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Assessment of sexual function before medically assisted procreation: A mixed-methods study among a sample of infertile women and men cared for in a fertility center

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ABSTRACT

A mixed-methods study was conducted to investigate sexual function among infertile patients undergoing medically assisted procreation for the first time. The study employed an interview and content analysis approach, involving 45 infertile patients prior to their medically assisted procreation procedures. The findings revealed that infertile patients are a group at risk for sexual distress. Furthermore, patients with sexual dysfunctions exhibited lower levels of sexual activity, potentially diminishing their chances of achieving pregnancy. Participants faced challenges in openly discussing their sexual problems and demonstrated limited knowledge of sexual functioning. Among infertile women with sexual dysfunctions, the most frequently reported issues were sexual interest/arousal disorders, with a majority also experiencing pain during sexual activity and associated genital-pelvic pain disorders. In contrast, delayed ejaculation and erectile disorder seem to be more common in infertile men, while sexual desire and excitement disorders and premature ejaculation disorders appeared to be as common as in the general population. While the relationship between infertility and sexuality is complex, our study suggests that sexual dysfunctions or the absence of sexual activity may explain infertility. Therefore, it is imperative for clinicians to evaluate the sexual functioning of both men and women undergoing medically assisted procreation treatment, to increase their chances of procreation and offer them sexological support if needed. Future studies should expand their scope to include a larger sample size and delve into the potential etiological factors associated with sexual dysfunctions.

Introduction

Sexuality plays a crucial role in the health, well-being, and overall quality of life for both women and men [1]. However, research shows that a significant portion of the population experiences sexual dysfunction (SD), with approximately 43–44 % of women [2–3] and 20–30 % of men affected [4–5] suffer from SDs. Additionally, 22 % of women and 12 % of men also experience emotional distress and negative emotions as a result of their sexual difficulties, including guilt, frustration, and embarrassment [6]. SDs refer to the difficulty in one or more phases of the sexual response: desire, arousal and orgasm [7]. The American Psychiatric Association [8] defines SDs as "a clinically significant disturbance in a person's ability to respond sexually or to experience sexual pleasure" (p. 423).

The Diagnostic and Statistical Manual Fifth Edition [8] outlines several diagnostic criteria for SD, such as the duration, frequency, level of distress, and underlying conditions or medications that may be contributing to the dysfunction. The symptoms must be present in the last six months and experienced on (almost) all occasions (approximately 75–100 %) and cause significant clinical distress to the patient. It is important to exclude the presence of another mental disorder (e.g., depression or anxiety) or the (ab)use of a drug or medications that may be inducing SD (e.g., alcohol, antidepressants). Clinical diagnosis requires establishing when SD first appeared: lifelong (present since the

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first sexual experience) or acquired (developed following a period of normal sexual functioning). Clinicians must specify whether the difficulty is situational (specific to a partner, stimulation, or situation) or generalized (generalized across all sexual situations). A final specifier includes the current severity of distress (i.e., mild, moderate, or severe) linked to SDs [1].

Assessing and treating SD in infertile individuals requires a biopsychosocial approach that includes evaluating biological, psychological, interpersonal, and sociocultural factors [9]. These include lifestyle choices (e.g. unhealthy diet, lack of exercise, smoking, alcohol and drug abuse), individual vulnerability factors (e.g., negative body image, negative attitudes toward sex, sexual self-esteem, sexual satisfaction, psychiatric comorbidity, life events and stressors [9], and types of sexual practices [10]. Partner difficulties (i.e., partner's sexual difficulties), relationship dynamics (i.e., poor communication, violence), cultural and religious factors (i.e., inhibitions related to prohibitions against sexual activity or pleasure), and medical conditions [8] (e.g., infertility [11] may also be responsible for SDs.

