focused on the individual subscale scores. Scores range from 0 (or 1) to 10 for the orgasmic function and sexual desire domains and from 0 (or 1) to 30 for erectile function. Higher scores indicate better sexual function. Sample items include "over the past 4 weeks, how often were you able to get an erection during sexual activity?" and "over the past 4 weeks, how much have you enjoyed sexual intercourse?". The IIEF has been shown to have adequate construct validity, highly significant test-retest repeatability, and a high degree of internal consistency for the five domains (α = .73 and higher)[11]. The IIEF was found to have a good level of internal consistency in the current sample (α ranging from .80 to .82 for domain scores).

Sexual Satisfaction

The satisfaction subscales of the FSFI[10] (3 items) and the IIEF[11] (2 items) were used separately as indices of overall sexual satisfaction. Sample items include "over the past 4 weeks, how satisfied have you been with your sexual relationship with your partner?" and "over the past 4 weeks, how satisfied have you been with your overall sexual life?". The satisfaction subscales were found to have a good level of internal consistency in the current sample (FSFI: α = .86, IIEF: α = .94).

Statistical Analysis

An a priori power analysis was conducted using APIMPowerR, a statistical app designed

to estimate power for dyadic studies.[69] With a power of .80 and an alpha of .05, the minimum number of participants needed for a medium effect size of actor effects (i.e., associations between an individual's score on the predictor and their own score on the outcome) was 59 couples, and for a small effect size of partner effects (i.e., associations between an individual's score on the predictor and their partner's score on the outcome) was 159 couples.

SPSS® Statistics 26.0[70] was used for preliminary data analyses. Prior to performing the main analyses, data were screened for outliers, missing values, and normality. Variables were normally distributed with the exception of men's erection and orgasm scores. Non-parametric bootstrapping (2000 samples) was used in the main analyses to account for the non-normality of the variables. Exploration of missing data was completed using SPSS Missing Values Analysis. Within the main variables, only 5.7% of data were missing. Little's Missing Completely at Random test[71] suggested that these values were missing completely at random (p = .09). Missing values were replaced using single imputation (expectation-maximization algorithm).

Preliminary correlations and repeated-measures MANOVAs (with gender being the repeated factor for the dyad) were performed to identify potential covariates among the sociodemographic, diagnosis and treatment-related variables. These analyses yielded non-significant associations between age, income, relationship duration, marital status, presence of an infertility diagnosis, cause of infertility, use of fertility medication, duration of conceiving difficulties and treatment type and both partners' domains of sexual function (desire, orgasm, arousal) and sexual satisfaction. Therefore, these variables were not included as covariates in the main analyses. Treatment duration was significantly associated with sexual desire and satisfaction for men, with those who reported receiving treatment for longer periods of time

reporting lower sexual desire (r = -.21, p = .005) and satisfaction (r = -.23, p = .002). Thus, treatment duration was included as a covariate in the main analyses.

To examine the associations between infertility-related personal (emotional, mind-body) and relational stressors and both partners' domains of sexual function (desire, orgasm, arousal) and satisfaction, path analyses using the Actor-Partner Interdependence Model[72] (APIM) were performed with the SPSS Amos software (version 25).[73] This approach addresses the nonindependence of dyadic data and treats the couple as the unit of analysis. It integrates both actor and partner effects. The design also reduces the overall number of analyses conducted and enables us to test gender differences in actor and partner effects.

Given the dyadic nature of the model, we included both partners' sexuality subscales (i.e., women and men's sexual desire, orgasm, arousal, and satisfaction) in the APIM analysis. Standardized scores were computed for these subscales to facilitate the interpretation and comparison of findings between men and women. The final model included each partner's infertility-related emotional, mind-body and relational stressors as predictors of sexual desire, orgasm, arousal, and satisfaction. Treatment duration was initially included as a control variable. However, when included in the model with the emotional, mind-body and relational stressors, treatment duration was no longer significantly associated with men or women's sexual desire, orgasm, arousal and satisfaction and was therefore removed. This result further supports our earlier argument that personal and relational stressors may be stronger predictors of couples seeking ART's sexual health than diagnosis or treatment related factors. Model fit was assessed using the following fit indices:[74] a non-significant chi-square, a value of the comparative fit index (CFI) greater than .95, and a value of the root mean square error of approximation (RMSEA) below .06 and its 90% confidence interval. To test gender differences in actor and

partner effects, a within-dyad test of distinguishability was performed.[72]

Results

The descriptive statistics and the bivariate correlations between infertility-related personal and relational stressors and domains of sexual function and satisfaction are shown in Table 2.

Infertility-Related Personal and Relational Stressors

When comparing a model in which all parameters were free to vary and a model in which all the effects were constrained to be equal between men and women, a significant difference in Chi-square was obtained ($\Delta\chi^2$ (24) = 39.165, p = .026), indicating that there were significant differences between men and women's actor and partner effects. A semi-constrained model was therefore retained, which constrained only the actor and partner effects that did not differ significantly between men and women ($\Delta\chi^2$ (16) = 19.857, p = .227). This model achieved a good fit: $\chi^2(30) = 29.644$, p = .484; CFI = 1.000; RMSEA = .000, 90% CI [.000; .055]. The final path model is displayed in Figure 2 and the 90% confidence intervals for the standardized regression coefficients are presented in Table 3.

Results indicated that for men and women, infertility-related emotional stressors were associated with their own and their partner's lower sexual desire. For women, experiencing greater infertility-related emotional stressors was also associated with their partner's lower sexual satisfaction. While experiencing greater infertility-related mind-body stressors was not associated with men and women's own sexual desire, arousal, orgasm, and satisfaction, for women, it was associated with their partner's lower sexual arousal. Lastly, for men and women, infertility-related relational stressors were associated with their own lower sexual arousal and satisfaction, as well as with their partner's lower sexual satisfaction. For women, experiencing

greater relational stressors was also associated with their own lower sexual desire and orgasm.

Discussion

The aim of this cross-sectional dyadic study was to provide a better understanding of the infertility-related personal (emotional, mind-body) and relational stressors associated with different domains of sexual function as well as sexual satisfaction in couples seeking ART. Our findings revealed that both infertility-related personal and relational stressors were associated with individuals' own and/or their partner's poorer sexual health.

Infertility-Related Personal Stressors

Our results confirm the expected associations between infertility-related emotional stressors and men and women's own lower sexual desire. Prior research suggests that the emotional burden of infertility may be more challenging than the physical burden associated with infertility[75] and its treatments,[76] and may have a significant influence on the decision to stop treatment.[77] Our results, therefore, support the idea that the emotional impact of infertility may be more strenuous on couples' quality of life and corroborate other studies' findings that it is associated negatively with domains of sexual function.[33,62]

Indeed, infertility has been associated with a significant range of emotions including sadness, shame, guilt, failure, incompetence, loss, and disappointment.[33,78,79] Consequently, couples seeking ART have been found to experience high rates of emotional distress and depressive symptoms,[80] which are associated with more difficulties in sexual function.[33,81] Sexual desire itself has been considered as a "subjective feeling state"[82] and an "emotional experience".[83] It is therefore not surprising that this domain of sexual function would be most affected by couples' emotional state related to infertility. Experiencing negative emotions could hinder couples' ability to access and connect with positive emotions such as sexual desire. It is

also possible that the negative emotions couples experienced were more difficult to understand and regulate than the mind-body stressors. The mind-body stressors refer to more concrete consequences of infertility and treatment (e.g., fatigue, pain, disruption to daily activities),[68] and their association with sexuality may be more distal than the overwhelming negative emotions that often accompany the experience of infertility and treatment. It should be noted however, that the emotional and mind-body subscales of the FertiQol are highly correlated and are considered to have some conceptual overlap (e.g., impact on day-to-day activities).[84] Therefore, it is possible that the emotional subscale has taken up most of the variance and smaller effects of the mind-body stressors on couples' sexuality have been obscured.

Our results did not reveal significant associations between infertility-related emotional stressors and individuals' own sexual arousal, orgasm and satisfaction, which suggests that the emotional impact of infertility may be more strongly associated with couples' interest and drive to engage in sexual activities. Indeed, as we expected, we found that for both men and women, infertility-related emotional stressors were also associated with their partner's lower sexual desire. The association between infertility-related emotional stressors and both partners' sexual desire suggests that when one partner experiences intense emotions related to infertility, this could potentially hinder the sexual desire of both partners. Hence, emotional stressors may take up most of the space within the couple, making it difficult for both partners to develop a desire to engage in sexual activity. This is consistent with the Interpersonal Emotion Regulation Model of sexual dysfunction[63], which posits that difficulties in emotion regulation, including emotional awareness, expression, and experience may negatively affect couples' sexual functioning. If couples are still able to engage in sexual activities and to cope with the feeling of lower sexual desire, our findings suggest however, that other domains of sexual function and sexual

satisfaction may not be as impacted by the negative emotions, and cognitive and physical burdens experienced due to infertility and its treatment.

For women, experiencing infertility-related emotional stressors was also associated with their partner's lower sexual satisfaction. Additionally, for women, experiencing infertility-related mind-body stressors was associated with their partner's sexual arousal. Our findings extend previous research, which has focused primarily on individual effects, by offering a dyadic understanding of the sexual health of couples seeking ART. Individuals who experience negative emotions, including depressive affect, are also more likely to view not only themselves, but also their partners through a negative lens. These negative perceptions may then result in the individual engaging in negative communication behaviors,[85] and may exacerbate both their own as well as their partner's sexual difficulties.[86] Given that having children is a goal shared by both members of the couple, witnessing disturbances in one's partner's emotional well-being due to infertility may be difficult to cope with for men, who may feel a sense of guilt, anger, and helplessness, which, in turn, may affect their sexual arousal and satisfaction.[87]

While it has been shown that the emotional burden of infertility and treatment can significantly affect both partners, studies have suggested that women generally experience higher distress, including anxiety, depression, cognitive disturbances, stress and self-esteem difficulties than their male partners.[88] Experiencing higher levels of distress, which is likely to be more apparent and to affect one's partner, may also explain why women's infertility-related emotional and mind-body stressors may be significantly associated with their partner's lower sexual satisfaction and arousal. Moreover, women coping with infertility have been found to disclose their feelings more often than their partners,[58] which could therefore lead to further concern in their partner and thus further impact the partner's sexual function. These hypotheses remain

speculative, however, and future studies are needed to examine potential mediators of the association between individuals' personal stressors and their partner's sexual health.

Infertility-Related Relational Stressors

We have found that infertility-related relational stressors were significantly associated with each partner's own lower sexual arousal and satisfaction. These results support our hypothesis and are consistent with previous studies that found significant associations between relationship concerns and lower sexual health in couples seeking ART.[58] Our findings are also in line with previous research showing that couples who experience relationship problems and distress often report lower sexual desire and problems with arousal and orgasm,[89] highlighting that couples reporting increased problems or conflicts within their relationships are less likely to want to engage in sexual activity with their partner.[89] Lower dyadic adjustment, communication, support, relationship satisfaction and intimacy have also been related to lower sexual satisfaction in clinical and non-clinical populations.[90]

Infertility and treatment can have a negative impact on partners' communication, ability to support each other, relationship satisfaction and perceived intimacy,[49,51,58,68] domains included in the relational stressors measure used in the present study. In our study, those who perceived such negative impacts of infertility and treatment on their relationship also reported lower sexual satisfaction. Indeed, intimacy and sexual intimacy are considered to be interrelated, both incorporating sexual and nonsexual expressions of affection, physical closeness, open communication and partner responsiveness.[91] Given the private nature of infertility and its close link with sexuality, couples tend to rely primarily on each other for support and may isolate from others, which could potentially put additional pressure on the relationship and result in increased tension,[42] and lower perceived intimacy,[58] affection,[60] and satisfaction[51] within relationships, and

could possibly also negatively influence their sexual function and sexual satisfaction.[92]

For women, experiencing greater relational stressors was also associated with their own lower sexual desire and orgasm. Since women tend to express a stronger desire to have a baby[93] and to experience higher emotional distress than men in the context of infertility,[88,94] experiencing greater relational stressors could potentially further threaten women's desire to conceive, exacerbate their worries regarding infertility and their relationship, as well as their emotional well-being and regulation. As suggested by Rosen and Bergeron,[63] the influence of interpersonal stressors on individuals' emotional regulation can in turn, affect their sexual well-being. Therefore, for women coping with infertility, it could understandably be associated with further disturbances in other domains of sexual function, beyond sexual satisfaction, such as problems with sexual desire and orgasm. These findings thus highlight that factors related to the couple's relationship seem to significantly account for disruptions in both women's and men's own sexual function and satisfaction.

Our analyses revealed that individuals' infertility-related relational stressors were also associated with their partner's lower sexual satisfaction, highlighting the importance of paying attention to the relational context surrounding the sexual experiences of couples seeking ART. Little is known about the reciprocal effects of relational stressors on each partner's sexuality in the context of infertility. However, in fertile populations, individuals' lower dyadic adjustment and relationship happiness have been associated with their own and their partner's lower sexual satisfaction.[63,95,96] Levels of sexual and nonsexual communication[96] and perceived partner responsiveness[97] have been suggested to mediate the association between relationship and sexual satisfaction. Further research on potential mediators of the association between infertility-related relational stressors and partners' sexual satisfaction is warranted.

Interestingly, individuals' own relational stressors were not associated with their partners' sexual function in our study. This finding suggests that perhaps, in the context of infertility, individuals' own personal stressors (emotional and mind-body) may play a more significant role in their partner's sexual function. Gana and Jakubowska[98] have found that the intrapersonal sphere seems to be more vulnerable to the deleterious effects of infertility stress than the dyadic sphere. Thus, it is possible that overall, partners were more sensitive to the emotional and mind-body well-being of their significant other, which could have a negative effect on their own sexual function.

Strengths, Limitations and Future Directions

This study included a large sample of couples and highlighted the necessity of applying a dyadic approach to research on the sexuality of couples seeking ART. Moreover, our sample was relatively heterogeneous with respect to couples' cause of infertility and treatment stage. Validated measures of sexual function were used to limit measurement bias. Additionally, the use of a measure designed for individuals with infertility allowed us to better capture personal and relational stressors specific to couples seeking ART. While this study explored risk factors that may be associated with lower sexual function and satisfaction, it would be valuable to explore dyadic protective factors, such as dyadic coping, intimacy, and partner support, that could promote better sexual health among couples seeking ART. Moreover, our findings highlight the importance of exploring different domains of sexual function and sexual satisfaction, given that they may be impacted differently in the context of infertility.

This study presents some limitations. Given the cross-sectional design of the study, causality between infertility-related factors and couples' sexual function and satisfaction cannot be inferred. For instance, it is possible that lower sexual function and satisfaction may lead to

more infertility-related stressors. A longitudinal design would allow for the examination of trajectories of change over time regarding the sexual health of couples seeking ART and potential predictors of these trajectories. Our sample included primarily White individuals with a high level of education, which may reduce the generalizability of our findings. Since our results relied on self-report data, they could be influenced by common-method variance bias and social desirability, especially given the sensitive nature of sexuality. However, these biases would not explain the partner effects observed. Lastly, the measures of sexual function and satisfaction used in this study are only valid for couples who were sexually active in the previous 4 weeks. Future studies should include measures that do not rely on a specific frequency of sexual activity in order to be more inclusive of couples who may experience more significant deteriorations in their sexual health and avoid sexual relations.

Conclusion

Our findings underscore that infertility is a couple's issue, affecting both members as a unit[42] and suggest that couples' subjective experience of infertility may be strongly associated with their sexual function and satisfaction. Thus, particular attention should be paid to the psychosocial burden of infertility on couples' sexuality from an empirical and clinical perspective. Clinically, these results are encouraging since, unlike medical factors on which couples have little control, couples may seek help with personal and relational stressors in the hopes of improving their sexual relationships.

Findings may inform clinical interventions for couples seeking ART, which often overlook sexuality as an area of concern. Given that couples faced with infertility generally refrain from disclosing their sexual difficulties,[99] it is essential for clinicians to assess sexual function and satisfaction in the clinical management of couples seeking ART. As emphasized by

Brotto et al.,[61] this is important during all phases of fertility diagnosis and should include both partners. A focus on interventions addressing the emotional, mind-body, and relational spheres may help facilitate improvements in sexual health and better serve the needs of couples going through the challenging experience of infertility and its treatment.

