

## COUPLES

## 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 (ie, emotional, mind-body) and relational stressors associated with the sexual desire, orgasm, arousal, and sexual satisfaction of infertile couples seeking ART.

**Methods:** The sample included 185 mixed-sex infertile 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 infertile couples seeking ART may help facilitate improvements in sexual function and satisfaction and better serve their needs.

**Strengths & 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. **S.E. Amiri, A Brassard, N.O. Rosen, et al. Sexual Function and Satisfaction in Couples with Infertility: A Closer Look at the Role of Personal and Relational Characteristics. J Sex Med 2021;18:1984–1997.**

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**Key Words:** Infertility; Assisted reproductive technology; Sexual function; Sexual satisfaction; Infertility-related stressors; Couple relationships

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

Sexual function and satisfaction are recognized as essential aspects of relationship adjustment and health-related quality of life.<sup>8,9</sup> Sexual function refers to sexual response including desire, orgasm, and arousal during sexual intercourse in women<sup>10</sup> and men.<sup>11</sup> 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”.<sup>12,p.268</sup> 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.<sup>7,13</sup> 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.<sup>14</sup> 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.<sup>15</sup>

A few controlled studies have reported higher levels of sexual dysfunction in women seeking ART,<sup>16,17</sup> mainly impairments in arousal, desire, and orgasm.<sup>18,19</sup> Relative to controls, higher levels of premature ejaculation,<sup>20</sup> erectile dysfunctions,<sup>21</sup> and lower desire and orgasmic function<sup>22</sup> have also been reported in men seeking ART. Individuals seeking ART have also been found to experience greater sexual dissatisfaction than fertile controls.<sup>23,24</sup> However, other studies have reported either greater sexual pleasure and more frequent intercourse in couples seeking ART<sup>25,26</sup> or no change in sexual function<sup>27</sup> 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,<sup>28</sup> 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,<sup>18</sup> whereas others have found that individuals facing infertility due to male factors experienced greater difficulty discussing sexual activities<sup>25</sup> and lower sexual satisfaction,<sup>29</sup> and that women with infertility related to female factors indicated a more negative impact on their sex lives due to infertility.<sup>30</sup> Similar rates of sexual dysfunction were also reported among couples using in vitro fertilization and intrauterine insemination,<sup>31</sup> although one study reported that the latter was associated with higher sexual frequency.<sup>25</sup> 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<sup>6</sup> 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<sup>32</sup> and poorer sexual function.<sup>27,33</sup> 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,<sup>34,35</sup> that often elicits feelings of anger, isolation, grief, guilt, and personal failure for men and women.<sup>36</sup> 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.<sup>6</sup> Women taking ART medication have also reported physical side effects, including hot flashes, vaginal dryness, dizziness, and fatigue.<sup>37</sup>

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.<sup>38</sup> These disruptions to multiple facets of their lives have been shown to limit their ability to engage in everyday tasks,<sup>6,39</sup> including sexual activities, whereby couples report reductions in the frequency of sexual activity,<sup>40</sup> which could affect their sexual function and satisfaction.

Some studies have suggested that men and women may experience infertility-related personal stressors differently,<sup>41</sup> with women

reporting more adverse effects on their self-esteem, stress, depression, and anxiety<sup>42</sup> and negative consequences on their quality of life<sup>43</sup> and sexual life.<sup>44</sup> Other studies, however, have reported no gender differences in the quality of life of couples coping with infertility.<sup>4</sup> Given the complex nature of the associations between infertility and sexuality,<sup>45</sup> 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.<sup>4,13,46</sup> Couples often face difficult decisions during treatment, including determining whether treatment should be discontinued, and deal with the financial burden that accompanies fertility treatments.<sup>47</sup> Moreover, infertility may force individuals to reevaluate their affiliation with their chosen partner and may also result in them feeling unworthy of their partner.<sup>48</sup> Several studies have demonstrated an association between infertility and more relationship and communication issues,<sup>49</sup> self and partner blame,<sup>50</sup> and lower relationship adjustment.<sup>51</sup> Studies have also reported lower relationship satisfaction in couples coping with infertility compared to controls,<sup>52</sup> as well as fears of abandonment or breakup.<sup>53</sup> 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.<sup>54–57</sup>