Infertility, defined as "the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse", can negatively impact couples' psychological well-being and sexual relationship. Studies show that infertility affects 10–18 % of couples in Europe, and can be caused by a variety of factors including, being male (30 %), female (23 %), male and female (20 %), or idiopathic (27 %), that is, without any known origin [12]. Research also indicates that the diagnosis of infertility can negatively impacts couples' psychological well-being and sexual relationship [13] and lead to increased levels of stress, anxiety, guilt, and depression for couples [14–16]. Additionally, for some couples, infertility can become a major stressor that can lead to feelings of guilt or blame directed at themselves or their partner [17]. The emotional price of infertility is often greater for women, as it may affect their sense of femininity and they may be more subject to social pressure to have children [18]. The stress caused by the inability to conceive, the need to plan intercourse around ovulation peak, social pressure (e.g., friends, family), and the negative impact of treatments can also hinder sexual function [4,11]. In the context of infertility, the sexual act focuses on the procreative function of sexuality, often at the detriment of the relational and hedonic function [17]. As a result, sexual intercourse can become less spontaneous, lose its erotic value, and increase the development of SDs [19].

There is a complex relationship between infertility and sexuality, with the two factors influencing one other. Studies suggest that while sexual difficulties can contribute to infertility, they are more commonly the consequence of it [19]. Several systematic literature reviews have shown that infertility significantly increases SDs [15,20–22] and decreases sexual satisfaction [20]. This impact is often greater for women, who report more SDs than men [20,22]. More specifically, 35.6–90 % of infertile women present a SD [20–22], mostly reporting decreased lubrication, orgasm, and sexual satisfaction [21]. Additionally, infertile men also report sexual difficulties (17.8–61.6 %) [23], with the most commonly impacted areas being erection, orgasm, and sexual desire. It is important to remember that most infertile couples seek medically assisted reproduction (MAR) to fulfill their desire for a child. The systematic review by Sater and colleagues [15] highlighted that, in infertile individuals, younger age, female infertility, and couples who needed infertility treatment are associated with increased risk of developing SD.

However, these systematic reviews and meta-analyses [15,20–22] highlight important limitations of previous studies on SD in infertile patients. To begin with, SD is measured using self-reported questionnaires. This quantitative method alone does not allow for a complete clinical diagnosis, which should include an in-depth assessment of the patient's sexual distress and when and in which situations he encounters sexual difficulties. As a result, the prevalence of SD in infertile women (35.6–90 %) [21,22]] and men (17.8–61.6 %; [23] is undetermined and varies greatly between studies. To the best of our knowledge, no mixed method studies have looked at the diagnostic assessment of SD prior to MAR using DSM-5 criteria [8], especially in men. Furthermore, they include a limited number of studies, lack homogeneity (type of MAR, diagnosis of infertility, age), and generally concentrate on female sexual functioning.

Mendonça and colleagues [21] recommend more studies with narrower inclusion criteria. In fact, studies often include people who have already undergone MAR, as well as those who are currently undergoing treatment or have never had it. As a result, it is difficult to determine whether the participants had SD prior to MAR or if it is a result of these treatments. Given that 27 % of the causes of infertility are currently unexplained [12], it seems important to us to determine whether SD could be at the origin of this problem before starting MAR.

To address these limitations, a new mixed method study was conducted at two university fertility centers in Belgium to assess the SDs of infertile patients who have not yet undergone MAR treatment using an interview approach. The inclusion criterion is that participants have not had any previous experience with MAR. This study is part of a larger multi-center project on MAR and sexuality, that aims to assess the impact of MAR on patients' sexuality over a 12-month period. We examined the SDs encountered by infertile patients before undergoing MAR. The study applied a mixed method approach, which is commonly used in the social sciences and humanities to understand complex phenomenon using a combination of quantitative and qualitative data. The aim of the study was to evaluate SDs based on a clinical interview using DSM-5 diagnostic criteria, while assessing sexual distress using a standardized questionnaire. The results of this study will help to provide clinical recommendations and to include sexuality in the care of patients undergoing MAR.

