



INFERTILITY AND SEXUAL DYSFUNCTIONS: A SYSTEMATIC LITERATURE REVIEW

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SUMMARY – This study aimed to investigate whether infertility and its treatment affect couple sexuality. A systematic literature review was performed, focusing on female and male sexual dysfunctions due to infertility. The method was descriptive, using a meta-synthesis of scientific research published between 2012 and 2017 in the English language. The search for suitable studies was carried out with the research databases Medline, CINAHL, PubMed and ScienceDirect using the following keywords: infertility, sexual dysfunctions, couple. It can be concluded that infertility negatively affects the sexuality of an infertile couple, which is further proven by a high percentage of sexual dysfunctions (43%-90% among women and 48%-58% among men). Couples report less satisfaction with sexuality. Since lower satisfaction and dysfunctions are closely connected with infertility and its treatment, couples might benefit from sexual therapy and support during the process of infertility treatment. Further research should focus on the evaluation of different psychological interventions that would address sexuality in couples when diagnosed and treated for infertility.

Key words: Infertility; Sexuality; Erectile dysfunction; Sexual dysfunctions, psychological

Introduction

Fertility in women is said to be at the highest level during their twenties and thirties, while in men fertility remains high until their forties. Conception in healthy fertile couples happens on average after 8 months of regular intercourse¹. Infertility is defined as the inability to conceive after a year of regular unprotected sexual activity². Globally, the fertility rate is de-

clining, due to several different factors, especially environmental changes³.

A study on global infertility rates, performed from 1990 to 2010 in 190 countries, revealed 48.5 million infertile couples of which 19.2 million suffered from primary infertility, while 29.3 million were diagnosed with secondary infertility. The research results showed that couples in developed countries more often suffered from primary infertility, whereas in developing countries secondary infertility was more common⁴.

The reasons for infertility can be found in women or in men, sometimes even in both. The female reproductive function can be impaired by the innate or acquired circumstances that affect the normal function

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of reproductive organs (genital etiology), illnesses (extragenital etiology), or by psychological factors^{5,6}. For male infertility, three possible categories of reasons exist, i.e. unobstructive etiology (where the problem is the production of sperm), obstructive etiology (where the problem is transportation of the sperm through the genital tract), while coital infertility is caused by disorders that hinder erection and ejaculation. Commonly, there are joint causes of male and female factors for the couple's infertility. In 10%-15% of cases, the etiology of infertility remains idiopathic infertility^{1,7}.

Infertility affects different areas of the couple's life. Unsuccessful family planning has a negative impact on individual's feelings, and many couples describe the period of diagnosis and treatment of infertility as the most stressful period of their life⁸. The ability of reproduction is closely connected with self-image, self-respect, and sexuality. Sexual intercourse may lose its spontaneity and erotic value because the main aim becomes conception. This may affect the ability for intimate sexuality and can provoke certain sexual dysfunctions^{8,9}. The treatment of infertility dictates the frequency and timing of sexual intercourse; the usual intimate event becomes regulated, controlled and couples often sense that the medical team is symbolically present also during their most personal act¹⁰. Problems often occur due to the emotional impact of the diagnosis, and forced and dictated sexual relations as part of the treatment and management of the problem¹¹.

Sexual dysfunctions can appear in both partners and might provoke problems in every stage of sexual response¹². Sexual dysfunctions can be a reason for infertility or can be triggered by infertility⁸. The classification of male and female sexual dysfunctions by the American Psychiatric Association¹³ is presented in Table 1.

The Diagnostic and Statistical Manual of Mental Disorders does not provide the possibility of a special diagnosis for sexual dysfunctions due to infertility. The diagnoses of female sexual arousal disorder and hypoactive sexual desire disorder are used, and a medical condition (infertility) can be used as a differential diagnosis; the criterion for diagnosis is that the duration of problems is more than six months. The therapist must be aware that additional diagnoses (sexual problems) can further damage the self-esteem of infertile patients. The treatment utilizes a cognitive behavioral

Table 1. Classification of male and female sexual disorders by the American Psychiatric Association 2013

Type of disorder	Men	Women
Desire	Male hypoactive sexual desire disorders	Female sexual interest/arousal disorder
Arousal	Erectile disorder	Female sexual arousal disorder
Orgasm	Delayed ejaculation, premature (early) ejaculation	Female orgasmic disorder, anorgasmia
Pain	Penodynia, scrotodynia	Genito-pelvic pain /penetration disorder, vaginismus

approach, an intervention that improves marital and sexual satisfaction. The main strategies of treatment are directed to lessen the anxiety, to improve the ability to reach orgasm, intimacy, and communication; in addition, the main goal is to break beliefs tied to fertility that can negatively affect the couple's sexuality (for example, that a woman's worth is connected to her fertility, and that masculinity is defined by the ability to perform sexually). Piva *et al.*⁹ argue that this could be useful to prepare couples entering infertility treatment for possible obstacles in sexuality.

In a study that included 121 women diagnosed with infertility, researchers identified a 26% prevalence of sexual dysfunctions, while in a subsequent study experts found an even higher proportion of sexual problems (61.7%)^{14,15}. A systematic literature review concluded that women faced sexual disorders more often than men when dealing with infertility¹⁶.