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Table 1

Participant Demographic and Clinical Characteristics

Variable	Women ($N = 185$)	Men ($N = 185$)
Age (years)	31.8±4.7	33.6±4.9
Language		
French	51.4	50.6
English	44.8	44.9
Additional[1]	3.8	4.5
Ethnic group		
White	92.4	91.6
Black	2.2	3.5
Asian	3.8	2.7
Hispanic	.5	1.7
Indigenous	1.1	.5
Education level		
Less than high school	2.8	2.8
High school diploma or GED	8.7	23.7
Community college diploma	21.9	23.1
University degree	66.1	48.1
Additional[2]	.5	2.3
Annual income (CAD)		
Less than 30 000	21.3	10.1
30 000 to 69 999	48.6	50.9
70 000 to 109 999	26.8	31.6
Over 110 000	3.3	7.4
Married couples	57.4	
Duration of couple relationship (years)	7.4±4.2	
Duration of cohabitation (years)	5.9±4.0	
Duration of difficulties to conceive		
Less than 1 year	6.6	
1 to 5 years	77.6	
More than 5 years	15.8	
Cause of infertility		
Male infertility	20.8	
Female infertility	26.4	
Combined factors	11.9	
Unexplained infertility	28.3	
Under investigation	12.6	
Duration of services at a fertility clinic		
Less than 1 year	6.6	
1 to 3 years	60.4	
More than 3 years	33.0	

Note. Values are given as percentages (%) or mean±standard deviations. [1]Additional languages included Sinhala, Russian, Tagalog, Bisaya, Nepali, Spanish and Romanian. [2]Additional education levels included attending a private college, skilled trades or other professional programs

Table 2

Descriptive Statistics and Bivariate Correlations between Infertility-Related Stressors and Sexual Outcomes

Variable	*M*	*SD*	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Emotional stressors W	46.49	21.52	.79***	.30***	.28***	.31***	.34***	.31***	.30***	.24***	.15*	.34***	.17*	.23**	.37***
2. Mind-body stressors W	59.21	21.94	–	.34***	.27***	.33***	.41***	.34***	.36***	.34***	.09	.30***	.19*	.28***	.32***
3. Relational stressors W	71.19	16.31		–	.44***	.35***	.45***	.57***	.15*	.12	.57***	.18*	.22**	.20**	.41***
4. Sexual desire W	3.49	1.15			–	.33***	.62***	.54***	.20**	.09	.26***	.17*	.08	.11	.40***
5. Sexual orgasm W	4.48	1.36				–	.65***	.54***	.15*	.17*	.26***	.16*	.18*	.17*	.20**
6. Sexual arousal W	4.46	1.19					–	.66***	.20**	.18*	.29***	.18*	.17*	.19**	.36***
7. Sexual satisfaction W	4.47	1.22						–	.15*	.15*	.42***	.28***	.27***	.24***	.38***
8. Emotional stressors M	73.55	18.06							–	.79***	.31***	.30***	.09	.22**	.31***
9. Mind-body stressors M	80.71	15.83								–	.27***	.22**	.10	.12	.25***
10. Relational stressors M	72.34	15.43									–	.19**	.18*	.26***	.47***
11. Sexual desire M	7.02	1.78										–	.29***	.35***	.46***
12. Sexual orgasm M	9.49	1.08											–	.48***	.18*
13. Sexual arousal M	27.95	2.55												–	.40***
14. Sexual satisfaction M	7.15	1.94													–

Note. W = Women; M = Men. * $p < .05$, ** $p < .01$, *** $p \leq .001$.

Table 3

Infertility-Related Stressors and Sexual Outcomes: Confidence Intervals (90%) for Standardized Regression Coefficients

Variable	Sexual desire W	Sexual orgasm W	Sexual arousal W	Sexual satisfaction W	Sexual desire M	Sexual orgasm M	Sexual arousal M	Sexual satisfaction M
Emotional stressors W	[.055, .363]				[.120, .398]			[.079, .369]
Mind-body stressors W							[.049, .486]	
Relational stressors W	[.227, .467]	[.046, .314]	[.174, .439]	[.285, .486]				[.047, .246]
Emotional stressors M	[.043, .301]				[.104, .335]			
Mind-body stressors M								
Relational stressors M			[.166, .383]	[.256, .434]				[.049, .244]

Note. *W* = Women; *M* = Men.

Figure 1

Participant Flow Chart

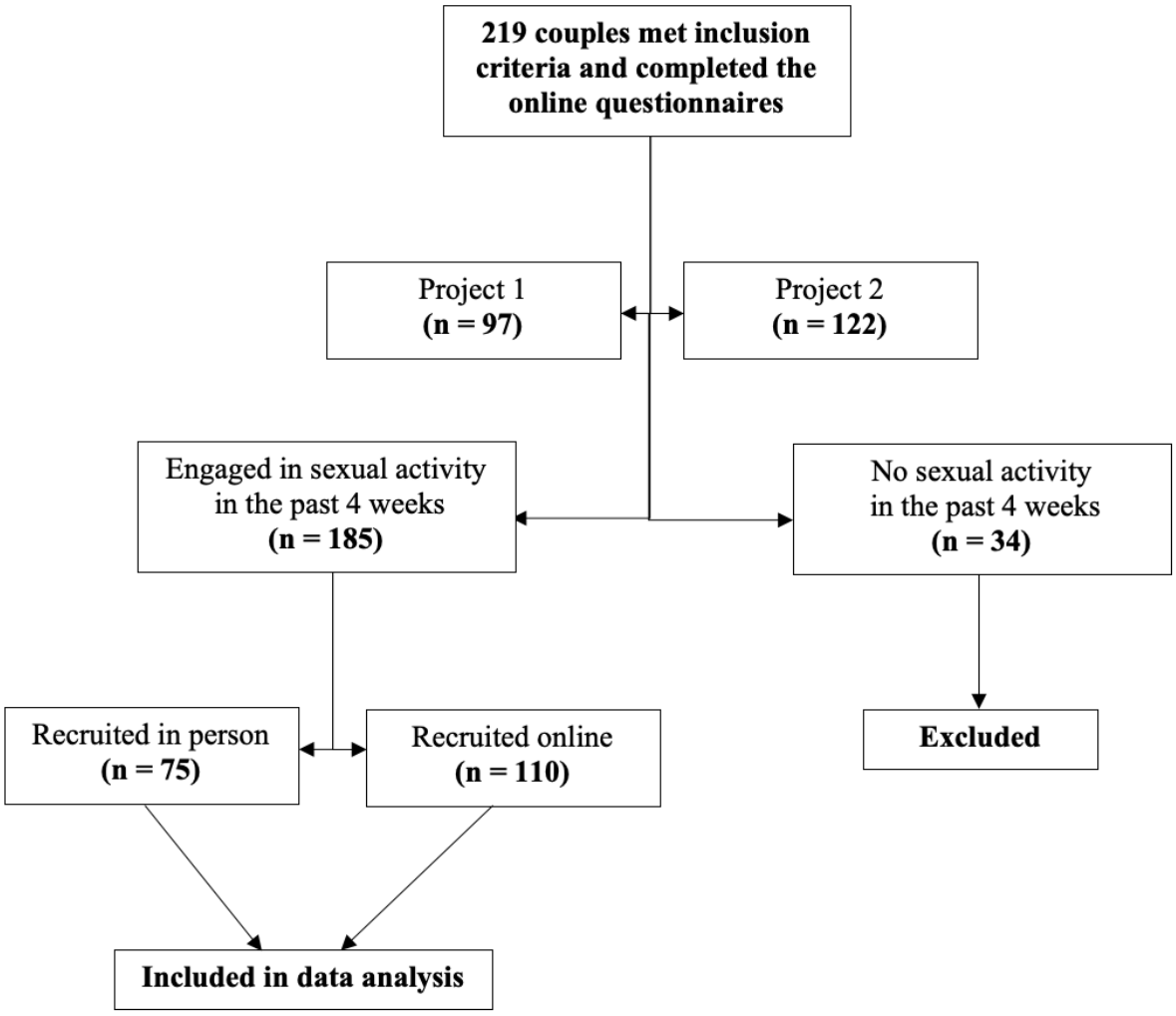
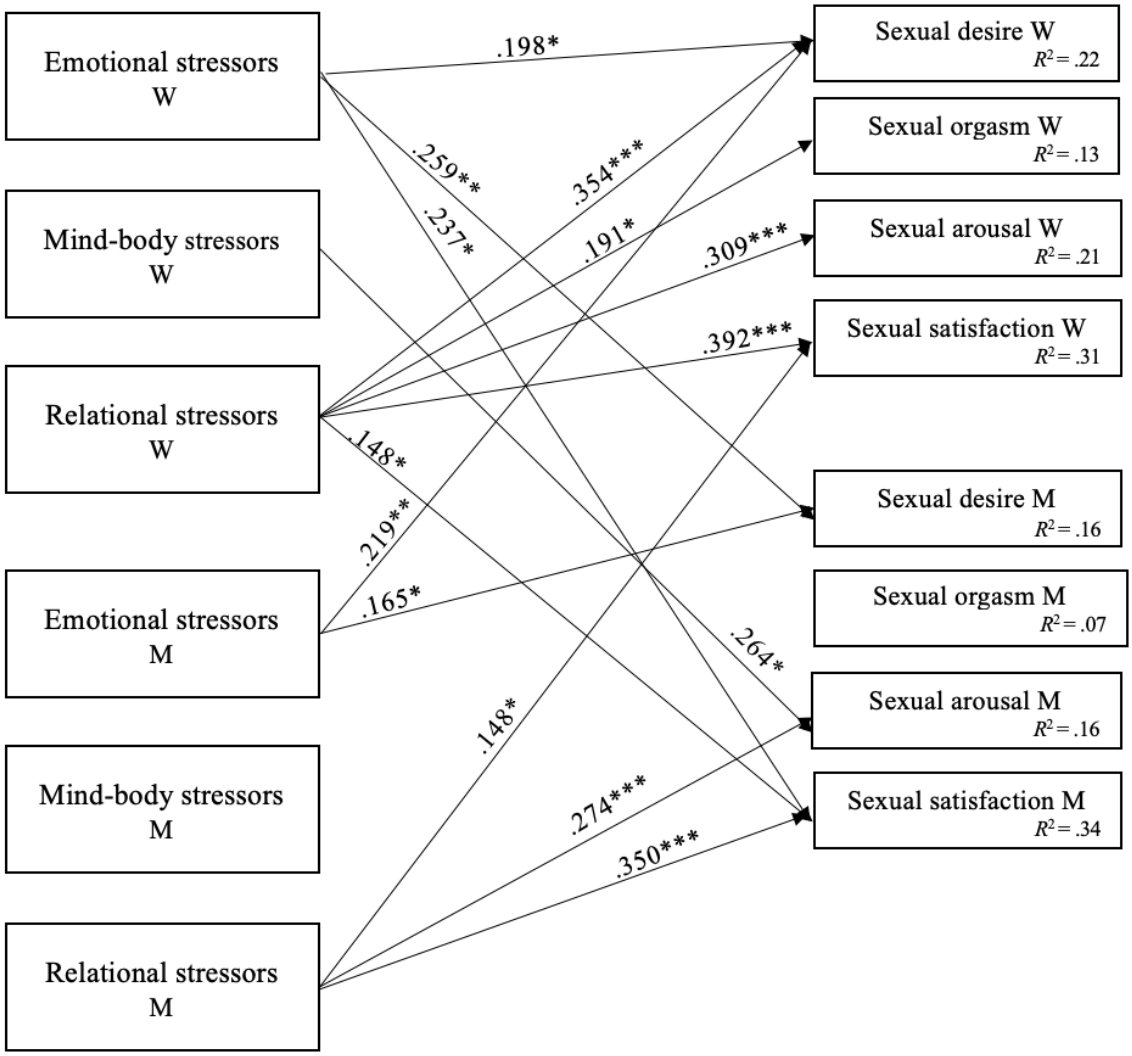


Figure 2

Path Analyses Showing the Associations Between Infertility-Related Stressors and Men and Women's Sexual Outcomes



Note. N = 185 couples. All possible direct paths between infertility-related stressors and both partners' domains of sexual function and sexual satisfaction were tested. Only significant standardized path coefficients are shown. Correlations between exogenous variables were tested but not shown in the figure. W = Women; M = Men. * $p < .05$, ** $p \leq .01$, *** $p \leq .001$.

Article 2

Dyadic Coping and Sexual Well-being

in Couples Seeking Assisted Reproductive Technology

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Abstract

Objective. This study examined whether perceptions of the partner's dyadic coping (DC) and of how partners cope together (common DC) are associated with sexual well-being in couples seeking assisted reproductive technology.

Background. Although infertility has been associated with significant sexual concerns, little is known about the relational processes underlying couples' sexual well-being.

Method. A sample of 232 couples with medical infertility completed questionnaires assessing DC and sexual well-being (infertility-related sexual concerns, sexual distress and satisfaction).

Results. Individuals who perceived that their partner engaged in higher negative DC reported lower sexual well-being (actor effects). Men who perceived that their partner engaged in higher positive DC reported higher sexual satisfaction, whereas women reported greater infertility-related sexual concerns (actor effects). Perceptions of higher common DC were associated with higher sexual well-being for men and women (actor effects). Women whose partners reported perceptions of higher common DC also reported fewer infertility-related sexual concerns (partner effect). Analyses adjusted for relationship satisfaction.

Conclusion. The findings highlight the need for future longitudinal research to better understand the associations between dyadic factors and infertile couples' sexual well-being.

Implications. These results suggest that the interpersonal context surrounding infertile couples' sexual well-being should be routinely discussed and could be facilitated by promoting greater common DC.

Keywords: Assisted reproductive technology; dyadic coping; infertility; sexual distress; sexual satisfaction; sexual well-being

Dyadic Coping and Sexual Well-being in Couples Seeking Assisted Reproductive Technology

Infertility affects approximately 12% of couples worldwide (Sun et al., 2019). It is a major life crisis and a dyadic stressor for couples (Molgora et al., 2019), that has been associated with significant concerns and distress related to sexuality, as well as sexual dissatisfaction (Starc et al., 2019). Although studies have begun to examine the impact of infertility on intimate relationships, a number of questions remain concerning infertile couples seeking assisted reproduction technology (ART)'s sexual experiences and the relational processes that may play a role in individuals' own and their partner's sexual well-being.

Research on sexuality in the context of infertility has almost exclusively focused on individual experiences, mainly the women's experience. The neglect of the dyadic context is striking given that most sexual expression is interpersonal and that partners are inherently interdependent in cultivating a mutually satisfying sexual relationship (Rosen & Bergeron, 2019). Since infertility has an impact on the couple as a whole (De Faria et al., 2012), taking into consideration both partners' perspectives and the dyadic context of couples' sexual experiences—especially how they cope together with infertility—is key to the development of effective sexual and reproductive health interventions. To address these limitations, this study aimed to examine the link between dyadic coping, that is, how couples cope with a shared stressor (Bodenmann, 1997), and the infertility-related sexual concerns, sexual distress, and sexual satisfaction of both members of couples seeking ART.

Sexual Well-being of Couples Seeking ART

Couples who require ART may do so due to physiological causes (e.g., medical infertility) or because of their sexual orientation and/or gender identity (e.g., same-sex and/or

gender couples). Infertility and undergoing ART can lead to changes in couples' sexual well-being. Research suggests that couples seeking treatment due to physiological causes may be at a high risk of experiencing issues related to sexuality (Starc et al., 2019). Indeed, these couples often have a long history of failed attempts at conceiving through regular sexual intercourse, and when they undergo fertility treatments, they often face stressful demands related to sexual activities (e.g., scheduled timing, increased frequency) to increase their chances of conception.

Sexuality may thus translate into a desire to conceive, rather than a pleasure-oriented motivation, making spontaneous sex more difficult to maintain (Marci et al., 2012; Starc et al., 2019). As a result, women and men experiencing infertility often report negative feelings towards sexual activity (Starc et al., 2019). Side effects of hormone medication (e.g., mood swings) can also lead to alterations in women's sexual experiences (Marci et al., 2012). Treatment procedures, including the necessity to produce semen samples on demand, can affect men's sexuality as well, by arousing a sense of anxiety, and affecting their masculinity (Ohl et al., 2009). As a result, individuals with infertility often report a reduction in the enjoyment and frequency of sexual activity, and a deflated level of sexual self-esteem (Tao et al., 2011).

To date, however, research on the sexuality of infertile couples seeking ART has been mostly descriptive and focused on medical variables, rather than non-medical factors, that may be associated with these couples' sexuality. As such, little is known about the risk and protective factors for the sexual well-being of these couples. Moreover, few studies have included infertility-specific sexual measures, thus omitting consideration of the specific sexual concerns of couples coping with infertility, such as being afraid of disappointment during sex, or feeling like a failure at sex. These concerns and the negative effects of infertility on sexual well-being may be obscured by using general measures of sexuality.

Sexual distress is a key component of partners' experience of sexuality. It is defined as negative and distressing emotions (e.g., anxiety, frustration, inadequacy) experienced in relation to one's sexual function and relationship (Santos-Iglesias et al., 2020). Although it is a criterion for the diagnosis of sexual dysfunctions (DSM-5; American Psychiatric Association, 2013), the construct has surprisingly received less attention within sexuality outcome research (Santos-Iglesias et al., 2018), particularly in the context of infertility. Most past research has focused on the rates of sexual dysfunction in couples seeking ART. These studies have yielded varying results (for a review, see Starc et al., 2019), highlighting the need to consider other sexual outcome variables that may help us better understand infertile couples' sexual well-being.

The few cross-sectional studies that have examined sexual distress in infertile individuals seeking ART have reported a significant association between higher age (Aydin et al., 2015), higher infertility-related stress (Facchin et al., 2019) and sexual distress in women. Given the significant emotional burden of infertility and the pressure it puts on sexuality (Starc et al., 2019), examining sexual distress in men and women facing infertility and the factors that may make couples more vulnerable to reporting higher sexual distress could contribute to the development of targeted interventions for this neglected population.

Sexual satisfaction is defined as "an affective response arising from one's subjective evaluation of the positive and negative dimensions associated with one's sexual relationship" (Lawrance & Byers, 1995). This definition recognizes that an individual's sexual satisfaction can be influenced by characteristics in both partners (Lawrance & Byers, 1995). While several studies have examined sexual satisfaction in the context of infertility, they have yielded conflicting findings. Some researchers have found that infertile men and women tend to report greater sexual dissatisfaction (Ozkan et al., 2015; Smith et al., 2015) compared to fertile controls.

A study by Masoumi et al. (2016) revealed however that couples with infertility reported higher sexual satisfaction. Findings regarding gender differences in sexual satisfaction are also inconsistent, with some studies reporting lower sexual satisfaction in women seeking ART (De Faria et al., 2012; Marci et al., 2012) and others showing no gender differences (Ying et al., 2015).