Couples often engage in sex as a way to express their feelings of intimacy, affection, and closeness with their partner.<sup>15</sup> Luk and Loke<sup>58</sup> 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,<sup>59</sup> 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<sup>58</sup> and to be less satisfied with the level of expressed affection within their relationship.<sup>60</sup> Given that in fertile populations, lower cohesion, intimacy and relationship satisfaction are associated with poorer sexual function,<sup>61</sup> these additional challenges of ART on relationships (eg, 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<sup>58</sup> and function.<sup>62</sup> 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,<sup>4</sup> 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,<sup>63</sup> which may become significantly more challenging for both members of the couple when a partner is faced with an illness.<sup>61</sup> Only a few studies have examined sexual function in samples of couples experiencing infertility.<sup>7</sup> 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<sup>64</sup> 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 (ie, 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 2 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 6 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 (i) being involved in a romantic relationship, (ii) being 18 years of age or older, (iii) both partners participating in the study, and (iv) 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 (eg stigma).<sup>65</sup> Moreover, this study focused on medical infertility given the closer link between infertility treatment and sexual practices (eg, ritualized, procreative approaches to sex) for couples experiencing medical infertility.<sup>45</sup> 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,<sup>66,67</sup> 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

**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*                                | 3.8             | 4.5           |
| Ethnic group                               |                 |               |
| White                                      | 92.4            | 91.6          |
| Black                                      | 2.2             | 3.5           |
| Asian                                      | 3.8             | 2.7           |
| Hispanic                                   | 0.5             | 1.7           |
| Indigenous                                 | 1.1             | 0.5           |
| 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†                                | 0.5             | 2.3           |
| Annual income (CAD)                        |                 |               |
| Less than 30,000                           | 21.3            | 10.1          |
| 30,000 – 69,999                            | 48.6            | 50.9          |
| 70,000 – 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 y                              |                 | 6.6           |
| 1 – 5 y                                    |                 | 77.6          |
| More than 5 y                              |                 | 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 y                              |                 | 6.6           |
| 1 – 3 y                                    |                 | 60.4          |
| More than 3 y                              |                 | 33.0          |

Note. Values are given as percentages (%) or mean±standard deviations.

\*Additional languages included Sinhala, Russian, Tagalog, Bisaya, Nepali, Spanish and Romanian.

†Additional education levels included attending a private college, skilled trades or other professional programs

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

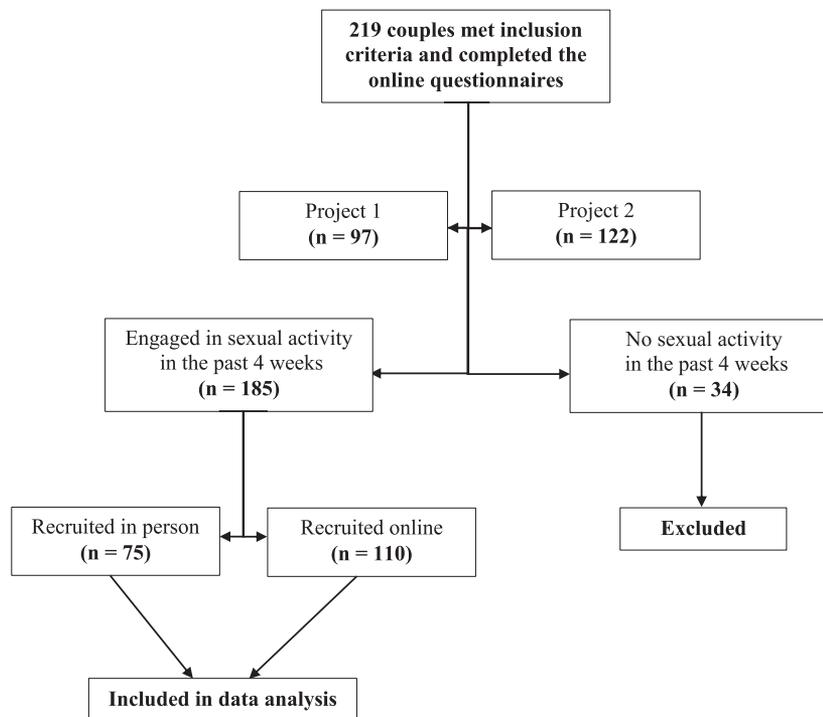


Figure 1. Participant flow chart.