Methods

Recruitment and procedure

Participants were recruited at the Saint-Luc University Clinics in Brussels (UCLouvain) and the Namur University Hospital Center (CHU-UCL) fertility clinics, from September 2021 to July 2022 through a call for participants in gynecology consultations. This study is part of a larger project on assessing and understanding the impact of MAR on couples and sexuality. Participants could choose to participate in a longitudinal study and/or a qualitative study by interview. The study was presented by a trainee from the Master in Family and Sexuality Sciences (UCLouvain). The call for participants included an informed consent form and a sociodemographic and medical questionnaire. Eligibility criteria included speaking French, being in a couple and never having used MAR before (including intrauterine Insemination and in vitro fertilization). After completing the questionnaires, they were invited to leave their contact details to participate in a second, separate, and qualitative interview study if interested. The semi-structured interviews were conducted via videoconference (Skype or Zoom) between December 2021 and July 2022. Participants' identities were protected by replacing their initials with an anonymous code. The study was approved by the Medical Ethics Committee of the Namur University Hospital Center (CHU-UCL; Godinne site; 93/2019).

Measures

Sociodemographic and medical questionnaire

Based on existing literature, the first author developed a 10-item sociodemographic and medical questionnaire. It included six basic information items (age, duration of current relationship, education level, religious affiliation, gender of partner, number of children), two medical items (origin of infertility, medication intake), one therapy-related item (ongoing psychological treatment), and one item relating to sexual activity (frequency of sexual activities with partner). Responses were given either in the form of dichotomous choices (yes or no), a Likert scale, with options ranging from "none" to "more than 10″, or numbered data

("number of months" to "number of years").

Sexual distress scale – Revised

To measure sexual distress, participants completed the Female Sexual Distress Scale-Revised (FSDS-R, [24], which is a 13-item, 5-point Likert scale questionnaire (0 = never, 1 = rarely, 2 = often, 3 = very often, 4 = always). A score of 11 or above indicates sexual distress. The scale has been shown to have high internal validity in both the original study ($\alpha = 0.86$) and in the current sample ($\alpha = 0.91$) and is considered a reliable tool for identifying sexual distress in both men and women. It was translated into French through a back-translation procedure: One researcher independently translated the scale into French, and another returned it to English, limiting translation errors in the original version.

Interviews

An individual semi-structured interview was conducted with each participant by a doctoral student specialized in sexology via videoconferencing. Participants agreed to interview recording, using a UCLouvain voice recorder, and transcription. Interviews lasted 15 min to 1 h and approached sexuality through open dialogue and progressive open-ended questions (ranging from less to more intimate) to avoid discomfort, as recommended [25].

The interview guide was developed to explore the research question (see Supplementary Materials 1) and was based on widely used models of sexual functioning assessment [7,26]. It was structured into five main parts. The third part of the interview addressed the practical aspects of the interview, including consent, professional secrecy, and agreement to recording. The second part was an introduction to the research purpose. The third part addressed patients' intimate and sexual life. Following the PLISSIT model [26], we asked patients' permission to talk about intimacy and sexuality. Then, the interview consisted of a series of transitional questions: "Could you tell me how things are going intimately and sexually?", "Are you still having sex?", "How often?", "Are you experiencing any sexual difficulties with your partner?", "In what situation(s)?", "What was it like before"? "How is the relationship between you and your partner?". According to the American College of Obstetricians and Gynecologists guidelines [25], marital satisfaction was addressed before sexuality to avoid patient discomfort. The fourth part assessed the presence of SD using DSM-5 criteria [8]. We used Masters and Johnson's linear model [7] to assess several stages of the sexual response, namely sexual desire, arousal, penetration, pleasure and arousal during penetration, orgasm, and absence of pain. For example, we asked the following questions: (e.g., "What about your sexual desire?", "How does penetration feel to you?", "Do you enjoy it?"). We asked about self-stimulation use and sexual difficulties during these sexual activities. Moreover, we asked about their sexual activities with other partners, if they had any. The participants were asked about the appearance of the SD (i.e., lifelong or acquired) and the situation in which the difficulty currently appears (i.e., situational or generalized). The fifth part concluded the interview and gave participants an opportunity to add any additional information before thanking them for their participation.

Interview analyses

The interviews were conducted using a descriptive approach to highlight SD presence and type commonly encountered by infertile patients before MAR. Only data from the group with SD were analyzed. Data from the infertile patients without SD were described in the Participants section (Table 1) but not discussed in detail.