Lower sexual satisfaction in couples with infertility has been associated with individuals' lower levels of optimism, life satisfaction, social support, and coping (Mahadeen et al., 2020), as well as with poorer fertility-related quality of life in women (Smith et al., 2015). However, studies have failed to examine specific relationship processes that may be associated with the sexual well-being, including sexual satisfaction, of both members of infertile couples seeking ART.

Dyadic Coping

According to the Systemic-Transactional Model, dyadic coping is defined as the interplay between the "stress signals of one partner and the coping reactions of the other to these signals" (Bodenmann, 1997). It is considered a multidimensional construct, comprised of positive, negative, and common dyadic coping (Bodenmann, 2008). Positive dyadic coping involves providing problem or emotion-focused support to one's partner to help them in coping and taking over responsibilities to alleviate one's partner's stress (Bodenmann et al., 2018). In contrast, negative dyadic coping refers to actions or words of a superficial, ambivalent or hostile nature communicated with harmful intentions (Bodenmann et al., 2018). Common dyadic coping refers to the joint efforts of both members of the couple to work together when faced with a stressful situation, as well as the sharing of feelings and mutual commitment (Bodenmann et al., 2018).

Dyadic coping is distinct from social support, most notably by its inclusion of support from one's partner specifically, in addition to the commitment of both partners to each other's well-being, and their engagement in other types of stress management and common problem-solving strategies (Falconier & Kuhn, 2019; Chaves et al., 2019). Dyadic coping thus aims to reduce both partners' stress levels and enhance relationship quality (Bodenmann et al., 2010). It is indeed a robust predictor of how couples deal with chronic illness (Berg & Upchurch, 2007). Despite the increasing acknowledgment of the need to consider coping through a dyadic lens (Berg & Upchurch, 2007; Papp & Witt, 2010), little remains known about the association between dyadic coping and the sexual well-being of infertile couples seeking ART.

Dyadic coping and sexuality

The handful of studies that have examined dyadic coping in the context of infertility have focused on its associations with relationship adjustment and demonstrated that perceptions of one's own and their partner's greater dyadic coping (e.g., positive and common) were associated with greater relationship adjustment (Chaves et al., 2019; Molgora et al., 2019). Yet, to our knowledge, no study to date has examined the role of dyadic coping in the sexual well-being of both members of couples seeking ART. Dyadic coping aims to promote couples' functioning through mutual closeness, intimacy, and a sense of "we-ness", aspects that are considered to build the basis for satisfaction in sexual activities (Bodenmann, 2000; Bodenmann et al., 2006). Indeed, greater dyadic coping has been associated with higher sexual satisfaction and more frequent orgasms in a sample of female students (Bodenmann et al., 2010; Bodenmann et al., 2019). Two recent studies have also revealed associations between lower levels of positive and higher levels of negative dyadic coping and sexual dissatisfaction in a community sample of men

and women (Wawrziczny et al., 2021), and between higher perceptions of common dyadic coping and lower sexual distress in new parent couples (Tutelman et al., 2021).

In light of these findings, the interdependence of individuals in intimate relationships (Papp & Witt, 2010), and the fact that partners constitute the primary source of support for each other in the context of infertility (Kroemeke & Kubicka, 2018), dyadic coping can be expected to play a significant role in individuals' own as well as their partner's sexual well-being (Chaves et al., 2019). Indeed, theoretical frameworks, such as the Interpersonal Emotion Regulation Model of sexual dysfunction (Rosen & Bergeron, 2019), have stressed the critical role of interpersonal factors in couples' sexual well-being. Moreover, recent calls in the literature (e.g., Molgora et al., 2019) have advocated for more research on how dyadic variables may affect the adjustment of infertile couples seeking ART.

Present Study

This study aimed to investigate the associations between dyadic coping and infertility-related sexual concerns, sexual distress, and sexual satisfaction in couples seeking ART. An individual's perceptions of what their partner does to help them cope with a stressful situation (i.e., dyadic coping by the partner) and how they cope together as a couple (i.e., common dyadic coping) have been found to be stronger predictors of an individual's relationship satisfaction than an individual's own efforts to help their partner cope, which may deplete their personal resources and amplify their stress (Falconier et al., 2015; Rusu et al., 2020). Therefore, we were particularly interested in individuals' perceptions of common dyadic coping and of positive and negative dyadic coping strategies used by their partner. The associations between these perceptions and both partners' sexual well-being were examined to better capture the dyadic context of couples' sexuality.

Based on prior research on dyadic coping and relationship adjustment (Bodenmann et al., 2006; Falconier et al., 2015; Papp & Witt, 2010; Rusu et al., 2020), we hypothesized that an individual's perceptions that their partner helps them cope with stress using supportive strategies and by taking over some of their responsibilities (positive dyadic coping) or that they are able to cope as a couple efficiently with stress (common dyadic coping) would be associated with fewer infertility-related sexual concerns, lower sexual distress, and higher sexual satisfaction for the individual and for their partner. We hypothesized that an individual's perceptions that their partner helps them cope with stress using hostile, ambivalent, or superficial strategies (negative dyadic coping) would be associated with greater infertility-related sexual concerns, higher sexual distress, and lower sexual satisfaction for the individual and for their partner. Given the close link between dyadic coping and relationship satisfaction (Falconier et al., 2015) and between relationship and sexual satisfaction (Henderson et al., 2009), we adjusted for relationship satisfaction in our analyses to examine the independent effect of dyadic coping on couples' sexual well-being. Gender differences in these associations were also examined although no a priori hypotheses were put forward due to the inconsistencies of past studies on the sexual well-being of couples faced with infertility.

Methods

The present cross-sectional study used data from a larger research project on the factors associated with treatment burden (psychological, relationship, and sexual strain) in couples seeking ART. The project has been approved by the researchers' universities' review boards and the fertility clinics partaking in the study. Another study on the infertility-specific personal and relational stressors associated with couples' sexual health has been published (El Amiri et al., 2021). The study used a subset of this sample as well as a sample of couples from a different

database. It focused on variables associated with the experience of infertility and examined their associations with couples' sexual function and satisfaction.

Participants

Couples were eligible to participate in the overall study if they were within six months of seeking any type of assisted reproductive services at a fertility clinic to better capture the experiences of couples beginning their journey with ART. Other inclusion criteria included 1) both partners participating in the study, 2) being 18 years of age or older, 3) participants having internet access in order to complete the online questionnaires, and 4) having a good comprehension of French or English. Couples were excluded if a member reported experiencing a major psychiatric disorder (e.g., psychosis, bipolar disorder), with symptoms they considered were not well-managed.

This study focused on the 232 couples with a medical diagnosis of infertility who had ART within the past six months. Couples' demographic and clinical information are presented in Table I.

Procedure

Participants were recruited in person (56.9%) or through advertisements (43.1%) placed in various fertility clinics and posted on several infertility-related association websites and social media in Canada and the United States. Interested participants contacted the research team by phone or email for online recruitment or in-person at their fertility clinic to receive detailed study information. They were screened by a research assistant by telephone or in-person to verify their eligibility for the study and to ensure that both partners were interested in participating. Both partners were asked to complete the consent form and separate online questionnaires via a secure online platform. Each member of the couple had 4 weeks to complete the survey before it

expired and received a compensation of $15 in gift cards for their participation.

Measures

We collected participants' demographic (e.g., age, education, income), medical (e.g., presence of a diagnosis, cause of infertility, use of fertility medication, duration of conceiving difficulties, treatment type), and relationship (e.g., duration, status) information.

Dyadic Coping

Dyadic coping was assessed using the Dyadic Coping Inventory (DCI; Bodenmann, 2008). This instrument measures perceived stress communication and dyadic coping within intimate relationships, when one or both partners are stressed. The scale is comprised of 37 items and includes individuals' perceptions of their own and their partner's attempts to reduce each other's stress and a common endeavor between partners to deal with external stress that affects their relationship.

Given that our primary interest was in the interpersonal context surrounding couples undergoing assisted reproductive technology's sexual well-being, the present study focused on the subscales assessing perceptions of positive (7 items) and negative dyadic coping (4 items) of the partner, as well as common dyadic coping (4 items). The decision to focus on individuals' perceptions of positive and negative dyadic coping received by their partner was further supported by our review of the literature, which suggests that perceived dyadic coping provided by the partner and common dyadic coping play a more important role than one's own dyadic coping in couples' relationship satisfaction (Falconier et al., 2013; Rusu et al., 2020). One item from the common dyadic coping scale "We are affectionate to each other, make love and try that way to cope with stress" was removed from our analyses to avoid artificially inflating the strength of the association with the sexual outcomes measured.

Each item is rated on a 5-point scale ranging from "*very rarely*" (1) to "*very often*" (5). Subscale scores are the sum of the included items. Higher scores indicate higher perceived positive and negative dyadic coping by the partner, as well as higher common dyadic coping. Sample items include "When I am too busy, my partner helps me out" (positive dyadic coping), "When I am stressed, my partner tends to withdraw" (negative dyadic coping), and "We help one another to put the problem in perspective and see it in a new light" (common dyadic coping). The scale showed a good predictive validity of relationship satisfaction and adequate internal consistency for its subscales (α ranging from .71 to .92; Bodenmann, 2008). In the current sample, the internal consistency of the positive (α = .85 for women, α = .88 for men), negative (α = .72 for women, α = .69 for men) dyadic coping by the partner and common dyadic coping (α = .82 for women, α = .82 for men) subscales was satisfactory.

Relationship Satisfaction

Relationship satisfaction was measured using a brief version of the Dyadic Adjustment Scale (DAS-4; Sabourin et al., 2005). The DAS-4 is an abbreviated form of the Dyadic Adjustment Scale (DAS; Spanier, 1976), which has good psychometric properties and has been shown to accurately distinguish distressed couples (Spanier, 1976). The 4-item version has also been proven to be informative at all levels of couple satisfaction, effectively predicting couple dissolution and less contaminated by socially desirable responding (Sabourin et al., 2005). Sample items include "In general, how often do you think that things between you and your partner are going well?" and "Do you confide in your partner?". Three of the items are rated on a 6-point scale ranging from "*all the time*" (0) to "*never*" (5), whereas the final item is rated on a 7-point scale ranging from "*extremely happy*" (0) to "*perfect*" (6). Internal consistency in the current study was satisfactory (α = .72 for women; .74 for men).

Infertility-Related Sexual Concerns

Infertility-related sexual concerns were assessed using three items from the sexual concern subscale of the Fertility Problem Inventory (FPI; Newton et al., 1999). The FPI is a measure of perceived infertility-related stress on five different areas: social, sexual, and relationship concerns, need for parenthood, and rejection of a childfree lifestyle. The three items from the sexual concern subscale are rated on a 6-point scale ranging from "*strongly disagree*" (1) to "*strongly agree*" (6). The items include "I feel like I've failed at sex", "During sex, all I can think about is wanting a child (or another child)" and "Having sex is difficult because I don't want another disappointment". The total sexual concerns score is the sum of the included items. Higher scores represent a higher level of infertility-related sexual concerns. The sexual concern subscale previously demonstrated good internal consistency (Newton et al., 1999). In the current study, the level of internal consistency was acceptable ($\alpha = .72$ for women, $\alpha = .64$ for men).

Sexual Distress

Sexual distress was measured using the Sexual Distress Scale-Short Form (SDS-SF; Santos-Iglesias et al., 2020). The short form consists of 5 items that assess sexual distress in men and women. Items are rated on a 5-point scale from "*never*" (0) to "*always*" (4), with total scores ranging from 0 to 20. The total score is the sum of the five items. Higher scores indicate greater sexual distress. Sample items include "How often do you feel distressed about your sex life?" and "How often do you feel frustrated by your sexual problems?". The scale has been shown to have adequate internal consistency reliability for men and women and to be positively correlated with sexual bother and negatively correlated with sexual satisfaction and function (Santos-Iglesias *et al*., 2020). The SDS-SF also had an adequate internal consistency in the current sample ($\alpha = .91$ for women, $\alpha = .93$ for men).

Sexual Satisfaction

The Global Measure of Sexual Satisfaction (GMSEX; Lawrance et al., 2020) was used to assess participants' global sexual satisfaction. Participants are asked to rate the quality of their sexual relationship on five 7-point bipolar scales (*very bad-very good*; *very unpleasant-very pleasant*; *very negative-very positive*; *very unsatisfying-very satisfying*; *worthless-very valuable*). The total score is the sum of the five items. Scores range from 5 to 35, with higher scores indicating greater sexual satisfaction. The GMSEX has been shown to have good reliability and validity (Lawrance et al., 2020). The level of internal consistency in this sample was adequate (α = .90 for women, α = .95 for men).

Statistical Analyses

SPSS® Statistics 26.0 (IBM Corp, 2019) was used for preliminary data analyses. Data were screened for outliers, missing values, and normality prior to performing the main analyses. The main variables were normally distributed. Within the main variables, 3.9 to 13.4% of data were missing. Little's Missing Completely at Random test (Little, 1988) suggested that these values were missing completely at random (p = .563). Previous studies (e.g., Drosdzol & Skrzypulec, 2009; Facchin et al., 2019) have yielded inconsistent results regarding the association between clinical (diagnosis and treatment-related) variables and the sexual well-being of men and women seeking ART. Therefore, preliminary correlations and repeated-measures ANOVAs were performed to identify potential covariates among the sociodemographic and clinical variables. These analyses yielded low (rs < .25) or non-significant associations between age, income, relationship duration, marital status, conceiving difficulties duration, use of fertility medication, diagnosis and treatment type, and the sexual well-being variables for men and women. Therefore, these variables were not included as covariates in the

main analyses. Relationship satisfaction was significantly associated with the sexual well-being variables for men and women (*r*s > .25) and was included as a covariate in the main analyses. Repeated-measures ANOVAs were conducted to examine gender differences in the perceptions of positive, negative, and common dyadic coping, and in the sexual outcomes. Intra-class correlation coefficients were also calculated for the dyadic coping and sexual well-being variables and suggested a good concordance between the partners' scores on these variables (women: ICC = .79 and .77, respectively; men: ICC = .75 and .71, respectively).

Path analyses using the Actor-Partner Interdependence Model (APIM; Kenny et al., 2006) were performed with the SPSS Amos software (version 25; Arbuckle, 2017) to examine the associations between positive, negative and common dyadic coping and sexual distress, satisfaction and infertility-related sexual concerns. This approach addresses the nonindependence of dyadic data and allows us to test gender differences in actor and partner effects. It also treats the couple as the unit of analysis and integrates both actor and partner effects. Missing values were handled using the Full Information Maximum Likelihood (FIML) method.

The model included each partner's perceptions of positive and negative dyadic coping strategies used by their partner and of common dyadic coping as predictors of infertility-related sexual concerns, sexual distress, and sexual satisfaction. Both partners' relationship satisfaction was included as a covariate in the model. The model fit was judged to be adequate as per a non-significant chi-square, a value of the comparative fit index (CFI) greater than .95, and a value of the root mean square error of approximation (RMSEA) below .06 and its 90% confidence interval (Kline, 2015). Given the cross-sectional nature of the study, an alternative model including the sexual outcomes as predictors of the different forms of dyadic coping was also tested. However, the model's lower fit indices ($\chi^2(22) = 53.668$, $p = .000$; CFI = .974; RMSEA =

.079, 90% CI [.052; .106]) and higher Akaike Information Criterion (AIC = 247.668), indicated an overall lower fit in comparison to our final model ($\chi^2(22) = 25.569$, $p = .271$; CFI = .997; RMSEA = .026, 90% CI [.000; .063]; AIC = 219.569). To test gender differences in actor and partner effects, a within-dyad test of distinguishability was performed (Kenny et al., 2006).

Results

The descriptive statistics and the bivariate correlations between the forms of dyadic coping, relationship satisfaction, and the sexual well-being variables are shown in Table II. The analyses revealed that men and women did not differ in terms of their perceptions of negative dyadic coping by partner, of positive dyadic coping by partner, or of common dyadic coping. Men and women also reported similar levels of sexual satisfaction. However, women reported significantly greater infertility-related sexual concerns, $F(1, 175) = 64.632$, $p < .001$; $\eta_p^2 = .27$, and higher levels of sexual distress, $F(1, 175) = 24.843$, $p < .001$; $\eta_p^2 = .12$, than men.

Dyadic Coping and Sexuality

When comparing a model in which all parameters were free to vary and a model in which all the effects were constrained to be equal between men and women, a non-significant difference in Chi-square ($\Delta\chi^2 (24) = 35.366$, $p = .063$) indicated that there were no significant differences between men's and women's actor and partner effects. However, a semi-constrained model was retained because it achieved a better fit (lower AIC). This semi-constrained model constrained only the actor and partner effects that did not differ significantly between men and women. The semi-constrained model also yielded a non-significant difference in Chi-square when compared to a model in which all parameters were free to vary ($\Delta\chi^2 (20) = 18.357$, $p = .564$). The final path model is displayed in Figure I.

Results indicated that men and women who perceived that their partner engaged in higher

levels of negative dyadic coping reported greater infertility-related sexual concerns and higher sexual distress (actor effects). Men and women's perceptions of negative dyadic coping by their partner were not associated with their own sexual satisfaction. In contrast, men who perceived that their partner engaged in higher levels of positive dyadic coping reported higher sexual satisfaction, whereas women who perceived that their partner engaged in higher levels of positive dyadic coping reported greater infertility-related sexual concerns (actor effects). Men and women's perceptions of negative and positive dyadic coping by their partner were not associated with their partners' infertility-related sexual concerns, sexual distress, nor sexual satisfaction (partner effects). Lastly, men and women who perceived that they and their partner engaged in higher levels of common dyadic coping reported fewer infertility-related sexual concerns, lower sexual distress, and higher sexual satisfaction (actor effects). Women whose partners reported perceptions of higher common DC also reported fewer infertility-related sexual concerns (partner effect). Men's and women's perceptions of common dyadic coping were not associated with their partner's sexual distress and sexual satisfaction.