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<sup>68</sup> (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 (i) personal (emotional and mind-body) and (ii) relational infertility-related stressors. The emotional domain (6 items) measures the extent to which individuals experience negative emotions (eg, 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 (eg, pain), cognitions (eg, poor concentration) and behavior (eg, 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 to 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 0.72 to 0.92) and sensitive tool of the impact of infertility on different life domains.<sup>68</sup> In the current sample, the internal consistency of the emotional, mind-body, and relational domains ( $\alpha$  ranging from 0.73 to 0.86 for women,  $\alpha$  ranging from 0.69 to 0.85 for men) was satisfactory.

**Domains of Sexual Function.** Women's sexual function was measured using the Female Sexual Function Index<sup>10</sup> (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 ( $\alpha = 0.82$  or higher).<sup>10</sup> The FSFI was found to have a high level of internal consistency in the current sample ( $\alpha$  ranging from 0.86 to 0.90 for domain scores).

Male sexual function was measured using the International Index of Erectile Function<sup>11</sup> (IIEF), a 15-item self-report measure of sexual function in 3 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 ( $\alpha = 0.73$  and higher).<sup>11</sup> The IIEF was found to have a good level of internal consistency in the current sample ( $\alpha$  ranging from 0.80 to 0.82 for domain scores).

**Sexual Satisfaction.** The satisfaction subscales of the FSFI<sup>10</sup> (3 items) and the IIEF<sup>11</sup> (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:  $\alpha = 0.86$ , IIEF:  $\alpha = 0.94$ ).

## Statistical Analysis

An a priori power analysis was conducted using APIMPowerR, a statistical app designed to estimate power for dyadic studies.<sup>69</sup> With a power of .80 and an alpha of 0.05, the minimum number of participants needed for a medium effect size of actor effects (ie, 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 (ie, associations between an individual’s score on the predictor and their partner’s score on the outcome) was 159 couples.

SPSS Statistics 26.0<sup>70</sup> 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<sup>71</sup> 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 ( $r = -0.21$ ,  $P = .005$ ) and satisfaction ( $r = -0.23$ ,  $P = .002$ ). 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<sup>72</sup> (APIM) were performed with the SPSS Amos software (version 25).<sup>73</sup> 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 (ie, 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:<sup>74</sup> a non-significant

chi-square, a value of the comparative fit index (CFI) greater than 0.95, and a value of the root mean square error of approximation (RMSEA) below 0.06 and its 90% confidence interval. To test gender differences in actor and partner effects, a within-dyad test of distinguishability was performed.<sup>72</sup>

## 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 = 0.000, 90% CI [0.000; 0.055]. 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 infertile 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<sup>75</sup> and its treatments,<sup>76</sup> and may have a significant influence on the decision to stop treatment.<sup>77</sup> 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.<sup>33,62</sup>

Indeed, infertility has been associated with a significant range of emotions including sadness, shame, guilt, failure, incompetence, loss, and disappointment.<sup>33,78,79</sup> Consequently, couples seeking ART have been found to experience high rates of emotional distress and depressive symptoms,<sup>80</sup> which are associated with more difficulties in sexual function.<sup>33,81</sup> Sexual desire itself has been considered as a "subjective feeling state"<sup>82</sup> and an "emotional experience".<sup>83</sup> 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 (eg, fatigue, pain, disruption to daily activities),<sup>68</sup> 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 (eg, impact on day-to-day activities).<sup>84</sup> 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,<sup>63</sup> which posits that difficulties in emotion regulation, including emotional awareness, expression, and experience may