After transcription, a content analysis was conducted to classify and interpret the data systematically and objectively [27]. This type of analysis entails three stages: [1] pre-analysis, [2] exploitation of the material and processing of the results, and [3] inference and interpretation [28]. The interviews were first read (*pre-analysis*) by a Psychological Sciences doctoral student specialized in sexology for an overall view. Then, the interviews were analyzed (*results processing*) to identify participants with SDs and to describe SD type and subtype according to DSM-5 criteria [8]. Participants were divided into two groups: Infertile patients with and without SD. The final stage (*inference and interpretation*) focused on participants with SDs. The interviews were read a second time, more exhaustively, to capture nuances in the entire sample.

An independent cross-check for integrity and consistency of SD type was conducted by a PhD-holding doctor in psychology and sexologist. The discussion between the researchers ensured that participants were correctly classified in the right group (infertile patients with vs. without

Table 1
Descriptive Statistics for Sociodemographic and Medical Data.

Characteristics	Full Sample ($N = 45$)	Infertile patient without SD ($N = 29$)	Infertile Patient with SD ($N = 16$)
	M (*SD*, range)	*M*(*SD*, range)	*M* (*SD*, range)
Age of women, years	32.54 (4.45, 27–41)	32.47(4.59, 27–41)	32.64 (4.43, 27–40)
Age of men, years	34.65 (5.02, 26–44)	35.50 (4.70, 29–44)	32.60 (5.72, 26–40)
Relationship duration, years	6.34 (4.09, 1–15)	6.46 (4.53, 1.25–15)	5.87 (2.45, 1–10)
	N (%)	**N (%)**	**N (%)**
Level of education			
Doctorate	3 (6.7)	1 (3.4)	2 (12,5)
Master	17 (37.8)	11 (37.9)	6 (37.5)
Bachelor	9 (20.0)	6 (20.7)	3 (18.8)
Secondary education	14 (31.1)	9 (31.0)	5 (31.3)
Others	2 (4.4)	2 (6.9)	0 (0.0)
Place of birth			
Europe	39 (86.5)	25 (86.0)	14 (87.8)
Africa	5 (11)	4 (13.8)	1 (6.3)
South America	1 (2.2)	0 (0.0)	1 (6.3)
Religious affiliation			
Yes	34 (75.6)	23 (79.4)	11 (68.7)
No	11 (24.4)	6 (20.6)	5 (31.3)
Catholic	26 (57.8)	17 (58.7)	9 (56.3)
Muslim	4 (8.9)	4 (13.7)	0 (0.0)
Others	4 (8.9)	2 (6.9)	2 (12.5)
Gender of partner			
Male	27 (60.0)	17 (58.6)	10 (62.5)
Female	18 (40.0)	12 (41.4)	6 (37.5)
Number of children			
No children	38 (84.4)	23 (79.3)	15 (93.8)
One child	7 (15.6)	6 (20.7)	1 (6.3)
Origin of infertility			
Male	17 (37.8)	10 (34.5)	7 (43.3)
Female	6 (13.3)	3 (10.3)	3 (18.8)
Male and female	8 (17.7)	5 (17.2)	3 (18.8)
Pre-implant diagnosis	2 (4.4)	2 (6.9)	0 (0.0)
Unexplained	12 (26.6)	9 (31.0)	3 (18.8)
Medication intake			
No	25 (55.6)	18 (62.1)	9 (56.3)
Yes, with contraindications for sexuality	12 (26.6)	5 (17.2)	6 (37.5)
Ongoing psychological treatment			
No	41(91.1)	28 (96.6)	13 (81.3)
Yes	4 (8.9)	1 (3.4)	3 (18.8)
Sexual frequency with the partner			
No sexual activity	2 (4.4)	2 (6.9)	0 (0.0)
1 to 3 per month	22 (48.9)	12 (41.3)	10 (62.6)
6 to more than 10 per month	21 (46.7)	15 (51.7)	6 (37.5)
Sexual distress – FSDS-R			
Yes	21 (45.7)	12 (41.4)	9 (56.3)
No	24 (54.3)	17 (58.6)	7 (43.7)

SD), that SD type and subtype corresponded to the DSM-5 [8], and the data reflected the participants' discourse. In total, 191 participants in relationships completed the questionnaires of the larger longitudinal study. From these, 82 individuals (45menand37women) agreed to be interviewed and provided their contact information. 37 participants did not schedule the interview or cancelled it.