Discussion

The objective of this study was to examine the associations between perceptions of dyadic coping and infertility-related sexual concerns, sexual distress and sexual satisfaction in couples seeking ART. Overall, the findings suggest that perceptions of dyadic coping by the partner and of common dyadic coping were associated with the sexual well-being of both members of the couple.

Positive and Negative Dyadic Coping by the Partner

Our results supported the expected associations between one's perceptions of their partner's use of higher levels of negative dyadic coping and greater infertility-related sexual

concerns and higher sexual distress. Previous research has shown that among individuals coping with other medical conditions, engagement in overprotectiveness (e.g., acting aggressively to avoid emotional involvement), protective buffering (e.g., minimizing worries, yielding to the partner), and hostile or ambivalent coping strategies (e.g., distancing, offering support unwillingly) have been associated with negative outcomes for the individual and the relationship (Falconier & Kuhn, 2019). Hostile and ambivalent dyadic coping strategies, in particular, have been linked with more destructive communication and conflict resolution, and relationship dissatisfaction (Falconier & Kuhn, 2019). These negative responses from a partner may be perceived as a lack of understanding or sensitivity and may create a negative interpersonal context for sexual activity (Rosen et al., 2010). Thus, given the stressful and sensitive nature of infertility, it is understandable that individuals who perceive that their partner blames them or dismisses their stress may experience greater distress and difficulty managing changes to their sex lives as a result of infertility-related challenges.

As hypothesized, our results also revealed that men who perceived that their partner engaged in higher levels of positive dyadic coping reported higher sexual satisfaction. In the context of infertility, support from one's partner has been associated with infertility stress reduction (Gibson & Myers, 2002), which has been related to higher sexual satisfaction (Nakić Radoš et al., 2020). Therefore, it is possible that for men, who tend to adopt a supportive role in this context (Chaves et al., 2019), perceiving that one's partner engages in positive strategies to relieve one's stress could help free up more personal resources to adapt themselves to infertility. This may, in turn, allow for more room for a positive appraisal of and satisfaction with their sexual activities (Rosen & Bergeron, 2019). Given our limited understanding of men's adjustment to infertility, this finding highlights the importance of examining the experiences of

men with infertility, and the protective role that positive partner coping behaviours may play in their sexuality.

Contrary to our hypothesis, the association between perceptions of positive dyadic coping by the partner and sexual satisfaction was not significant for women. In addition, perceptions of positive dyadic coping by the partner were associated with greater infertility-related sexual concerns for women. Previous studies have reported associations between solicitous partner responses and higher pain intensity and sexual difficulties in women with genito-pelvic pain (Rosen et al., 2010; Rosen et al., 2014). Relatedly, women appear to be more adversely affected by infertility, reporting more negative consequences on their self-esteem, stress, depression, anxiety (Ying et al., 2015), and sexual quality of life (de Faria et al., 2012). Indeed, in our sample, women reported greater infertility-related sexual concerns than men. It is possible that partners of women whose infertility may have a more negative impact on their well-being, including their sexual well-being, may feel a greater urge to engage in additional positive dyadic coping strategies to alleviate their partner's stress. This may, in turn, be associated with negative consequences for women's self-worth, with feelings of guilt or a sense of being a burden (Leuchtmann & Bodenmann, 2017), and potentially exacerbate their infertility-related sexual well-being.

Perceptions of positive and negative dyadic coping by the partner were not associated with partners' infertility-related sexual concerns, sexual distress, and sexual satisfaction (i.e., no partner effects). Past research has demonstrated a stronger effect of perceived dyadic coping provided by the partner than dyadic coping by self on relationship satisfaction (Falconier et al., 2015; Rusu et al., 2020). Since partners are considered to rely primarily on each other for support

while navigating infertility (Kroemeke & Kubicka, 2018), they may be more attuned to how their partner is supporting them during this process.

Common Dyadic Coping

In support of our hypotheses, our results revealed that perceptions of higher levels of common dyadic coping were associated with men and women's own higher sexual satisfaction and lower sexual distress. Individuals who reported that their couple engaged in higher levels of common dyadic coping also reported fewer infertility-related sexual concerns. Since infertility is considered a life crisis affecting the couple as a unit, joint involvement in emotion or problem-focused coping, such as mutual commitment, seeking solutions together, and sharing of feelings (Bodenmann et al., 2006) may be most effective when navigating this stressor. This is consistent with previous research showing that common dyadic coping is associated with lower depression and negative emotional expression and improved physical well-being and individual coping in couples dealing with various medical conditions (Berg et al., 2008; Bodenmann et al., 2004; Falconier & Kuhn, 2019; Rottmann et al., 2015).

Common dyadic coping has also been related to better cohesion within couples (Rottmann et al., 2015) and found to be a strong predictor of relationship satisfaction (Falconier et al., 2015). In couples seeking ART, common dyadic coping has also been associated with higher relational adjustment (Molgora et al., 2019), suggesting that perceiving infertility as a couple issue may promote feelings of greater emotional closeness, validation, and intimacy within relationships, which could help partners be more focused on the present moment, making spontaneous and intimate sexual activities easier to maintain, and accordingly, could be associated with a better sexual adjustment for partners. Engaging in higher levels of common dyadic coping may also be associated with better communication, including sexual

communication, which has been shown to facilitate greater sexual satisfaction (Freihart et al., 2020). Therefore, above and beyond relationship satisfaction, couples engaged in higher levels of common dyadic coping may be increasingly able to concentrate on the less distressing thoughts and emotions related to infertility and to be more attentive to their own and each other's emotional, physical and sexual needs, rendering sexual interactions more pleasure-oriented.

Men's perceptions of higher common dyadic coping were also associated with their partner's fewer infertility-related sexual concerns. This association was not significant for women. Perceptions of common dyadic coping were not however, associated with partners' sexual distress and satisfaction. Given that couples who engage in ART procedures share a strong desire to conceive, joint efforts of partners to cope together may further enhance their commitment towards their common goal to have a child. Moreover, women tend to express a stronger desire to have a baby (Deka & Sarma, 2010) and may more closely tie sex to reproduction, which may justify why women may engage in, and men subsequently perceive, their greater efforts to jointly cope with infertility. The fact that couples engage in higher common dyadic coping speaks to their ability to put forth actions to manage a stressor together, such as infertility. It is therefore not surprising that this is associated with a reduction in infertility-related concerns specifically; a stressor-specific effect rather than an effect on more general sexual outcomes that do not take into account the experience of infertility. This further highlights the importance of measuring not just overall sexual outcomes, but the specific impact of infertility on sexuality. Otherwise, more subtle effects of infertility on sexuality may be overlooked. Future studies should investigate the mechanisms (e.g., communication, intimacy) by which common dyadic coping facilitates couples seeking ART's sexual well-being.

Research and Clinical Implications

Building upon previous research that focused on individual adjustment to infertility, this study included a considerably large sample of couples seeking ART, allowing us to better understand the sexual well-being of both members of the couple. Moreover, the sample was relatively heterogeneous with respect to couples' cause of infertility. Studies examining sexuality in this context have generally focused on sexual function. The present study provides a better understanding of other important aspects of couples' sexual experiences as they are going through the process of ART, notably their sexual satisfaction, sexual distress, and infertility-related sexual concerns. The use of a measure of infertility-related sexual concerns also allowed us to assess the unique sexual difficulties that these couples experience. Moreover, the inclusion of relationship satisfaction as a covariate in the analyses increases our confidence in the associations observed in the present study.

The findings from the present study highlight the necessity to pay increased attention to couples seeking ART's sexual experiences, not solely from a research viewpoint but also from a clinical perspective. Given that couples are often reluctant to discuss their sexual concerns with healthcare providers (Risen, 2010), our results suggest that sexual well-being (i.e., infertility-related sexual concerns, sexual distress, sexual satisfaction), beyond just sexual function, should be routinely discussed with couples to facilitate the early detection and proper management of sexual difficulties and possibility reduce the negative impact that infertility and ART may have on their sexual well-being and overall adjustment. The study's findings also emphasize the importance of understanding the sexual well-being of couples seeking ART from a dyadic rather than an individual lens. Indeed, by including both partners and assessing couple-related dyadic processes such as their dyadic coping strategies, medical and mental health professionals may be better equipped to identify couples that may be more vulnerable to developing sexual difficulties

during the ART process. Addressing couples' sexual concerns and their dyadic coping strategies may also help normalize partners' concerns and increase their understanding of their shared experience. This could also help assist clinicians in the detection of potential intervention avenues and targets that may better help couples during ART. As the findings suggest, interventions aimed at helping couples to engage in joint strategies to cope with infertility as a shared stressor may assist couples in building a stronger sense of mutual understanding, relieving some of the pressures on sex related to fertility treatments and thereby, improving their sexual well-being.

Limitations

The findings of the present study should be considered in light of some limitations. The study included couples seeking ART who were involved in mixed-sex relationships, were primarily White, and had a high level of education. The sample may, thus, not be representative of all couples seeking ART and future studies should include a more heterogeneous sample to improve the generalizability of the findings. Since our results rely on self-reported and cross-sectional data, they do not allow for any inference about causation between our main variables. Longitudinal studies testing the temporal order of these associations are warranted and would allow to further examine the complex interplay between dyadic coping and sexual well-being in couples with infertility. Finally, given that the culture's communication style and orientation have been found to influence individuals' coping responses (Falconier et al., 2016; Falconier & Kuhn, 2019), future research should consider cultural differences, particularly given the sensitive nature of sexuality and infertility.

Conclusion

Little is known about the relational processes that may make certain infertile couples seeking ART more vulnerable to reporting sexual difficulties than others. The present study's results extend our knowledge of the sexual well-being of infertile couples seeking ART and highlight the importance of examining sexuality from an interpersonal angle and the associations between dyadic factors, specifically dyadic coping, and couples' sexual well-being. Moreover, we found actor and partner effects for both men and women, emphasizing the necessity of including both members of couples seeking ART, from an empirical as well as a clinical perspective. Results may also guide clinical interventions for infertile couples by providing information regarding the interpersonal context surrounding their sexual well-being, which could be facilitated by promoting greater common dyadic coping within couples.

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Table I

Participant Demographic and Clinical Characteristics

Variable	Women ($N = 232$)	Men ($N = 232$)
Age (years)	32.5±4.4	34.4±5.2
Language spoken from early childhood		
French	36.4	33.3
English	57.6	60.6
Additional languages[1]	6.0	6.1
Ethnic group		
White	88.0	88.8
Black	4.3	4.3
Asian	4.3	2.2
Hispanic	1.7	1.3
Middle Eastern	1.3	1.7
Indigenous	.4	1.7
Education level		
Less than high school	.4	4.2
High school diploma or GED	8.7	20.7
Pre-University degree	18.2	22.5
University degree	68.9	50.3
Additional education levels[2]	3.8	2.3
Annual income		
Less than CAN$ 30 000	17.4	5.6
CAN$ 30 000 to 69 999	47.8	48.8
CAN$ 70 000 to 109 999	30.9	35.2
Over CAN$ 110 000	3.9	10.4
Married	62.3	
Duration of couple relationship (years)	8.2±4.4	
Duration of difficulties to conceive		
Less than 1 year	13.6	
1 to 5 years	75.0	
More than 5 years	11.4	
Cause of infertility		
Male infertility	22.4	
Female infertility	26.7	
Combined factors	13.8	
Unexplained infertility	20.7	
Under investigation	16.4	

Note. Values are given as percentages (%) or mean±standard deviations. [1]Additional languages included Spanish, German, Arabic, Portuguese, Gujarati, Sinhala, Kirundi, Bisaya, Filipino, Hindi, Nepali, Italian, Persian, Russian, Swedish.[2]Additional education levels included attending a private college, skilled trades or other professional programs.

Table II

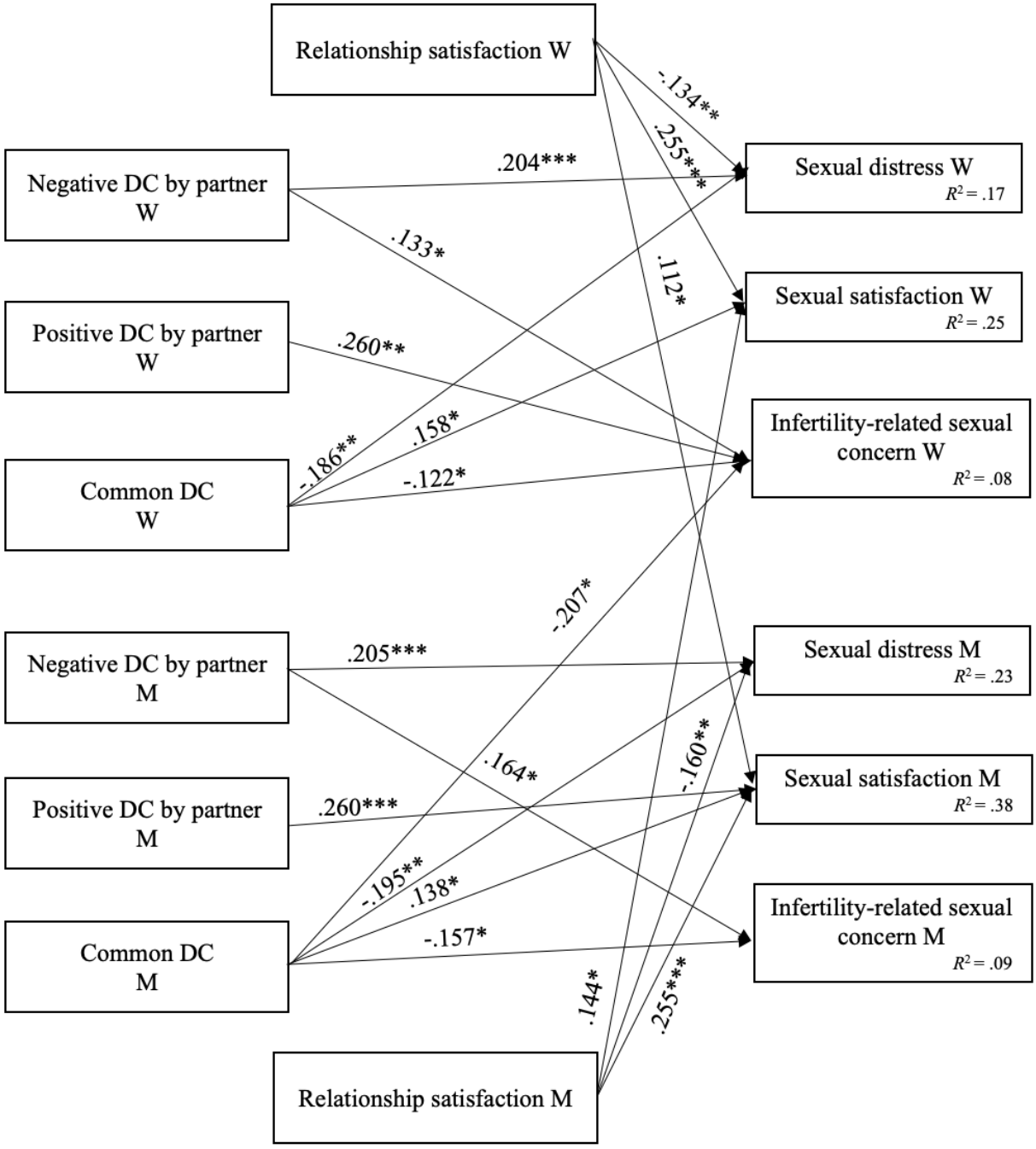
Descriptive Statistics and Bivariate Correlations between Dyadic Coping and Men's and Women's Relationship Satisfaction and Sexual Outcomes

Variable	*M*	*SD*	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Negative DC by partner W	15.59	3.28	-.59***	-.50***	-.50***	.30***	-.33***	.11	-.27***	-.23***	-.29***	-33***	.10	-.22**	.04
2. Positive DC by partner W	26.44	5.14	–	.69***	.54***	-.25***	.34***	.01	-.29***	.26***	.38***	.26***	-.16*	.22**	-.03
3. Common DC W	15.18	3.11		–	.49***	-.37***	.43***	-.14*	-.31***	.24***	.33***	.27***	-.23***	.25***	-.14
4. Relationship satisfaction W	16.87	2.61			–	-.31***	.44***	-12	-.21**	.12	.24***	.33***	-.17*	.29***	-.06
5. Sexual distress W	6.97	4.84				–	-.70***	.49***	.13	-.15*	-.20**	-.25***	.41***	-.45***	.20**
6. Sexual satisfaction W	26.42	6.12					–	-.40***	-.12	.14	.23***	.26***	-.35***	.45***	-.26***
7. Infertility-related sexual concerns W	8.34	4.23						–	.18*	-.17*	-.21**	-.21**	.33***	-.28***	.36***
8. Negative DC by partner M	16.09	3.10							–	-.51***	-.43***	-.45***	.41***	-.36***	.25***
9. Positive DC by partner M	26.00	5.26								–	.68***	.50***	-.32***	.52***	-.17*
10. Common DC M	15.00	3.07									–	.54***	-.31***	.42***	-.18**
11. Relationship satisfaction M	16.57	2.94										–	-.36***	.50***	-.23***
12. Sexual distress M	4.95	4.58											–	-.63***	.53***
13. Sexual satisfaction M	27.14	6.65												–	-.36***
14. Infertility-related sexual concerns M	6.00	3.20													–

Note. W = Women; M = Men; DC = Dyadic coping. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure I

Path Analyses Showing the Associations Between Perceptions of Dyadic Coping and Men and Women's Sexual Outcomes



Note. $N = 232$ couples. All possible direct paths between the different forms of perceived dyadic coping and sexual distress, satisfaction and infertility-related sexual concerns were tested. Relationship satisfaction was added as a covariate in the model. Only significant standardized path coefficients are shown. Correlations between exogenous variables and between endogenous variables were tested but not shown in the figure. W = Women; M = Men. * $p < .05$. ** $p < .01$. *** $p < .001$.