**Table 2.** Descriptive statistics and bivariate correlations between infertility-related stressors and sexual outcomes M = Men; W = Women

| Variable                   | M     | SD    | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | 11      | 12      | 13      | 14      |
|----------------------------|-------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. Emotional stressors W   | 46.49 | 21.52 | 0.79*** | 0.30*** | 0.28*** | 0.31*** | 0.34*** | 0.31*** | 0.30*** | 0.24*** | 0.15*   | 0.34*** | 0.17*   | 0.23**  | 0.37*** |
| 2. Mind-body stressors W   | 59.21 | 21.94 | —       | 0.34*** | 0.27*** | 0.33*** | 0.41*** | 0.34*** | 0.36*** | 0.34*** | 0.09    | 0.30*** | 0.19*   | 0.28*** | 0.32*** |
| 3. Relational stressors W  | 71.19 | 16.31 | —       | —       | 0.44*** | 0.35*** | 0.45*** | 0.57*** | 0.15*   | 0.12    | 0.57*** | 0.18*   | .22**   | 0.20**  | 0.41*** |
| 4. Sexual desire W         | 3.49  | 1.15  | —       | —       | —       | 0.33*** | 0.62*** | 0.54*** | 0.20**  | 0.09    | 0.26*** | 0.17*   | 0.08    | 0.11    | 0.40*** |
| 5. Sexual orgasm W         | 4.48  | 1.36  | —       | —       | —       | —       | 0.65*** | 0.54*** | 0.15*   | 0.17*   | 0.26*** | 0.16*   | 0.18*   | 0.17*   | 0.20**  |
| 6. Sexual arousal W        | 4.46  | 1.19  | —       | —       | —       | —       | —       | 0.66*** | 0.20**  | 0.18*   | 0.29*** | 0.18*   | 0.17*   | 0.19**  | 0.36*** |
| 7. Sexual satisfaction W   | 4.47  | 1.22  | —       | —       | —       | —       | —       | —       | 0.15*   | 0.15*   | 0.42*** | 0.28*** | 0.27*** | 0.24*** | 0.38*** |
| 8. Emotional stressors M   | 73.55 | 18.06 | —       | —       | —       | —       | —       | —       | —       | 0.79*** | 0.31*** | 0.30*** | 0.09    | 0.22    | 0.31*** |
| 9. Mind-body stressors M   | 80.71 | 15.83 | —       | —       | —       | —       | —       | —       | —       | —       | 0.27*** | 0.22**  | 0.10    | 0.12    | 0.25*** |
| 10. Relational stressors M | 72.34 | 15.43 | —       | —       | —       | —       | —       | —       | —       | —       | —       | 0.19**  | 0.18*   | 0.26*** | 0.47*** |
| 11. Sexual desire M        | 7.02  | 1.78  | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | 0.29*** | 0.35*** | 0.46*** |
| 12. Sexual orgasm M        | 9.49  | 1.08  | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | 0.48*** | 0.18*   |
| 13. Sexual arousal M       | 27.95 | 2.55  | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | 0.40*** |
| 14. Sexual satisfaction M  | 7.15  | 1.94  | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       |