Results

Participants

The final sample with complete data consisted of 45 participants (17 men and 28 women), aged 26–44 years ($M = 33.33$, $SD = 4.73$), were in a relationship for one to 15 years ($M = 6.34$, $SD = 4.09$), and had previously received care at a fertility center before using MAR (see Table 1). Most participants reported male factor infertility ($N = 17$, 37.8 %) or did not know the cause of the infertility ($N = 12$, 26.6 %). It is important to note that some participants ($N = 12$, 26.6 %) were taking medication with contraindications for sexual activity (e.g., antidepressant, L-Thyroxine, antipsychotics). Additionally, most participants ($N = 41$, 91.1 %) were not undergoing psychological treatment (psychotherapy, couple therapy, sex therapy). The frequency of sexual activity with a partner varied from 0 to more than 10 times per month, with most participants reporting moderate (1 to 3; $N = 22$, 48.9 %) or high activity (six to ten times or more; $N = 21$, 46.7 %). Finally, 45,7 % ($N = 21$) reported sexual distress according to the FSDS-R scale [24].

To evaluate the presence and types of SDs among infertile patients, we analyzed data from a subgroup of patients who reported having a SD before starting MAR ($N = 16$; 11 women, five men, aged respectively 27 to 40 and 26 to 40). This group did not differ significantly from infertile patients without SD, in terms of age, relationship duration, education level, place of birth, and gender of partner. However, this group was more likely to be childless, less likely to have religious affiliations, and more likely to have infertility of both male and women origin. Infertile patients with SD presented less unexplained infertility. Additionally, this group was more likely to be receiving ongoing psychological treatment and to be taking medications with contraindications for sexuality. Lastly, this group reported a lower frequency of sexual activity and higher levels of sexual distress compared to infertile patients without SDs according to the FSDS-R [24] (see Table 1).

Marital relationship

Overall, 81,82 % of women with SDs ($N = 9$) reported a good relationship with their partner. However, two women reported dissatisfaction with the relationship due to unmet their needs and poor sexual communication. In contrast, 60 % of men with SDs ($N = 3$) reported marital difficulties, including poor communication with their partner. Some of these sought couple therapy ($N = 2$). These difficulties may also be linked to sexual difficulties ($N = 2$).

> "Most of the couple's problems arise […] because of poor communication. Sometimes, we don't really express what we think. Or sometimes, we express [ourselves] but the [partner] doesn't really understand. It's harder to understand what the other person wants". (M2).
> "Because I'm tired of, of, of explaining it. And that [uhm] [well] even when I get on him, the cuddles, all that, he didn't know, [huh]. There is like no desire to pursue my pleasure". (W9).
> "A complicity that is always more and more important [uhm]. No, it's going very well". (W4).

Female sexual dysfunctions

In the sample of women ($N = 28$), 39,29 % of women ($N = 11$) suffered from SD according to DSM-5 criteria [8] and 46,43 % ($N = 13$) present sexual distress. In Table 2, we can observe that 54,55 % of women with a SD experience sexual distress. In Table 3, one can observe the type and presence of SDs in our sample compared to the general population.

Sexual interest/arousal disorder

Our analysis found that 32,14 % of women ($N = 9$) reported experiencing sexual interest/arousal disorder. As shown in Table 2, this difficulty is acquired for all women (developed following a period of normal sexual functioning) and generalized for most of them ($N = 8$; present across all sexual situations). Several examples of this difficulty can be seen in the testimonies provided:

> "OK […] I don't have any […] well I don't have a very strong sexual desire." (W1)
> "…It's not [uhm] the best of the best." (W4)
> "[Ponders]… I don't know. I think it's a little bit smaller than the norm." (W6)
> "I think the problem is really me[…] it takes longer to get going, I'll say[…] Before, for example, it could […] happen right away but now it takes a lot […] a lot more effort, actually. […] It's just my body not responding." (W3)

Genito-pelvic Pain/Penetration disorder

The second most common dysfunction reported by 14,29 % of women ($N = 4$) was Genito-pelvic pain/penetration disorder. This difficulty is often a consequence of another SD, such as sexual interest/arousal disorder or orgasmic disorder. All participants had acquired this disorder, and half of them experienced it in certain situations, while the other half had a generalized disorder (Table 2). These difficulties can be exemplified by this example:

> "It is because I have the impression that it goes too far, see? That he goes too far, as if his sex was too long." (W7)

Orgasmic disorder

Finally, orgasmic disorder is reported by 14,29 % of women ($N = 4$). Table 2 shows that half of the latter also suffered from sexual distress, most women suffered from an acquired and generalized orgasm disorder ($N = 3$), and only one reported a lifelong and situational orgasm disorder ($N = 1$). One patient explained that she "can't go all the way, but [she does] get more pleasure than with him at times […]", that "it will never reach orgasm", and that she also has the impression she prevents herself from reaching orgasm. She explains "there is something that is, that is in [her] head" (W9). Two patients (W5 and W10) also reported difficulties in reaching orgasm, while a third explained that she is "someone who can easily have orgasms […] relatively quickly still" but that it currently takes "longer than usual" (W8).

Male sexual dysfunctions

Among men ($N = 17$), 29,41 % ($N = 5$) reported SDs as defined by DSM-5 criteria [8] and 47,07 % of men (N = 8) presented sexual distress. In Table 3, we can observe the type and presence of SDs compared to the general population.

Delayed ejaculation

The most common dysfunction reported was delayed ejaculation (17,65 %, N = 3), mostly acquired and situational ($N = 2$, see Table 4). One man reported a lifelong and generalized disorder with a medical origin (i.e., hypospade). The testimonies below illustrate sexual pain experienced by these men:

> "I […] sometimes during penetration, I have zero sensation. Well, during masturbation, I always manage to come […] sometimes during penetration itself […] I have zero sensation […] I'm inside

Table 2
Female Sexual Dysfunctions.

Participants (N = 11)	Types			Subtype				Sexual Distress
	Female Sexual Interest/ Arousal Disorder	Female Orgasmic Disorder	Genito-Pelvic Pain/ Penetration Disorder	Lifelong	Acquired	Generalized	Situational	
W1	Yes				Yes		Yes	Yes
W2	Yes				Yes	Yes		Yes
W3	Yes				Yes	Yes		No
W4	Yes				Yes	Yes		Yes
W5	Yes	Associated			Yes	Yes		Yes
W6	Yes		Associated		Yes	Yes		No
W7	Yes		Associated		Yes	Yes		No
W8	Associated	Yes			Yes	Yes		No
W9	Associated	Yes	Associated		Yes	Yes		Yes
W10		Yes		Yes			Yes	No
W11			Yes		Yes		Yes	Yes

Table 3
Comparison Of General Prevalence of Female and Male Sexual Dysfunctions with the Current Study.

	Sexual Dysfunction Type	General Prevalence	Presence in the current study
Women	Female Sexual Interest/ Arousal Disorder	21–31 % [29]	32,14 %
	Female Orgasmic Disorder	10–42 % [8]	14,29 %
	Genito-Pelvic Pain/ Penetration Disorder	15 % [8]	14,29 %
Men	Delayed Ejaculation	1 % [8]	17,65 %
	Male Hypoactive Sexual Desire Disorders	16–44 % [8]	17,65 %
	Erectile Disorder	2 % of men younger than age 40–50 years [8]	11,76 %
	Premature (Early) Ejaculation	20–30 % [8]	11,76 %

and I feel like there is no sensation in my […] in my penis […]." (M2).
"The only problem I have with the hypospade is that I can get, excuse the expression, it up for an hour. It doesn't come." (M1).

Hypoactive sexual desire disorder

Hypoactive Sexual Desire Disorder was reported by 17,65 % of men (N = 3), and all men reported that the disorder was acquired and situational. Table 4 shows that this difficulty always results from another, "associated" SD (e.g. erectile disorder, delayed ejaculation, premature ejaculation).

"For me, my sexual desire unfortunately does not manifest itself much […]. A lot of girls who played with me in many, many respects, so I was, in my opinion, calmed down at that level, at the same time. And so, it was played on both my feelings and on my desire, I guess." (M5).