General Discussion

Objectives of the Thesis and Summary of the Results

Couples undergoing ART report a negative impact of an infertility diagnosis and fertility treatment on their sexual lives, which may become routinized and task-oriented, making spontaneous and intimate sex more difficult to maintain (Cousineau & Domar, 2007; Nelson et al., 2008) and creating significant emotional pressure (Zhuoran et al., 2018). Couples facing infertility also report a change in their sexual behavior, frequency of sex, and motivation for sexual activities (Zhuoran et al., 2018), and studies have reported higher levels of sexual dysfunction and dissatisfaction in infertile couples relative to controls (Ozkan et al., 2015; Ozturk et al., 2019; for a review, see Starc et al., 2019). The increasing use of assisted reproductive technology (ART; Smith et al., 2015) and the mounting evidence that ART affects couples' sexual well-being (Starc et al., 2019) underscore the need to better understand the factors affecting the sexual well-being of couples seeking assisted reproduction services. Yet, little is known about the biopsychosocial factors associated with couples seeking ART's sexual well-being. Addressing this gap, using a biopsychosocial framework, the aim of the present thesis was to further the understanding of the factors that may make couples seeking ART more vulnerable to experiencing sexual difficulties.

Study 1

The first study included in this thesis involved a dyadic and cross-sectional design and aimed to provide a better understanding of the infertility-specific personal (i.e., emotional, mind-body) and relational stressors associated with the sexual desire, orgasm, arousal, and sexual satisfaction of both partners of 185 couples facing medical infertility and seeking ART. The associations between diagnosis and treatment-related factors (i.e., presence of a diagnosis, cause

of infertility, use of fertility medication, duration of conceiving difficulties, treatment type and duration) and both partners' domains of sexual function (desire, orgasm, arousal) and sexual satisfaction were also examined to determine whether these variables should be included as covariates in the main analyses. It was hypothesized that experiencing higher levels of infertility-related emotional, mind-body (physical burden of treatment, disruptions in daily life), and relational stressors would be associated with lower sexual desire, orgasm, arousal, and satisfaction for the individual and for their partner. Gender differences in the associations between these infertility-related stressors and domains of sexual function and satisfaction were also examined. No hypotheses were put forth with regards to the potential gender differences in the associations examined.

As expected, the results revealed an association between infertility-related emotional stressors and men and women's own and their partner's lower sexual desire, supporting the idea that the emotional impact of infertility may have a significant influence on couples' quality of life and corroborates other studies' findings that it is associated negatively with domains of sexual function (Facchin et al., 2019; Ho et al., 2020). Experiencing negative emotions in relation to infertility could thus hinder couples' ability to access and connect with positive emotions such as sexual desire. For women, experiencing greater infertility-related emotional stressors was also associated with their partner's lower sexual satisfaction. Additionally, for women, experiencing infertility-related mind-body stressors was associated with their partner's lower sexual arousal, highlighting that the emotional and cognitive burden of infertility may exacerbate both individuals' own as well as their partner's sexual difficulties (Badr & Taylor, 2009). These findings also underscore the importance of understanding the sexual well-being of couples seeking ART from a dyadic lens rather than focusing primarily on individual effects.

Lastly, as hypothesized, for men and women, infertility-related relational stressors (i.e., issues related to communication and commitment due to infertility) were associated with their own lower sexual arousal and satisfaction, as well as with their partner's lower sexual satisfaction. For women, experiencing greater relational stressors was also associated with their own lower sexual desire and orgasm. These results supported previous findings showing significant associations between relationship concerns and lower sexual health in couples seeking ART (Luk & Loke, 2019). Moreover, they underscored the role of interpersonal stressors, which as suggested by Rosen and Bergeron (2019) in their model of interpersonal emotion regulation, could have a significant impact on individuals' emotional regulation and could in turn, affect their sexual well-being. From a research and clinical perspective, the results thus also emphasized the necessity of taking into account the factors related to the couple's relationship, since they seem to be significantly associated with disruptions in both women's and men's own sexual function and satisfaction in the context of infertility.

Our results did not reveal significant associations between infertility-related emotional stressors and individuals' own sexual arousal, orgasm and satisfaction, suggesting that the emotional impact of infertility may be more strongly associated with couples' interest and drive to engage in sexual activities. Moreover, experiencing mind-body stressors was not associated with men and women's own sexual desire, arousal, orgasm, and satisfaction. This may reflect a more distal association between the more concrete consequences of infertility and treatment (e.g., fatigue, pain, disruption to daily activities) and couples' sexual well-being than the overwhelming negative emotions that often accompany the experience of infertility. Interestingly, individuals' own relational stressors were not associated with their partners' sexual function in our study, suggesting that individuals' own personal stressors (emotional and mind-

body) may play a more significant role in their partner's sexual function in the context of infertility.

It should be noted that our preliminary analyses also did not reveal significant associations between the presence of an infertility diagnosis, cause of infertility, use of fertility medication, duration of conceiving difficulties and treatment type, and both partners' domains of sexual function (desire, orgasm, arousal) and sexual satisfaction. Treatment duration was significantly associated with sexual desire and satisfaction for men, with those who reported receiving treatment for longer periods of time reporting lower sexual desire and satisfaction. However, when included in the model with the emotional, mind-body and relational stressors, treatment duration was no longer significantly associated with men or women's sexual desire, orgasm, arousal, and satisfaction. These results further highlight that unlike objective treatment-related factors, couples' subjective experience of infertility and treatment (personal and relational stressors) seem to play a more important role in couples' sexual well-being.

Study 2

In light of the findings of study 1, the second dyadic and cross-sectional study aimed to investigate the associations between dyadic factors, specifically dyadic coping, and infertility-related sexual concerns, sexual distress, and sexual satisfaction in a second sample of 232 couples seeking ART, while adjusting for relationship satisfaction. It was hypothesized that an individual's perceptions that their partner helps them cope with stress using supportive strategies and by taking over some of their responsibilities (positive dyadic coping) or that both partners are able to cope as a couple efficiently with stress (common dyadic coping) would be associated with fewer infertility-related sexual concerns, lower sexual distress, and higher sexual satisfaction for the individual and for their partner. Conversely, we hypothesized that an

individual's perceptions that their partner helps them cope with stress using hostile, ambivalent, or superficial strategies (negative dyadic coping) would be associated with greater infertility-related sexual concerns, higher sexual distress, and lower sexual satisfaction for the individual and for their partner. While gender differences in these associations were also examined, due to the inconsistencies of past studies on the sexual well-being of couples faced with infertility, no a priori hypotheses were put forward.

As hypothesized, the results indicated that men and women who perceived that their partner engaged in higher levels of negative dyadic coping reported greater infertility-related sexual concerns and higher sexual distress. Contrary to expectations, perceptions of negative dyadic coping were not associated with individuals' own sexual satisfaction. Additionally, as expected, the results also revealed that men who perceived that their partner engaged in higher levels of positive dyadic coping reported higher sexual satisfaction, but this association was not significant for women. Perceptions of positive dyadic coping by the partner were, however, associated with greater infertility-related sexual concerns for women, which contradicted our hypothesis. Men and women's perceptions of negative and positive dyadic coping by their partner were also not associated with their partners' infertility-related sexual concerns, sexual distress, nor sexual satisfaction (no partner effects). Overall, these results suggest that, in the context of infertility, negative responses from a partner may explain men's and women's greater sexual distress and difficulty managing changes to their sex lives as a result of infertility-related challenges. Moreover, these results suggest that for men, who tend to adopt a more supportive role in the context of infertility and treatment (Chaves et al., 2019), perceiving that one's partner engages in positive strategies to relieve one's stress could allow for more room for a positive appraisal of and satisfaction with their sexual activities (Rosen & Bergeron, 2019). It is also

possible that since women appear to be more adversely affected by infertility (Ying et al., 2015) and within our sample, have reported greater infertility-related sexual concerns, perceiving their partner's additional positive dyadic coping strategies may be associated with negative consequences for their self-worth, with feelings of guilt or a sense of being a burden (Leuchtmann & Bodenmann, 2017), and potentially exacerbate their infertility-related sexual well-being. Additional research is nonetheless necessary to replicate these findings and confirm this hypothesis.

Lastly, as anticipated, the results indicated that perceptions of higher levels of common dyadic coping were associated with men and women's own higher sexual satisfaction, lower sexual distress, and fewer infertility-related sexual concerns. For men, perceptions of higher levels of common dyadic coping were also associated with their partner's fewer infertility-related sexual concerns as well. Men's and women's perceptions of common dyadic coping were not associated with their partner's sexual distress and sexual satisfaction These results suggest that above and beyond relationship satisfaction, couples engaged in higher levels of common dyadic coping may be increasingly able to concentrate on the less distressing thoughts and emotions related to infertility and to be more attentive to their own and each other's emotional, physical and sexual needs, rendering sexual interactions more pleasure-oriented. The findings also highlight the importance of measuring not just general sexual outcomes (i.e., global sexual satisfaction and general sexual distress), but also the specific impact of infertility on sexuality (i.e., infertility-related sexual concerns).

Theoretical Contributions

The present thesis provides several theoretical contributions. First, the findings from the two studies presented in this thesis provide further support for the biopsychosocial approach to

human sexuality (Berry & Berry, 2013; Engel, 1977; Nimbi et al., 2021) and infertility (Gerrity, 2001; Grinion, 2005; Williams et al., 1992), which posits that the effect of infertility on individuals and their sexual expression are characterized by an interaction among biological, psychological, and interpersonal factors. Unfortunately, the literature in the context of infertility and sexuality has, for decades, largely adopted a unimodal, biomedical approach that failed to underscore the important contribution of psychological and interpersonal factors in the understanding of couples' sexual and infertility experiences. Indeed, to date, research on the sexuality of infertile couples seeking ART has been mostly descriptive and focused on medical variables, rather than non-medical factors, that may be associated with these couples' sexuality. In their international consensus development study, Duffy et al. (2020) further highlight that addressing the emotional and psychological impact of infertility constitutes a priority for future infertility research, since these aspects have often been largely overlooked.

To bridge this gap, the first study examined infertility-specific personal (emotional and mind-body) and relational stressors associated with the sexual desire, orgasm, arousal, and sexual satisfaction of couples seeking ART. As the results from the first study revealed, couples' subjective experience of infertility and treatment (personal and relational stressors) seems to be more strongly associated with their sexual desire, orgasm, arousal, and sexual satisfaction than diagnosis or treatment-related factors. By taking a closer look at the relational processes that underly couples' sexual well-being, specifically perceptions of dyadic coping, the second study further highlighted the crucial role of the interpersonal context surrounding couples seeking ART's sexual experiences. The biopsychosocial model characterizes patients' subjective experience as an "essential contributor to accurate diagnosis, health outcomes, and humane care" (Borrell-Carrió et al., 2004). In line with the biopsychosocial theoretical principles, this thesis

supports the importance of adopting a more comprehensive framework that incorporates psychological and interpersonal factors to the understanding of the sexual well-being of couples seeking ART.

A second theoretical contribution of this thesis is that the studies presented allow us to identify specific predictors of sexual difficulties in couples seeking ART. In the context of infertility, previous studies were predominantly qualitative in nature or focused primarily on the prevalence of sexual dysfunctions, providing little insight into the risk and protective factors underlying the sexual well-being of couples seeking ART. Findings from our first study revealed that emotional, mind-body and relational stressors, related to the experience of infertility and treatment, were associated with lower sexual function and satisfaction in both members of couples seeking ART. These findings seem to corroborate the principles of the interpersonal emotion regulation model, developed by Rosen and Bergeron (2019), which puts an emphasis on interpersonal processes surrounding sexual dysfunction, and the psychosocial pathways likely to moderate and interact with these responses. The model proposes that distal and proximal interpersonal factors influence partners' emotion regulation in relation to their sexual relationship, which in turn, affects partners' psychological, relational, and sexual functioning (Rosen & Bergeron, 2019). It has been developed, in particular, for couples affected by genito-pelvic pain/penetration disorder (GPPPD). Rosen and Bergeron (2019) refer to distal factors as childhood, social, and relational contexts and behavioral or emotional experiences that occur prior to GPPPD which may influence proximal factors such as partner responses, affection and mood occurring just before, during, or just after sexual activities (Rosen & Bergeron, 2019). These proximal factors might in turn activate predisposing relational patterns and play a role in

modulating and maintaining GPPPD by influencing partners' emotion regulation and subsequently their sexual outcomes (Rosen & Bergeron, 2019).

One could extrapolate Rosen and Bergeron's model to the experience of infertility, in which, as our results suggest, different factors associated with infertility, including infertility-related emotional and relational stressors may be significantly associated with couples seeking ART's sexual well-being. The association found between infertility-related emotional stressors (e.g., jealousy & resentment, sadness, depression) and both partners' sexual desire is consistent with the model's suggestion that difficulties in emotion regulation, including emotional awareness, expression, and experience may negatively affect couples' sexual functioning (Rosen & Bergeron, 2019). Hence, when one partner experiences intense emotions related to infertility, this could potentially make it difficult for both partners to develop a desire to engage in sexual activity. Moreover, the model posits that feeling understood and cared for by a partner as well as greater affection between partners may help couples better cope with their emotions with respect to stressors and promote better sexual adjustment (Rosen & Bergeron, 2019). Our results revealed that infertility-related relational stressors seem to be significantly associated with individuals' own lower sexual arousal and satisfaction as well as with their partner's lower sexual satisfaction. Experiencing greater relational stressors (e.g., difficulties in communication, commitment, affection due to infertility) could potentially exacerbate partners seeking ART's worries regarding infertility and their relationship, as well as their emotional well-being. Thus, as suggested by Rosen and Bergeron (2019), this can in turn, affect their sexual health.

The findings from the second study also represent a novel contribution to the literature by providing additional insight into not only risk factors such as negative dyadic coping strategies but also potential positive contributors (positive dyadic coping and common dyadic coping) to

the sexual well-being of couples seeking ART. Most studies to date have generally solely investigated predictors of lower sexual function. One study in the context of infertility, by Herrmann et al. (2011), has examined the role of a protective factor, resilience, on partners' infertility-specific distress and quality of life. Their sample included 199 infertile couples who completed The Resilience Scale **(**Wagnild & Young, 1993), the WHO Quality of Life assessment (WHO, 1998) and the Fertility Problem Inventory (Newton et al., 1999). The authors found that high resilience was associated with high scores on all quality of life domains and low scores in infertility-related distress, suggesting that resilience could be considered as a protective factor for infertile couples (Herrmann et al., 2011). This study, however, did not examine couples' sexual well-being.

Our second study, which examined the associations between how partners cope together and their sexual well-being, revealed that perceptions of higher common dyadic coping were associated with higher sexual well-being for men and women and that women whose partners reported perceptions of higher common dyadic coping also reported fewer infertility-related sexual concerns. These findings suggest that common dyadic coping could represent a protective factor for couples seeking ART. Moreover, they also provide further support for the interpersonal emotion regulation model (Rosen & Bergeron, 2019) by highlighting the important role that interpersonal factors, particularly how partners cope and respond to each other in the face of infertility, seem to play in couples' infertility-related sexual concerns, sexual distress, and satisfaction.

Finally, in addition to shedding light on potential positive contributors to couples' sexual well-being, this thesis emphasizes the crucial need to consider men's experiences in addition to women's when examining sexual well-being in the context of infertility. Our finding that men

who perceived that their partner engaged in higher levels of positive dyadic coping reported higher sexual satisfaction, for example, highlights the protective role that positive partner coping behaviours may play in men's sexuality. Perceiving that their partner engages in positive strategies to relieve their stress could help free up more personal resources for men, allowing them to adapt better to infertility. This may, in turn, as the interpersonal emotion regulation model suggests, allow for more room for a positive appraisal of and satisfaction with their sexual activities (Rosen & Bergeron, 2019). This finding, along with the other actor and partner effects found for both men and women in the studies presented, also underscore the necessity of including male partners in the study and management of infertility (Luk & Loke, 2015) in an effort to address the needs of the couple as a whole. Indeed, infertility is a life crisis for both men and women (Onat & Beji, 2012a) that, as this thesis has shown, is associated with significant personal and relational stressors for both partners, which in turn, affect both partners' sexual well-being. This thesis thus aimed to further enhance our understanding of men's adjustment to infertility and sexual experiences in this context, which unfortunately remains very limited to date.

Methodological Contributions

The present thesis provides a unique portrait of the sexual experiences of couples seeking ART and offers a number of important methodological contributions to the present literature. In particular, the methodological design of the two studies presented have numerous strengths that are worth highlighting.

First and foremost, the dyadic design adopted in both studies allowed us to collect and analyze data from both members of couples seeking ART, which is especially important in the context of infertility, a condition experienced as a shared problem between members of a couple

(Peterson et al., 2003; Sauvé et al., 2018). Thus, several researchers have suggested that a dyadic approach that considers both members of the couple within its analysis is necessary for a better understanding of the experience of infertility (Péloquin et al., 2018; Peterson et al., 2003; Maroufizadeh et al., 2018). Most studies to date on sexuality in the context of infertility, however, have largely focused on individual perspectives, mainly women's, neglecting to consider that infertility affects the couple as a unit and how partners influence each other's sexual adjustment to infertility. These studies have therefore failed to capture the essence of both partners' sexual experiences and the dyadic nature of sexuality.