\*p < .05,  
\*\*p < .01,  
\*\*\*p ≤ .001

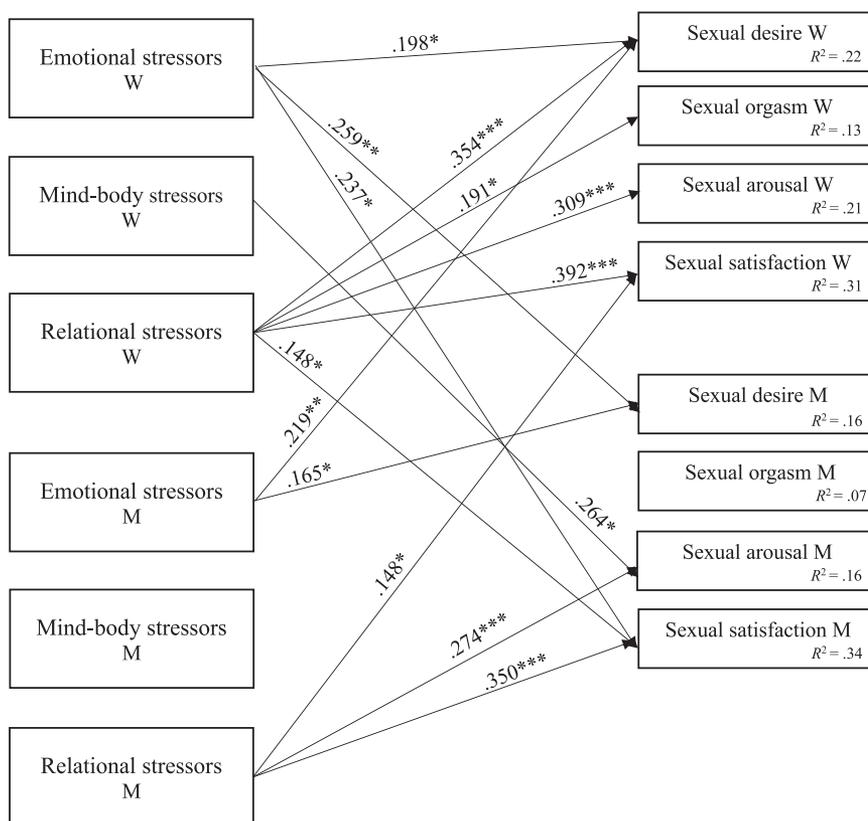
negatively affect couples' sexual functioning. If couples are still able to engage in sexual activities and to cope with the feeling of lower sexual desire, our findings suggest however, that other domains of sexual function and sexual satisfaction may not be as impacted by the negative emotions, and 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,<sup>85</sup> and may exacerbate both their own as well as their partner's sexual difficulties.<sup>86</sup> 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.<sup>87</sup>

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.<sup>88</sup> 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,<sup>58</sup> 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.<sup>58</sup> 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,<sup>89</sup> highlighting that couples reporting increased problems or conflicts within their



**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 ≤ .01, \*\*\* P ≤ .001.

relationships are less likely to want to engage in sexual activity with their partner.<sup>89</sup> Lower dyadic adjustment, communication, support, relationship satisfaction and intimacy have also been related to lower sexual satisfaction in clinical and non-clinical populations.<sup>90</sup>

Infertility and treatment can have a negative impact on partners’ communication, ability to support each other, relationship satisfaction and perceived intimacy,<sup>49,51,58,68</sup> 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.<sup>91</sup> 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,<sup>42</sup> and lower perceived intimacy,<sup>58</sup> affection,<sup>60</sup> and satisfaction<sup>51</sup> within relationships, and could possibly also negatively influence their sexual function and sexual satisfaction.<sup>92</sup>

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<sup>93</sup> and to experience higher emotional distress than men in the context of infertility,<sup>88,94</sup> 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,<sup>63</sup> 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

**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<br>W | [0.055, 0.363]  |                 |                  |                       | [0.120, 0.398]  |                 |                  | [0.079, 0.369]        |
| Mind-body stressors<br>W |                 |                 |                  |                       |                 |                 | [0.049, 0.486]   |                       |
| Relational stressors W   | [0.227, 0.467]  | [0.046, 0.314]  | [0.174, 0.439]   | [0.285, 0.486]        |                 |                 |                  | [0.047, 0.246]        |
| Emotional stressors M    | [0.043, 0.301]  |                 |                  |                       | [0.104, 0.335]  |                 |                  |                       |
| Mind-body stressors<br>M |                 |                 |                  |                       |                 |                 |                  |                       |
| Relational stressors M   |                 |                 | [0.166, 0.383]   | [0.256, 0.434]        |                 |                 |                  | [0.049, 0.244]        |

W = Women; M = Men.

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.<sup>63,95,96</sup> Levels of sexual and nonsexual communication<sup>96</sup> and perceived partner responsiveness<sup>97</sup> 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<sup>98</sup> 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<sup>42</sup> 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,<sup>99</sup> 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,<sup>61</sup> 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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## STATEMENT OF AUTHORSHIP

Conceptualization, K.P., A.B., N.O.R. and S.E. Methodology, K.P., A.B., N.O.R., and S.E. Formal Analysis, S.E., N.B., and K.P. Investigation, S.E. and M.A.R. Resources, K.P. and N.O.R. Writing – Original Draft, S.E. and K.P. Writing – Review

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