"We don't really get intimate. When we go, we go and during penetration… But it's been a little while since I've even had a hard time keeping up, actually." (M2).

Erectile disorder

Erectile disorder was reported by 11,76 % of men (N = 2), and all men reported that the disorder was acquired and situational (Table 4).

"When you masturbate, the erection is there. Then, you start a sexual activity and during the activity, the erection decreases." (M2).
"It's an erection problem. […] I something but, but, but by dragging on I make it drag on, I couldn't perform like that. […] A performance problem". (M3).

Premature (Early) ejaculation

Premature ejaculation was reported by 11,76 % of men (N = 2), with one reporting a lifelong and situational disorder and one reporting an acquired and situational disorder.

"I feel like I'm not really living up to it … […] it could have gone on a little longer so that […] or that my partner could have been as satisfied as possible". (M4)
"Given that we make, in a manner of speaking, […] less love, you see, because of it happens that, *voilà*, that I am premature but well, voilà, we start again after". (M5)

Discussion

The study aimed to assess SDs among infertile patients at fertility centers prior to starting MAR for the first time. Clinical assessments were made through interviews. Several rounds of rephrasing were necessary, as participants faced challenges in discussing their sexual problems, causing some embarrassment. They also had limited knowledge of sexual functioning.

Initially, our study focused on SDs among infertile patients. Our analyses showed no higher presence of SDs in infertile patients compared to the general population [2–5] (see Table 3). However,

Table 4
Male Sexual Dysfunctions.

Participants (N = 5)	Types			Subtype				Sexual Distress	
	Male Hypoactive Sexual Desire Disorders	Erectile Disorder	Delayed Ejaculation	Premature (Early) Ejaculation	Lifelong	Acquired	Generalized	Situational	
M1			Yes		Yes		Yes		Yes
M2	Associated	Associated	Yes			Yes	Yes		Yes
M3	Associated	Yes	Associated			Yes		Yes	No
M4				Yes	Yes			Yes	No
M5	Associated			Yes	Yes		Yes	Yes	

patients with SDs may have been less likely to participate in our study, as discussing sexuality can be a challenging topic for them specifically [30].Moreover, our study reported considerably lower presence of SDs in infertile patients compared to previous systematic reviews [20–23]. This difference may be rooted in the low sample size in the current study, or in the fact that previous studies evaluated SDs only through questionnaires, while our study was, to the best of our knowledge, the first to apply DSM-5 [8] diagnostic criteria in a clinical assessment of SDs through interviews. Another interesting result was that infertile patients have a higher level of sexual distress compared to the general population [6] and present twice the risk of experiencing worries and suffering regarding their sexual life, even if they don't have more dysfunctions than the general population (see Table 3). It is important to note that the presence of sexual distress is a key criterion for diagnosing sexual dysfunction according to the DSM-5 [8]. However, there is a limited number of studies that simultaneously investigate sexual dysfunction and the presence or absence of sexual distress. In our study, we assessed sexual distress using a questionnaire, as the DSM-5 lacks standardized diagnostic criteria for this aspect. To the best of our knowledge, no prior study has explored sexual dysfunction and the presence or absence of sexual distress in infertile patients using a mixed-method approach.

The study then focused specifically on the subgroup of infertile patients with SDs. According to our descriptive analyses, infertile patients with a SD reported a lower frequency of sexual activity, reducing their chances of pregnancy. In this sample, most women reported good marital relations while men reported the opposite. The latter complained of marital difficulties characterized by poor communication that negatively impacted their sexual life.

In the women of this subgroup, the most common SD was sexual interest/arousal disorder, also the most common sexual difficulty in the general population [2]. The majority reported that this SD resulted in subsequent pain during sexual activity and associated genital-pelvic pain disorder. Some women explained that this SD also appeared because they did not experience pleasure during sexual activities and presented an orgasmic disorder. According to the descriptive analysis, infertile patients with a SD also consumed more medications that can lead to side effects on arousal (e.g. antidepressants). In the context of infertility, our study supports previous research, which states that sexual activities can be experienced as less spontaneous and lose their erotic value [19], with vaginal lubrication not always present and, therefore, increased sexual pain. Our study differs from the results observed by Mendonça and colleagues [21], who highlighted that sexual difficulties mostly reported by infertile women were lubrication and orgasm. Surprisingly, these authors did not mention SD related to desire or sexual pain. Our analyses suggest that infertile women engage in unpleasurable sexual activities (e.g., lack of desire and arousal or anorgasmia) probably motivated more by a desire for a child. However, their consequences can be more deleterious by reducing the frequency of sexual activity and chances of pregnancy, and, therefore, becoming a cause of infertility.