The dyadic design used in the two studies presented, not only allowed us to address the nonindependence of dyadic data and treat the couple as the unit of analysis, but also to integrate both actor and partner effects and test gender differences in the actor and partner effects observed. Studies have previously reported a negative impact of infertility on men and women's sexual well-being, particularly their sexual function (for a review, see Starc et al., 2019). However, our studies go beyond exploring the impact of infertility on sexual well-being, by also examining the associations between one partner's responses and the other partner's sexual well-being in the context of infertility. This seems essential since partners are considered to be inherently interdependent in cultivating a mutually satisfying sexual relationship (Rosen & Bergeron, 2019).

Partner effects observed in our first study further support the importance of using a dyadic design when examining the sexual experiences of couples seeking ART. For women, our analyses indicated that experiencing greater infertility-related emotional stressors was associated with their partner's lower sexual satisfaction and experiencing greater infertility-related mind-body stressors was associated with their partner's lower sexual arousal. These findings highlight

the significant impact an infertility diagnosis and treatment can have on women's emotional and mind-body health, which may not only affect their own sexual well-being but their partner's as well. Our analyses also revealed that for men and women, infertility-related relational stressors were associated with their partner's lower sexual satisfaction and that women whose partners reported perceptions of higher common dyadic coping reported fewer infertility-related sexual concerns. In addition to reflecting the importance of paying attention to men's experiences as well as to women's in the context of infertility, as previously mentioned, these findings accentuate that by failing to include both members of couples seeking ART and using a dyadic methodological design, studies can overlook crucial relational and sexual experiences of couples seeking ART.

Second, the use of a quantitative design along with the use of empirically validated measures of sexual function, sexual satisfaction, and sexual distress constitutes another significant methodological contribution of this thesis. Firstly, it allowed us to quantify and measure the different aspects of couples' sexual well-being rather than rely solely on qualitative or descriptive studies as several studies have done to date (e.g., Bokaie et al., 2015; Kohan et al., 2015; Lundin & Elmerstig, 2015). Moreover, the use of validated measures of sexual well-being allowed us to limit measurement bias and to provide a better understanding of other important aspects of couples' sexual experiences beyond sexual function, notably their sexual satisfaction, sexual distress, and infertility-related sexual concerns. Previous studies have predominantly used measures of sexual function and focused on the prevalence of sexual dysfunction in couples seeking ART, neglecting other important aspects of sexual well-being.

Failing to examine other sexual variables such as sexual satisfaction, sexual distress or infertility-specific concerns in the sexual sphere portrays a limited picture of couples seeking

ART's sexuality, that does not take into account significant information regarding the interrelation between partners' sexual experiences (partner effects) in the context of infertility. Our first study's findings revealed that infertility, specifically infertility-related emotional, mind-body and relational stressors, are associated with greater difficulties in sexual function. However, we have also found both actor and partner effects supporting an association between infertility-related stressors and sexual satisfaction, which we did not obtain for sexual function. For example, we found a significant association between men and women experiencing greater infertility-related relational stressors and their partner's sexual satisfaction and between women experiencing greater infertility-related emotional stressors and their partner's lower sexual satisfaction. By examining sexual function alone, one could deduct that the non-significant partner effects for sexual function might indicate that men's relational and women's relational and emotional distress related to infertility may not be significantly associated with their partner's sexuality. This would reinforce a reductive notion of the sexuality of couples seeking ART, failing to challenge the misconception that men are not significantly affected by infertility and to consider the dyadic context surrounding these couples' sexual well-being.

Third, the use of a combination of general (e.g., Female Sexual Function Index, International Index of Erectile Function, Sexual Distress Scale-Short Form, Global Measure of Sexual Satisfaction) and disease-specific measures (e.g., Fertility Quality of Life tool, Fertility Problem Inventory) also allowed us to better assess partners' emotional, mind-body, relational and sexual stressors and capture the unique difficulties and concerns of couples seeking ART. This significantly extends the existing literature, which has largely focused on more general questionnaires that do not account for the specific context of infertility. Specifically, in our second study, we found that men who perceived that their partner engaged in higher positive

dyadic coping reported higher sexual satisfaction, whereas women reported greater infertility-related sexual concerns. Women whose partners reported perceptions of higher common dyadic coping also reported fewer infertility-related sexual concerns. If our analyses had relied on general measures of sexual well-being only, such as sexual satisfaction, we would have failed to observe the difference in the association between men and women's perceptions of positive dyadic coping and their sexual well-being, as well as the partner effect between men's perceptions of higher common dyadic coping and their partner's infertility-related sexual concerns. The use of empirically validated measures of infertility-related sexual concerns thus allowed us to provide a more nuanced portrayal of couples seeking ART's sexual well-being. This is consistent with results from previous studies that have obtained different results when looking at the impact of infertility specifically rather than global measures of adjustment. For example, in their study on the acceptability and preliminary efficacy of a novel group intervention for couples seeking fertility treatment, Arpin et al. (2019) found that their group intervention revealed a significant improvement in fertility-related relational quality of life but did not indicate a significant increase in global relationship satisfaction. As the authors have suggested, general measures of adjustment may not be sensitive to the particular effects of infertility and thus, fail to capture effects obtained when infertility-specific variables are considered (Arpin et al., 2019).

Finally, the participants in our samples were recruited through various methods, including in person at fertility clinics and through advertisements posted on several infertility-related association websites and social media in Canada and the United States. Moreover, unlike previous studies, which have focused on participants with either female-factor or male-factor infertility or have included a sample of couples at a specific stage of infertility treatment, both

studies presented in this thesis included a considerably large sample of couples seeking ART, that was relatively heterogeneous with respect to the cause of infertility and treatment stage. The large sample size, along with the diverse participant pool in both studies therefore increases the generalizability of our findings to all couples who are seeking ART for medical infertility.

Clinical Implications

While applying the biopsychosocial model provides a more comprehensive understanding of infertility and sexuality from a research perspective, the model also inevitably provides a framework for a richer clinical understanding and guide for practitioners (Pahwa & Foley, 2017). Indeed, by examining not only the diagnosis and treatment-related factors, but also the emotional, mind-body, relational stressors, and dyadic factors associated with couples' sexual well-being, the findings of the current thesis have potentially important clinical implications, offering potential targets for intervention with couples seeking ART.

To begin with, the studies presented highlight the necessity to pay increased attention to couples seeking ART's sexual well-being, not solely from a research perspective to expand our understanding of the factors that may make certain couples more vulnerable to developing sexual difficulties, but also from a clinical standpoint. Considering that sexuality and reproduction are intimately linked, it is surprising that sexuality has received less attention within research and clinical efforts directed towards the adjustment to infertility. Given that couples are often reluctant to discuss their sexual concerns with healthcare providers (Risen, 2010), by overlooking the topic of sexuality when assisting couples seeking ART, practitioners reinforce a more biomedical rather than an inclusive approach that recognizes individuals and couples' biopsychosocial influences. Indeed, the biopsychosocial model suggests that clinicians should

adopt a patient-centered focus, that understands and is tailored to patients' specific needs (Nimbi et al., 2021).

Sexuality is associated with overall quality of life, health, psychological well-being, and relationship functioning, quality, and stability (Byers, 2011; McNulty et al., 2016; Schoenfeld et al., 2017; WAS, 2013; WHO, 2002a). Hence, sexual well-being (i.e., infertility-related sexual concerns, sexual distress, sexual satisfaction), beyond sexual function should be routinely discussed with couples in the context of infertility to facilitate the early detection and proper management of sexual difficulties and improve their adjustment to infertility and treatments, and overall quality of life. In support of this recommendation, Luca et al. (2021) have underlined the necessity of considering couples' sexual well-being during ART treatment along with their reproductive health. The authors have emphasized the correlation between sexuality and fertility and the need of an integrated approach to diagnosis and treatment (Luca et al. (2021). Thus, it is essential for fertility specialists to assess sexual well-being in the clinical management of couples seeking ART during all phases of fertility diagnosis and treatment (Brotto et al., 2016).

Additionally, as our findings underline, it could be beneficial to address couples' emotional, mind-body, and relational spheres. In their systematic review of reasons and predictors of discontinuation in fertility treatment, Gameiro et al. (2012) found that some of the most selected reasons for treatment discontinuation included the physical, psychological, and relational burden associated with infertility. Thus, it seems essential for the fertility medical team to consider the extent to which individuals experience negative emotions, the impact of infertility on their physical health (e.g., pain), their concentration, and their daily activities, as well as the extent to which couples' intimate relationship has been affected (e.g., communication, affection, satisfaction). This may help better serve the specific needs of couples going through the

challenging experience of infertility and its treatment and facilitate improvements in couples' sexual well-being.

Our findings also emphasize the importance of understanding both partners' experiences of infertility and the need to consider the couple as a whole in the assessment and treatment phase of ART. The majority of studies to date in the context of infertility have failed to include both partners' perspectives. In line with this recommendation, it seems essential that fertility medical teams actively involve both members of the couple in the diagnosis and treatment process (Gameiro et al., 2015) and address both partners' psychological, relational and sexual well-being during ART. Doing so may help identify couples at a higher risk of experiencing significant personal and relational distress, as well as sexual difficulties.

In light of the presented studies' findings and the above-mentioned implications, we have highlighted below a few, more specific, clinical assessment and intervention avenues for fertility healthcare teams and mental health professionals to consider when working with couples seeking ART.

Assessment

In line with a biopsychosocial assessment approach, Pahwa & Foley (2017) recommend that providers open the conversation with patients with questions about sexual health, incorporated in their more general interview (Foley, 2015). Examples of initial questions proposed include "We have been talking about your general health and your sexual health is part of your general health. Do you have any questions about your sexual health?" (Foley, 2015; Pahwa & Foley; 2017). Foley (2015) also developed a standard interview assessment named DOUPE to help practitioners gather further information in an efficient and sensitive manner. While the tool was not specifically developed for couples seeking ART, it could be applicable to

the context of infertility. The assessment process consists of getting first a Description of the concern ("What is the concern/What is a typical situation when this happens?"), information on the Onset of the concern (past or recent, in one situation or every time, and whether it is paired with other changes), patients' Understanding of the situation ("What's your understanding of why this is happening?"), Past efforts to address the concern ("What's your experience trying to fix the problem?") and finally, patients Expectations, including how realistic they are and patients' level of motivation (Foley, 2015; Pahwa & Foley; 2017). This line of questioning, as the authors suggest, may open the door to further questions aimed at exploring levels of pain and discomfort, couples' sexual function and satisfaction, as well as the biopsychosocial influences of the patient, the partner and the couple that may impact their sexual well-being (Foley, 2015; Pahwa & Foley; 2017). This model may be easily implemented by the fertility medical team for a general assessment and screening for sexual difficulties. If specific difficulties are identified, the medical team may then consider referring couples to specialized professionals such as psychologists or sexologists.

Another important way through which fertility staff may begin facilitating a better psychological, relational and sexual adjustment for couples seeking ART is through the provision of preparatory information (Gameiro et al., 2015). In addition to information pertaining to medical procedures, couples may benefit from information about patients' typical concerns, including the emotional, relational and sexual difficulties that may be associated with infertility treatment (Read et al., 2014). These educational interventions may help clarify couples' misconceptions, address their fears, and better prepare them for treatment, in addition to validating their experience, which can be difficult in the context of ART (Boivin et al., 2012).

This could be provided both verbally or through written materials such as information booklets including available services within the community (Read et al., 2014).

Finally, if possible, fertility medical teams may consider using screening tools to help with the identification of couples that may be at risk of experiencing higher infertility-related emotional, mind-body or relational distress and thus require additional psychotherapeutic care. A few tools, such as the SCREENIVF (Verhaak et al., 2010) and the Fertility Quality of Life tool (FertiQol; Boivin et al., 2011) may be helpful for fertility health providers to identify highly distressed patients (Boivin et al., 2012; Gameiro et al., 2015; Read et al., 2014). The SCREENIVF is a 34-item questionnaire specifically designed for individuals with infertility, to be used prior to treatment as an assessment of risk factors for depression and anxiety, negative illness cognitions, low acceptance of infertility, and poor social support following a treatment cycle (Gameiro et al., 2015; Verhaak et al., 2010). The FertiQol, used in our first study, is a 26-item questionnaire evaluating the impact of infertility in the emotional, mind-body, relational and social domains (Boivin et al., 2011). These questionnaires may therefore help health teams identify couples at a higher risk of emotional difficulties, experiencing higher relationship strain, and high treatment distress (Boivin et al., 2012; Peterson et al., 2012). Brief sexuality measures could also be useful as screening tools. Several options are available including the NATSAL-SF, a short survey that provides an estimate of the level of sexual function in the last year and includes items related to distress about sex (Mitchell et al., 2012) and the Changes in Sexual Functioning Questionnaire Short-Form (CSFQ-14), a brief measure of sexual functioning developed for couples who report problems with sexual function related to illness or medication side effects (Keller et al., 2006).

The assessment recommendations highlighted above may therefore help fertility staff better detect couples seeking ART's support needs and allow them to refer couples in need of additional support to appropriate services (Read et al., 2014). Overall, it is recommended that practitioners adopt a healthy curious attitude during assessment, use real rather than vague language (Pahwa & Foley; 2017), and model a sex-positive (Nimbi et al., 2021), affirmative, and permission-giving stance (Foley, 2015; Pahwa & Foley; 2017).

Intervention

Different types of interventions may be proposed to couples who may need additional support by mental health professionals in order to explore and address their concerns regarding their sexual well-being and the personal and relational factors associated with their sexual health. Firstly, mental health professionals may use assessment questionnaires to obtain a more detailed representation of couples' sexual well-being and the influencing factors including sexual function and self-image scales, depression scales, questionnaires assessing couples' perceptions and personal beliefs of the illness, and dyadic adjustment scales (Foley, 2015). The screening tools discussed above may also be helpful to counselors, particularly if these have not been administered previously by the fertility medical team.

In addition to sexual assessment, sexual education and psychotherapy may be avenues worth incorporating in the management of infertility and the services offered to couples throughout their ART journey. These may help normalize and validate the experience of sexual difficulties in the context of infertility and better prepare couples to deal with the experience of infertility as well as plan any further possible psychological or pharmacological interventions that may be necessary (Luca et al., 2021). Providing couples support in the sexual sphere of their relationship would ensure couples are offered a more comprehensive clinical care and that they

are given the appropriate resources to help them navigate the decision-making process and maximize the therapeutic benefit of their ART procedures.

An avenue that could be recommended for couples seeking ART that are at a higher risk of experiencing sexual difficulties is sex therapy. Indeed, the inclusion of sex therapy may improve the success of interventions aiming to ameliorate couples' quality of life (Lara, 2017). An intersystem approach to sex therapy that considers biological or medical, psychological, dyadic relationship or couples dynamics, intergenerational and sociocultural influences has been endorsed for couples dealing with infertility (Oehler et al., 2021). Specifically, a combination of sex therapy and psychotherapy are recommended to help prevent or improve sexual dysfunctions and relational issues between partners (Lara, 2017). In terms of the biological sphere, Oehler et al. (2021) suggest that common techniques prescribed by sex therapists may be directed masturbation and orgasmic reconditioning (Burns, 2006), whereas psychosocial interventions most frequently used to relieve the psychological burden of infertility on couples include cognitive behavioral therapy, acceptance and commitment therapy, mindfulness-based, and group interventions (Bach, 2018; Ying et al., 2016). While these approaches have been reported to have potentially positive effects on depression, anxiety, relationship function, and pregnancy rates, literature reviews have been unable to conclude that these interventions were efficacious or that they significantly relieved the psychological and relational burden of infertility (Bach, 2018; Ying et al., 2016). Methodological issues related to measurement points and attrition rates in past studies have been suggested as an explanation for the lack of evidence supporting these interventions (Ying et al., 2016), along with the need for further research with appropriate methodological techniques (Bach, 2018). Nevertheless, researchers have recommended that interventions involving both members of couples and addressing couple dynamics should be at

the forefront of efforts to assist infertile couples, particularly during the period of waiting for pregnancy test results and following failed treatment cycles (Arpin et al., 2019; Oehler et al., 2021; Ying et al., 2016).

A few relationship interventions have indeed been suggested to be helpful for mental health professionals to consider with infertile couples, including homework assignments such as giving each other massages and practicing communication techniques (Burns, 2006; Oehler et al., 2021). Sensate focus exercises, which consist of using physical touch and sensations to improve sexual intimacy and communication between partners have also been recommended to help couples overcome sexual struggles (Burns, 2006; Oehler et al., 2021). Couples may also be given sexual problem specific self-help books when necessary (Pahwa & Foley, 2017). These strategies may help nourish the pleasurable and enjoyable aspects of couples' sexual relationship, which would be particularly important for couples seeking ART whose sexual relationship can become primarily linked solely to reproductive purposes.

Given the inconclusive evidence to date regarding individual interventions, and in line with the previously-mentioned recommendations and with our findings highlighting the association between how couples cope together and infertile couples' sexual well-being, couple-focused therapies could be avenues worth considering for couples seeking ART. Attachment theory, an empirically validated theory of adult love, posits that early emotional bonds with primary attachment figures have a significant impact on adult intimate relationships, by influencing individuals' adult attachment styles (Hazan & Shaver, 1987; Johnson, 2019). These attachment styles can affect how couples navigate relational dynamics, including their ability to manage decision-making, a stressful process for couples seeking ART (Johnson, 2019; Koser, 2019). Using a theoretical approach such as attachment theory to help couples repair and

preserve their relational bond has been recommended to help address the limitations in interventions surrounding infertility to date (Koser, 2019). Emotionally Focused Couple therapy (EFT), developed by Dr. Susan Johnson and Dr. Leslie Greenberg in the 1980s, draws from attachment theory and aims to help distressed couples improve their relationship and develop a more secure emotional bond (Johnson, 2019). The goals of EFT include expanding partners' key emotional responses, the organization of self, identifying attachments longings and fears and creating a shift in couples' interactional positions and patterns (Johnson, 2019). While a substantial body of research exists on the effectiveness of EFT, the few studies to date that have examined the effectiveness of EFT for infertile couples have reported a reduction in the rate of depression, anxiety and stress in couples (Soltani et al., 2014), as well as an enhancement of relationship satisfaction, cohesion, affectional expression, and emotional and physical satisfaction (Najafi et al., 2015; Soleimani et al., 2015). Soleimani et al. (2015) have also reported an improvement in sexual satisfaction in infertile couples who have attended 10 sessions of EFT.

EFT can be applied to couples with sexual issues and involves, in Stage 1, exploring the quality of the couple's physical relationship, placing partners' sexual responses within the context of their general relational cycle and the attachment frame (Johnson, 2017; Johnson & Zuccarini, 2010). In Stage 2, the therapist can help couples create positive cycles of emotional responsiveness, as well as confide and risk in the area of physical closeness and sexuality in order to strengthen their bond and continue to build a more erotic and pleasurable sexual life (Johnson, 2017; Johnson & Zuccarini, 2010). It has been suggested that EFT may provide a safe space for couples to better communicate their emotional reactions to infertility and better respond and support each other (Brigance et al., 2020). Moreover, the approach may help

couples reframe their reproductive journey in a more meaningful one within their relationship, help them find new purpose and develop more empathic communication (Brigance et al., 2020). Thus, by better communicating and sharing their emotional experiences related to infertility with each other, couples may be better equipped to cope together in the face of the challenges associated with infertility, thereby improving their dyadic coping and reducing their infertility-related emotional and relational concerns. As our findings suggest, couples' sexual well-being could also be facilitated by promoting greater common dyadic coping within couples. Couples engaging in joint strategies to cope with infertility as a shared stressor may feel a stronger sense of mutual understanding, relieving some of the pressures on sex related to fertility treatments. EFT involves both partners equally in the therapeutic process and may help infertile couples share their fears, process loss and their desire for connection, and better manage the difficulties of fertility treatment (Koser, 2019). EFT can also help couples have more frequent interactions, improve their sexual self-expression (e.g., touching, kissing, hugging), communicate their needs, and experience greater physical closeness (Johnson & Zuccarini, 2010; Soleimani et al., 2015). By taking in consideration dyadic effects and the impact of infertility on the couple as a unit, EFT may help revive emotions and intimacy that can sometimes be compromised during ART procedures (Luca et al., 2021). Thus, EFT's potential benefits for this population, particularly given its emphasis on helping partners create a lasting bond, seem promising.

It should be noted however, that our findings do not allow us to imply that interventions targeting couples' personal, or relationship stressors related to infertility or positive or common dyadic coping would necessarily lead to significant changes in couples' well-being, including their sexual health. Further clinical studies on the effectiveness of interventions targeting these variables, such as EFT and its specific techniques, for improving couples seeking ART's sexual well-being are required.

Limitations and Directions for Future Research

Despite the numerous strengths of the current doctoral thesis, the limitations of the studies presented should also be noted. The samples consisted primarily of White and mixed-sex couples with a high level of education, which limits our ability to generalize our findings to couples with diverse backgrounds and may not be representative of all couples seeking ART. Couples who require ART may do so due to physiological causes (e.g., medical infertility) as well as because of their sexual orientation and/or gender identity (e.g., same-sex and/or gender couples). This study focused on medical infertility given the closer link between infertility treatment and sexual practices (e.g., ritualized, procreative approaches to sex). Moreover, the measures used to assess infertility-related personal, relational, and sexual stressors in this study were designed to address medical infertility and have not been validated with couples who are using ART for other reasons. However, same-sex or same-gendered couples may also experience involuntary childlessness. Indeed, same-sex or same-gendered couples' experiences and needs could significantly differ from those of mixed-sex couples seeking ART (Ross et al., 2014). These differences can be largely attributed to the additional barriers that they may face, including stigma and discrimination (Maxwell et al., 2018), service gaps, limited access to information and services, and lack of education in service providers about 2SLGBTQ+ health (Ross et al., 2006; Ross et al., 2014). A couple of studies have also investigated differences in dyadic adjustment between gay and heterosexual men, and lesbian and heterosexual women and revealed that lesbian women reported significantly higher dyadic adjustment compared to heterosexual women (Peixoto, 2022; Peixoto & Nobre, 2015). Future studies involving couples seeking ART for reasons other than medical infertility should therefore investigate whether the present findings would be comparable to those obtained in the present studies.

Investigating cultural differences in the outcomes presented may also be relevant given that culture can impact couples' view on sexuality and their perceptions of their sexual well-being in the context of infertility (Luca et al., 2021). Moreover, it has been suggested that the impact of infertility on intimate relationships may also depend on the sociocultural context (Greil et al., 2010). Infertility is more likely to have a more negative effect on couples from cultures in which marriage and women's roles are closely linked with having children, more prominent in the developing world (Greil et al., 2010). The distress related to infertility may also be higher in collectivistic countries, in which there is significant social stigma associated with infertility (Greil et al., 2010; Husain & Imran, 2020).

Although both studies used empirically validated measures, the measures were self-report questionnaires which may increase the risk of social desirability, recall, and common method variance bias. Additionally, given the cross-sectional design of the studies, which is correlational in nature, causality between our variables cannot be inferred. Further studies, preferably longitudinal research, would allow for a better understanding of the complex associations between infertility-related treatment characteristics, stressors, dyadic coping, and couples' sexual well-being over time. A longitudinal design would allow for the examination of trajectories of change over time. Since psychological and sexual attitudes may change through the course of treatment for infertility, Luca et al. (2021) also underline the need to examine these factors before and after treatment, as well as during the different stages of treatment. It is possible that couples may experience increased distress related to infertility at varying time points during their ART journey, for example during critical decision-making moments or while awaiting treatment results, which may play a more significant role on their couple relationship and sexual well-being. It is also possible that couples' ability to cope well as a couple may vary

at earlier or more advanced stages of treatment, which may eventually affect their sexual experiences during treatment.

It should be noted that within our first study, couples included were sexually active within the last 4 weeks of participating in the study. Moreover, for both studies, we did not have data on couples' sexual well-being prior to their infertility diagnosis and treatment and on the importance they placed on the sexual difficulties they experienced. Future studies wishing to replicate our results should consider gathering this information and should also seek to reproduce our results in other samples of couples. By including couples experiencing sexual difficulties due to other stressors or medical conditions, those not sexually active, as well as control samples, future studies can better assess the influence of the context of infertility on the variables explored.

As per the interpersonal emotion regulation model (Rosen & Bergeron, 2019), further studies should also examine other distal and proximal factors associated with both members of couples seeking ART's sexuality (e.g., childhood trauma, social context, sexual communication, and motivation). Since most studies have focused on examining risk factors in the context of infertility, further research on potential protective factors (e.g., common values, social and partner support, religious beliefs) that may facilitate a relational and sexual well-being in infertile couples is highly warranted.

A mixed-methods design involving both quantitative and qualitative methods that would allow partners to elaborate on the factors affecting their sexual well-being during treatment and therefore, provide a more comprehensive understanding of their sexual experiences would also warrant consideration in future research. For example, through semi-structured interviews or focus groups, partners may provide in their own words the most challenging aspects of their

infertility experience and the specific relational and sexual difficulties they may face during ART. Moreover, specific coping strategies couples have utilized during their journey may be gathered, along with ones they believe may have been most helpful. Finally, information on couples' needs may also be insightful from a clinical perspective.

Conclusion

> "On se sent privé de notre sexualité mais on nous demande de le faire sur demande sans être accompagnés là-dedans" – Participant
>
> "We feel deprived of our sexuality, yet we are asked to have sex on demand, without being assisted in the process" – English translation

These poignant words were communicated to me by a study participant who wanted to share her appreciation over the phone for our interest in the sexuality of couples seeking ART. The crucial meaning behind this participant's words underscores the impact of the failure to pay significant attention to the sexuality of couples seeking ART from a research and clinical standpoint. The present thesis aimed to extend the literature on the sexual well-being of couples seeking ART and provide clinical avenues stemming from our findings to highlight the need to take a close look and normalize couples' sexual experiences. Using a biopsychosocial approach to infertility and sexuality, this thesis allowed us to examine and provide a more comprehensive and in-depth understanding of the factors associated with couples seeking ART's sexual well-being.

Together, findings from the two studies presented suggest that couples seeking ART's sexual well-being is not solely associated with medical and biological factors. Couples' emotional and mind-body stressors, and the relational burden of infertility in particular, as well as partners' ability to cope together as a couple have been found to play a more significant role in

couples' sexual well-being. Further research is required to examine other factors that may be associated with couples' sexual well-being and whether interventions targeting emotional, mind-body and relational stressors, and dyadic coping would be effective in improving the sexual well-being of infertile couples. Overall, the current thesis's findings are novel and encouraging since, unlike medical factors on which couples have little control, couples may seek help with personal and relational concerns in the hopes of improving their sexual relationships.

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ANNEXE A

The Female Sexual Function Index (FSFI)

Female Sexual Function Index

INSTRUCTIONS: These questions ask about your sexual feelings and responses during the past 4 weeks. Please answer the following questions as honestly and clearly as possible. In answering these questions the following definitions apply:

Sexual activity includes intercourse, caressing, foreplay, and masturbation.
Sexual intercourse is defined as penile penetration (entry) of the vagina.
Sexual stimulation includes situations like foreplay with a partner, self-stimulation (masturbation), or sexual fantasy.
Sexual arousal refers to physical and mental states, and may include feelings of warmth or tingling in your genitals, lubrication (being “wet”), or muscular contractions.
Sexual desire or interest is a feeling that includes wanting to have a sexual experience, feeling receptive to a partner’s sexual initiation, and thinking or fantasizing about having sex.

SELECT ONLY ONE CHOICE PER QUESTION:

1. Over the past 4 weeks, how often did you feel sexual desire or interest?	5 = Almost always or always 4 = Most times (more than half the time) 3 = Sometimes (about half the time) 2 = A few times (less than half the time) 1 = Almost never or never
2. Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?	5 = Very high 4 = High 3 = Moderate 2 = Low 1 = Very low or none at all
3. Over the past 4 weeks, how often did you feel sexually aroused ("turned on") during sexual activity or intercourse?	5 = Almost always or always 4 = Most times (more than half the time) 3 = Sometimes (about half the time) 2 = A few times (less than half the time) 1 = Almost never or never N/A = No sexual activity
4. Over the past 4 weeks, how would you rate your level of sexual arousal ("turn on") during sexual activity or intercourse?	5 = Very high 4 = High 3 = Moderate 2 = Low 1 = Very low or none at all N/A = No sexual activity

5. Over the past 4 weeks, how confident were you about becoming sexually aroused during sexual activity or intercourse?	5 = Very high confidence 4 = High confidence 3 = Moderate confidence 2 = Low confidence 1 = Very low or no confidence N/A = No sexual activity
6. Over the past 4 weeks, how often have you been satisfied with your arousal (excitement) during sexual activity or intercourse?	5 = Almost always or always 4 = Most times (more than half the time) 3 = Sometimes (about half the time) 2 = A few times (less than half the time) 1 = Almost never or never N/A = No sexual activity
7. Over the past 4 weeks, how often did you become sexually aroused (lubricated or "wet") during sexual activity or intercourse?	5 = Almost always or always 4 = Most times (more than half the time) 3 = Sometimes (about half the time) 2 = A few times (less than half the time) 1 = Almost never or never N/A = No sexual activity
8. Over the past 4 weeks, how difficult was it to become aroused (lubricated or “wet") during sexual activity or intercourse?	1 = Extremely difficult or impossible 2 = Very difficult 3 = Difficult 4 = Slightly difficult 5 = Not difficult N/A = No sexual activity
9. Over the past 4 weeks, how often did you maintain your arousal (lubrication or "wetness") until completion of sexual activity or intercourse?	5 = Almost always or always 4 = Most times (more than half the time) 3 = Sometimes (about half the time) 2 = A few times (less than half the time) 1 = Almost never or never N/A = No sexual activity
10. Over the past 4 weeks, how difficult was it to maintain your arousal (lubrication or "wetness") until completion of sexual activity or intercourse?	1 = Extremely difficult or impossible 2 = Very difficult 3 = Difficult 4 = Slightly difficult 5 = Not difficult N/A = No sexual activity
11. Over the past 4 weeks, when you had sexual stimulation or intercourse, how often did you reach orgasm (climax)?	5 = Almost always or always 4 = Most times (more than half the time) 3 = Sometimes (about half the time) 2 = A few times (less than half the time) 1 = Almost never or never N/A = No sexual activity
12. Over the past 4 weeks, when you had sexual stimulation or intercourse, how difficult was it for you to reach orgasm (climax)?	1 = Extremely difficult or impossible 2 = Very difficult 3 = Difficult 4 = Slightly difficult 5 = Not difficult N/A = No sexual activity

13. Over the past 4 weeks, how satisfied were you with your ability to reach orgasm (climax) during sexual activity or intercourse?	5 = Very satisfied 4 = Moderately satisfied 3 = About equally satisfied and dissatisfied 2 = Moderately dissatisfied 1 = Very dissatisfied N/A = No sexual activity
14. Over the past 4 weeks, how satisfied have you been with the amount of emotional closeness during sexual activity between you and your partner?	5 = Very satisfied 4 = Moderately satisfied 3 = About equally satisfied and dissatisfied 2 = Moderately dissatisfied 1 = Very dissatisfied N/A = No sexual activity
15. Over the past 4 weeks, how satisfied have you been with your sexual relationship with your partner?	5 = Very satisfied 4 = Moderately satisfied 3 = About equally satisfied and dissatisfied 2 = Moderately dissatisfied 1 = Very dissatisfied
16. Over the past 4 weeks, how satisfied have you been with your overall sexual life?	5 = Very satisfied 4 = Moderately satisfied 3 = About equally satisfied and dissatisfied 2 = Moderately dissatisfied 1 = Very dissatisfied
17. Over the past 4 weeks, how often did you experience discomfort or pain during vaginal penetration?	1 = Almost always or always 2 = Most times (more than half the time) 3 = Sometimes (about half the time) 4 = A few times (less than half the time) 5 = Almost never or never N/A = No vaginal penetration
18. Over the past 4 weeks, how often did you experience discomfort or pain following vaginal penetration?	1 = Almost always or always 2 = Most times (more than half the time) 3 = Sometimes (about half the time) 4 = A few times (less than half the time) 5 = Almost never or never N/A = No vaginal penetration
19. Over the past 4 weeks, how would you rate your level (degree) of discomfort or pain during or following vaginal penetration?	N/A = No sexual activity 1 = Very high 2 = High 3 = Moderate 4 = Low 5 = Very low or none at all N/A = No vaginal penetration

ANNEXE B

The International Index of Erectile Function (IIEF)

INTERNATIONAL INDEX OF ERECTILE FUNCTION (IIEF)

These questions ask about the effects that your erection problems have had on your sex life over the last four weeks. Please try to answer the questions as honestly and as clearly as you are able. Your answers are completely confidential. In answering the questions, the following definitions apply:

- **sexual activity** includes intercourse, caressing, foreplay & masturbation
- **sexual intercourse** is defined as sexual penetration of your partner
- **sexual stimulation** includes situation such as foreplay, erotic pictures etc.
- **ejaculation** is the ejection of semen from the penis (or the feeling of this)
- **orgasm** is the fulfilment or climax following sexual stimulation or intercourse

Choose one answer only.