Previous studies reported that infertility has a greater impact on women's sexual functioning and sexual satisfaction, with more reported SDs than men [20,22]. However, our study does not seem to follow this trend. First, the men in our sample do not seem to experience the same SDs as the male population. They present much higher presence of delayed ejaculation and erectile dysfunction, compared to what is typically reported in the masculine population (see Table 3). However, sexual interest/arousal disorder and premature ejaculation disorder seem as present as in the general population (see Table 3). It is important to note that delayed ejaculation is the least common SD in the male population. In the general population, this sexual difficulty can be explained by psychological factors such as fear of pregnancy and fertility issues or performance anxiety (for more information, see [31]. According to the content analysis, some infertile men with SDs may experience emotions that are not conducive to sexual arousal. They may report having been disappointed by romantic relationships in the past, may have concerns about becoming fathers and feel pressure for sexual activities to result in pregnancy. This context could diminish the perception of erotic and sexual sensations and interfere with obtaining satisfactory sexual response (erection and ejaculation) necessary for procreation. SDs also seem to have a greater impact on men's marital harmony than on women's. It therefore seems essential to include men in the MAP care pathway to safeguard the overall health of the couple's relationship.

Strengths and limitations

There is a complex relationship between infertility and sexuality, with the two factors influencing one another [19]. Currently, 27 % of infertility cases are still unexplained [12]. While previous studies have focused more on SDs as a consequence of infertility, our study explored the possibility that SDs could be a cause instead. To our knowledge, our study is the first to highlight a higher presence of delayed ejaculation and erectile dysfunction disorder in infertile men. These SDs hinder the chances of intra-vaginal ejaculation and could be a cause of infertility and directly interfere with pregnancy plans. It would be advisable to assess the functioning of women, and specifically that of men undergoing MAR treatment.

Our study comprises certain limitations. Firstly, the sample size does not allow us to generalize our results to the general population. However, it highlights novel results regarding the presence of SDs, particularly in infertile men. This study demonstrates the need for further studies in representative samples to capture the extent to which the numbers obtained in the current study represent true prevalence of SDs in patients undergoing MAR. Secondly, other standard questionnaires of sexual functioning could have been used to discuss them with the results of the clinical interviews in order to reinforce the mixed-methods approach. Moreover, our study did not allow us to determine if the SDs were present before the infertility diagnosis nor their causes. However, the original aim of our study was to evaluate the sexual functioning of patients before IVF rather than identify the explanatory causes of SDs. Future studies should assess the presence of SDs in a larger sample and explore their etiological factors.

This study also provides several clinical perspectives. Despite the empirical evidence of the links between sexuality and infertility, the fertility center team is generally composed of gynecologists and psychologists who are often not trained in sexology and patients' sexual functioning is rarely assessed in consultation [19]. It is strongly advised that professionals involved in reproductive health and human sexuality monitor sexuality from the time of diagnosis until the end of treatment. This would help couples who encounter SDs by offering guidance and sex therapy strategies to improve les chances de procreation and their sexual life.

Conclusion

Infertile patients are a group at risk for developing SDs. In the current study, infertile women with SDs most often reported sexual interest/arousal disorder and the majority reported pain during sexual activity and associated genital-pelvic pain disorder. Infertile men reported higher presence of delayed ejaculation and erectile dysfunction, while sexual desire and excitement disorder and premature ejaculation disorder seemed as present as in the general population. Infertile patients with sexual dysfunctions also presented a lower frequency of sexual activity, thus reducing their chances of pregnancy. Our study suggests that sexual dysfunctions may be a cause of infertility. In this regard, it is crucial for clinicians to assess the sexual functioning for individuals undergoing medically assisted procreation treatment, especially for men.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.srhc.2023.100922.

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