1. **In the past 4 weeks, how often were you able to get an erection during sexual activity?**	0 No sexual activity 1 Almost never or never 2 A few times (less than half the time) 3 Sometimes (about half the time) 4 Most times (more than half the time) 5 Almost always or always
2. **In the past 4 weeks, when you had erections with sexual stimulation, how often were your erections hard enough for penetration?**	0 No sexual activity 1 Almost never or never 2 A few times (less than half the time) 3 Sometimes (about half the time) 4 Most times (more than half the time) 5 Almost always or always
3. **In the past 4 weeks, when you attempted intercourse, how often were you able to penetrate (enter) your partner?**	0 Did not attempt intercourse 1 Almost never or never 2 A few times (less than half the time) 3 Sometimes (about half the time) 4 Most times (more than half the time) 5 Almost always or always
4. **In the past 4 weeks, during sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner?**	0 Did not attempt intercourse 1 Almost never or never 2 A few times (less than half the time) 3 Sometimes (about half the time) 4 Most times (more than half the time) 5 Almost always or always
5. **In the past 4 weeks, during sexual intercourse, how difficult was it to maintain your erection to completion of intercourse?**	0 Did not attempt intercourse 1 Extremely difficult 2 Very difficult 3 Difficult 4 Slightly difficult 5 Not difficult
6. **In the past 4 weeks, how many times have you attempted sexual intercourse?**	0 No attempts 1 One to two attempts 2 Three to four attempts 3 Five to six attempts

4 Seven to ten attempts
5 Eleven or more attempts

7. **In the past 4 weeks, when you attempted sexual intercourse, how often was it satisfactory for you?**
0 Did not attempt intercourse
1 Almost never or never
2 A few times (less than half the time)
3 Sometimes (about half the time)
4 Most times (more than half the time)
5 Almost always or always

8. **In the past 4 weeks, how much have you enjoyed sexual intercourse?**
0 No intercourse
1 No enjoyment at all
2 Not very enjoyable
3 Fairly enjoyable
4 Highly enjoyable
5 Very highly enjoyable

9. **In the past 4 weeks, when you had sexual stimulation or intercourse, how often did you ejaculate?**
0 No sexual stimulation or intercourse
1 Almost never or never
2 A few times (less than half the time)
3 Sometimes (about half the time)
4 Most times (more than half the time)
5 Almost always or always

10. **In the past 4 weeks, when you had sexual stimulation or intercourse, how often did you have the feeling of orgasm or climax?**
1 Almost never or never
2 A few times (less than half the time)
3 Sometimes (about half the time)
4 Most times (more than half the time)
5 Almost always or always

11. **In the past 4 weeks, how often have you felt sexual desire?**
1 Almost never or never
2 A few times (less than half the time)
3 Sometimes (about half the time)
4 Most times (more than half the time)
5 Almost always or always

12. **In the past 4 weeks, how would you rate your level of sexual desire?**
1 Very low or none at all
2 Low
3 Moderate
4 High
5 Very high

13. **In the past 4 weeks, how satisfied have you been with your overall sex life?**
1 Very dissatisfied
2 Moderately dissatisfied
3 Equally satisfied & dissatisfied
4 Moderately satisfied
5 Very satisfied

14. **In the past 4 weeks, how satisfied have you been with your sexual relationship with your partner?**
1 Very dissatisfied
2 Moderately dissatisfied
3 Equally satisfied & dissatisfied
4 Moderately satisfied
5 Very satisfied

15. **In the past 4 weeks, how do you rate your confidence that you could get and keep an erection?**
1 Very low
2 Low
3 Moderate
4 High
5 Very high

ANNEXE C

The Fertility Quality of Life tool (FertiQol)

QUALITY OF LIFE IN THE CONTEXT OF MEDICALLY ASSISTED REPRODUCTION (MAR)

For each question, kindly check (tick the box) for the response that most closely reflects how you think and feel. Relate your answers to your current thoughts and feelings. Some questions may relate to your private life, but they are necessary to adequately measure all aspects of your life.

Very poor 0	*Poor* 1	*Neither good nor poor* 2	*Good* 3	*Very good* 4

A. A. How would you rate your health? 0 1 2 3 4

Very dissatisfied 0	*Dissatisfied* 1	*Neither satisfied nor dissatisfied* 2	*Satisfied* 3	*Very satisfied* 4

B. Are you satisfied with your quality of life? 0 1 2 3 4

Completely 0	*A great deal* 1	*Moderately* 2	*Not much* 3	*Not at all* 4

Q1.	Are your attention and concentration impaired by thoughts of infertility or your experience with MAR?	0	1	2	3	4	Does not apply
Q2.	Do you think you cannot move ahead with other life goals and plans because of infertility or your experience with MAR?	0	1	2	3	4	Does not apply
Q3.	Do you feel drained or worn down because of fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply
Q4.	Do you feel able to cope with your fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply

Very dissatisfied 0	*Dissatisfied* 1	*Neither satisfied nor dissatisfied* 2	*Satisfied* 3	*Very satisfied* 4

Q5.	Are you satisfied with the support you receive from friends with regard to your fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply
***Q6.**	Are you satisfied with your sexual relationship even though you have fertility problems or you have to use MAR?	0	1	2	3	4	Does not apply

Always	*Very often*	*Quite often*	*Seldom*	*Never*
0	*1*	*2*	*3*	*4*

Q7.	Do your fertility problems or the fact that you have to use MAR to have a child cause feelings of jealousy or resentment?	0	1	2	3	4	Does not apply

Always	*Very often*	*Quite often*	*Seldom*	*Never*
0	*1*	*2*	*3*	*4*

Q8.	Do you experience grief and/or feelings of loss about not being able to have a child (or more children) without the use of MAR?	0	1	2	3	4	Does not apply
Q9.	Do you fluctuate between hope and despair because of fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply
Q10.	Are you socially isolated because of fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply
***Q11.**	Are you and your partner affectionate with each other even though you have a fertility problem or you have to use MAR?	0	1	2	3	4	Does not apply
Q12.	Do your fertility problems or your experience with MAR interfere with your day-to-day work or obligations?	0	1	2	3	4	Does not apply
Q13.	Do you feel uncomfortable attending social situations like holidays and celebrations because of your fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply
Q14.	Do you feel your family can understand what you are going through?	0	1	2	3	4	Does not apply

An extreme amount	*Very much*	*A moderate amount*	*A little*	*Not at all*
	1		*3*	*4*

0				*2*		
***Q15.**	Have fertility problems or your experience with MAR strengthened your commitment to your partner?	0	1	2	3	4	Does not apply
Q16.	Do you feel sad and depressed about your fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply
Q17.	Do your fertility problems or your experience with MAR make you feel inferior to people with children?	0	1	2	3	4	Does not apply
Q18.	Are you bothered by fatigue because of fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply
***Q19.**	Have fertility problems or your experiences with MAR had a negative impact on your relationship with your partner?	0	1	2	3	4	Does not apply
***Q20.**	Do you find it difficult to talk to your partner about your feelings related to infertility or your experience with MAR?	0	1	2	3	4	Does not apply
***Q21.**	Are you content with your relationship even though you have fertility problems or you have to use MAR?	0	1	2	3	4	Does not apply
Q22.	Do you feel social pressure on you to have (or have more) children?	0	1	2	3	4	Does not apply
Q23.	Do your fertility problems or your experience with MAR make you angry?	0	1	2	3	4	Does not apply
Q24.	Do you feel pain and physical discomfort because of your fertility problems or your experience with MAR?	0	1	2	3	4	Does not apply

The next questions are about your experience with MAR (including all medical consultations or interventions). Your responses should indicate your real thoughts and feelings.

T0. In your couple, who receives treatment (ex., surgery, insemination, IVF)?

___ I receive the treatment (Please complete the following questions).
___ My partner receives the treatment (Please skip to the next questionnaire).
___ Neither myself nor my partner receives treatment. We are using a surrogate mother and an egg donor. (Please skip to the next page).

Always	*Very often*	*Quite often*	*Seldom*	*Never*

0	*1*	*2*	*3*	*4*

T1.	Does your infertility treatment or your experience with MAR negatively affect your mood?	0	1	2	3	4	Does not apply

An extreme amount	*Very much*	*A moderate amount*	*A little*	*Not at all*
0	*1*	*2*	*3*	*4*

T3.	How complicated is dealing with the procedure and/or administration of medication for your treatment?	0	1	2	3	4
T4.	Are you bothered by the effect of the treatment on your daily or work-related activities?	0	1	2	3	4
T6.	Are you bothered by the physical side effects of fertility medications and treatment?	0	1	2	3	4

ANNEXE D

The Dyadic Coping Inventory (DCI)

Dyadic Coping Inventory

This scale is designed to measure how you and your partner cope with stress. Please indicate the first response that you feel is appropriate. Please be as honest as possible. Please respond to any item by selecting the appropriate box that fits your personal situation. There are no wrong answers.

Very rarely	Rarely	Sometimes	Often	Very often
1	2	3	4	5

This section is about how you communicate your stress to your partner							
1.	I let my partner know that I appreciate his/her practical support, advice, or help.	1	2	3	4	5
2.	I ask my partner to do things for me when I have too much to do.	1	2	3	4	5
3.	I show my partner through my behaviour when I am not doing well or when I have problems.	1	2	3	4	5
4.	I tell my partner openly how I feel and that I would appreciate his/her support.	1	2	3	4	5

This section is about what your partner does when you are feeling stressed							
5.	My partner shows empathy and understanding to me.	1	2	3	4	5
6.	My partner expresses that he/she is on my side	1	2	3	4	5
7.	My partner blames me for not coping well enough with stress	1	2	3	4	5
8.	My partner helps me see stressful situations in a different light	1	2	3	4	5
9.	My partner listens to me and gives me the opportunity to communicate what really bothers me.	1	2	3	4	5
10.	My partner does not take my stress seriously.	1	2	3	4	5
11.	My partner provides support, but does so in an unwilling and unmotivated manner.	1	2	3	4	5
12.	My partner takes on things that I normally do in order to help me out	1	2	3	4	5
13.	My partner helps me analyze the situation so that I can better face the problem	1	2	3	4	5

14.	When I am too busy, my partner helps me out.	1	2	3	4	5
15.	When I am stressed, my partner tends to withdraw.	1	2	3	4	5

This section is about how your partner communicates when he/she is feeling stressed.						
16.	My partner lets me know that he/she appreciates my practical support, advice or help.	1	2	3	4	5
17.	My partner asks me to do things for him/her when he/she has too much to do	1	2	3	4	5
18.	My partner shows me through his/her behaviour that he/she is not doing well or when he/she has problems	1	2	3	4	5
19.	My partner tells me openly how he/she feels that he/she would appreciate my support	1	2	3	4	5

In the last 2 weeks…

This section is about what you do when your partner makes known his/her stress.						
20.	I show empathy and understanding to my partner.	1	2	3	4	5
21.	I express to my partner that I am on his/her side.	1	2	3	4	5
22.	I blame my partner for not coping well enough with stress.	1	2	3	4	5
23.	I tell my partner that his/her stress is not that bad and help him/her to see the situation in a different light.	1	2	3	4	5
24.	I listen to my partner and give him/her space and time to communicate what really bothers him/her.	1	2	3	4	5
25.	I do not take my partner's stress seriously.	1	2	3	4	5
26.	When my partner is stressed, I tend to withdraw.	1	2	3	4	5
27.	I provide support, but do so in an unwillingly and unmotivated manner because I think that he/she should cope with his/her problems on his/her own.	1	2	3	4	5
28.	I take on things that my partner would normally do in order to help him/her out.	1	2	3	4	5
29.	I try to analyze the situation together with my partner in an objective manner and help him/her to understand and change the problem.	1	2	3	4	5
30.	When my partner feel he/she has too much to do, I help him/her out.	1	2	3	4	5

This section is about what you and your partner do when you are both feeling stressed.						
31.	We try to cope with the problem together and search for solutions.	1	2	3	4	5
32.	We engage in a serious discussion about the problem and think through what has to be done.	1	2	3	4	5
33.	We help one another to put the problems in perspective and see it in a new light.	1	2	3	4	5
34.	We help each other relax with things like massage, taking a bath together, or listening to music together.	1	2	3	4	5
35.	We are affectionate with each other, make love and try that way to cope with stress.	1	2	3	4	5

This section is about how you evaluate your coping as a couple.						
36.	I am satisfied with the support I receive from my partner and the way we deal with stress together.	1	2	3	4	5
37.	I am satisfied with the support I receive from my partner and I find as a couple, the way we deal with stress together is effective.	1	2	3	4	5

ANNEXE E

The Dyadic Adjustment Scale (DAS)

DAS-4

All the time	*Most of the time*	*More often than not*	*Occasionally*	*Rarely*	*Never*
0	1	2	3	4	5

1.	How often do you discuss or have you considered divorce, separation, or terminating your relationship?	0	1	2	3	4	5
2.	In general, how often do you think that things between you and your partner are going well?	0	1	2	3	4	5
3.	Do you confide in your mate?	0	1	2	3	4	5

4. The dots on the following line represent different degrees of happiness in your relationship. The middle point, “happy”, represents the degree of happiness of most relationships. Please circle the number, which best describes the degree of happiness, all things considered, of your relationship.

● ● ● ● ● ● ●

Extremely unhappy	Fairly unhappy	A little unhappy	Happy	Very happy	Extremely happy	Perfect
0	1	2	3	4	5	6

ANNEXE F

The Fertility Problem Inventory (FPI)

FERTILITY PROBLEM INVENTORY (FPI)

The following statements express different opinions about fertility problems. Please indicate how much you agree or disagree with it. Please respond according to how you are feeling right now.

Strongly disagree	*Moderately disagree*	*Slightly disagree*	*Slightl agree*	*Moderately agree*	*Strongly agree*	*Does not apply*
1	*2*	*3*	*4*	*5*	*6*	*7*

1.	Couples without a child are just as happy as those with children.	1	2	3	4	5	6	7
2.	Pregnancy and childbirth are the two most important events in a couple's relationship.	1	2	3	4	5	6	7
3.	I find I've lost my enjoyment of sex because of the fertility problem.	1	2	3	4	5	6	7
4.	I feel just as attractive to my partner as before.	1	2	3	4	5	6	7
5.	For me, being a parent is a more important goal than having a satisfying career.	1	2	3	4	5	6	7
6.	My relationship needs a child (or another child).	1	2	3	4	5	6	7
7.	I don't feel any different from other members of my sex or gender.	1	2	3	4	5	6	7
8.	It's hard to feel like a true adult until you have a child.	1	2	3	4	5	6	7
9.	It doesn't bother me when I'm asked questions about children.	1	2	3	4	5	6	7
10.	A future without a child (or another child) would frighten me.	1	2	3	4	5	6	7
11.	I can't show my partner how I feel because it will make him/her feel upset.	1	2	3	4	5	6	7
12.	Family members don't seem to treat us any differently.	1	2	3	4	5	6	7
13.	I feel like I've failed at sex.	1	2	3	4	5	6	7
14.	The holidays are especially difficult for me.	1	2	3	4	5	6	7
15.	I could see a number of advantages if we didn't have a child (or another child).	1	2	3	4	5	6	7
16.	My partner doesn't understand the way the fertility problem affects me.	1	2	3	4	5	6	7
17.	During sex, all I can think about is wanting a child (or another child).	1	2	3	4	5	6	7
18.	My partner and I work well together handling questions about our infertility.	1	2	3	4	5	6	7
19.	I feel empty because of our fertility problem.	1	2	3	4	5	6	7
20.	I could visualize a happy life together, without a child (or another child).	1	2	3	4	5	6	7
21.	It bothers me that my partner reacts differently to the problem.	1	2	3	4	5	6	7
22.	Having sex is difficult because I don't want another disappointment.	1	2	3	4	5	6	7
23.	Having a child (or another child) is not the major focus of my life.	1	2	3	4	5	6	7

24.	My partner is quite disappointed with me.	1	2	3	4	5	6	7
25.	At times, I seriously wonder if I want a child (or another child).	1	2	3	4	5	6	7

Strongly disagree 1	*Moderately disagree* 2	*Slightly disagree* 3	*Slightl agree* 4	*Moderately agree* 5	*Strongly agree* 6	*Does not apply* 7

26.	My partner and I could talk to each other more openly with each other about our fertility problem.	1	2	3	4	5	6	7
27.	Family get-togethers are especially difficult for me.	1	2	3	4	5	6	7
28.	Not having a child (or another child) would allow me to do other satisfying things.	1	2	3	4	5	6	7
29.	I have often felt that I was born to be a parent.	1	2	3	4	5	6	7
30.	I can't help comparing myself with friends who have children.	1	2	3	4	5	6	7
31.	Having a child (or another child) is not necessary for my happiness.	1	2	3	4	5	6	7
32.	If we miss a critical day to have sex, I can feel quite angry.	1	2	3	4	5	6	7
33.	I couldn't imagine us every separating because of this.	1	2	3	4	5	6	7
34.	As long as I can remember, I've wanted to be a parent.	1	2	3	4	5	6	7
35.	I still have lots in common with friends who have children.	1	2	3	4	5	6	7
36.	When we try to talk about our fertility problem, it seems to lead to an argument.	1	2	3	4	5	6	7
37.	Sometimes I feel so much pressure, that having sex becomes difficult.	1	2	3	4	5	6	7
38.	We could have a long, happy relationship without a child (or another child).	1	2	3	4	5	6	7
39.	I find it hard to spend time with friends who have young children.	1	2	3	4	5	6	7
40.	When I see families with children, I feel left out.	1	2	3	4	5	6	7
41.	There is a certain freedom without children that appeals to me.	1	2	3	4	5	6	7
42.	I will do just about anything to have a child (or another child).	1	2	3	4	5	6	7
43.	I feel as if friends or family are leaving us behind.	1	2	3	4	5	6	7
44.	It doesn't bother me when others talk about their children.	1	2	3	4	5	6	7
45.	Because of infertility, I am concerned that my partner and I are drifting apart.	1	2	3	4	5	6	7
46.	When we talk about our fertility problem, my partner seems comforted by my comments.	1	2	3	4	5	6	7

ANNEXE G

The Sexual Distress Scale-Short Form (SDS-SF)

SEXUAL DISTRESS SCALE

Below is a list of feelings and problems that people sometimes have concerning their sexuality. Please read each item carefully, and select the number that best describes **how often that the problem has bothered you or caused you distress during the past 30 days, including today.** Select only one number for each item, and take care not to skip any items.

Never 0	Rarely 1	Occasionally 2	Frequently 3	Always 4

In the past 30 days, how often did you feel …

1.	Distressed about your sex life	0	1	2	3	4
2.	Frustrated by your sexual problems	0	1	2	3	4
3.	Stressed about sex	0	1	2	3	4
4.	Worried about sex	0	1	2	3	4
5.	Sexually inadequate	0	1	2	3	4

ANNEXE H

The Global Measure of Sexual Satisfaction (GMSEX)

Global Measure of Sexual Satisfaction

Instructions: Overall, how would you describe your sexual relationship with your partner? For each pair of words, select the number that best describes your sexual relationship with your partner right now.

My sexuality is…

1.	Very bad						Very good
	1	2	3	4	5	6	7
2.	Very unpleasant						Very pleasant
	1	2	3	4	5	6	7
3.	Very negative						Very positive
	1	2	3	4	5	6	7
4.	Very unsatisfying						Very satisfying
	1	2	3	4	5	6	7
5.	Very worthless						Very valuable
	1	2	3	4	5	6	7