Objectives

This study aimed to perform a systematic literature review regarding the impact of infertility on sexual disorders in couples. The main research questions were:

- how the infertility treatment affects sexuality of the couple;
- how often infertile couples face sexual dysfunctions; and
- how infertility affects perceptions of sexual satisfaction in the couple?

Methods

A systematic search of medical databases was performed. Medline, CINAHL, PubMed and ScienceDirect

Table 2. Categorization of evidence (Eccles and Mason, 2001)¹⁷

Category	Methodological strength of evidence
I	Meta-analysis of randomized controlled trials (RCT) or at least one RCT
II	A controlled study (non-randomized), other type of quasi-experimental study
III	Nonexperimental descriptive studies, such as comparative studies, correlation studies, and case control studies
IV	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities

rect were searched with the following keywords: infertility, couple, sexuality, dysfunction. The search was performed in April 2017. Inclusion criteria were studies published in the previous five years; studies published in the English language; and studies focused on the research of sexual function of infertile individuals.

Sixteen studies were identified as appropriate for analysis. They were categorized by methodological quality using Eccles-Mason categorization¹⁷. Studies rated in category I have the strongest and those in category IV the least methodological quality, as shown in Table 2.

All 16 studies were categorized as belonging in category II. Meta-analysis of the studies enabled in-depth analysis of the contents and generalization of the newest, empirically sound results to address research questions set in the purpose of the study.

Table 3. Research findings regarding the effect of infertility on couple sexuality

Authors (year)	Description of methodology	Summary of results
Marci <i>et al.</i> (2012) ¹⁸	30 couples diagnosed with infertility in the previous two months, 30 primary infertile couples in the process of infertility treatment and 52 fertile. The research aimed to define whether personal characteristics of the individual changed when diagnosed with infertility and how this affected sexual functioning.	No differences were found in personal characteristics after the diagnosis of infertility in experimental groups; however, higher rates of stress were reported. Stress connected with infertility had negative impact on sexual function; fertile couples had better sexuality than the two experimental groups.
Davari Tanha <i>et al.</i> (2014) ¹⁹	191 primary and 129 secondary infertile women, compared with 87 fertile women. Sexual function was investigated.	Sexual function was deprived in infertile women; secondary infertility was linked with worst results.
Jamali <i>et al.</i> (2014) ³⁴	100 infertile and 100 fertile women. Sexual function was evaluated.	Sexual function was better in the group of infertile women.
Ozkan <i>et al.</i> (2015) ²⁰	56 infertile and 48 fertile men. Sexual function and rates of depression were researched.	Infertile men had impaired sexual function.
Direkvand Moghadam <i>et al.</i> (2015) ²¹	384 women divided into fertile and infertile groups. Sexual function was studied.	Sexual function was impaired in the group of infertile women.
Song <i>et al.</i> (2016) ²²	236 infertile men. Rate of stress was measured according to the fertile and infertile days of their partners.	Infertility diagnosis of the couple negatively affected male sexual function.
Czyżkowska <i>et al.</i> (2016) ²³	50 infertile and 50 fertile women. Sexual function and sexual satisfaction were investigated.	Impaired sexual function was found in infertile women.
Emec <i>et al.</i> (2017) ²⁴	137 infertile and 142 fertile women. Sexual function was estimated.	There were no significant differences in sexual function between the groups of fertile and infertile women.

Table 4. Research findings regarding the incidence of sexual dysfunctions in infertile couples

Authors (year)	Description of methodology	Summary of results
Pakpour <i>et al.</i> (2012) ²⁵	410 and 194 women with primary and secondary infertility, respectively. The incidence of sexual dysfunctions was estimated.	56% of all infertile women had some form of sexual dysfunction.
Aggarwal <i>et al.</i> (2013) ²⁶	267 infertile and 233 fertile women. The incidence of sexual dysfunctions was compared between the groups.	63.67% of infertile women reported some form of sexual dysfunction in comparison to 46.35% of fertile women.
Bayar <i>et al.</i> (2014) ²⁷	50 couples with primary infertility. Rate of sexual dysfunctions was evaluated at the beginning and 3 months after initiation of infertility treatment.	At the beginning of infertility treatment, 60% of women and 34% of men had some form of sexual dysfunction. After 3 months of fertility treatment, 72% of women and 48% of men suffered from sexual dysfunctions.
Bakhtiari <i>et al.</i> (2015) ²⁸	236 infertile men. The prevalence of sexual dysfunctions was estimated.	58% of infertile men suffered from sexual dysfunctions.
Czyżkowska <i>et al.</i> (2016) ²³	50 infertile and 50 fertile women. The incidence of sexual dysfunctions was determined.	90% of infertile women suffered from sexual dysfunctions in comparison to 26% of fertile women.
Bakhtiari <i>et al.</i> (2016) ²⁸	236 infertile women. The incidence of sexual dysfunctions was estimated.	55.5% of infertile women reported some form of sexual dysfunction.
Kucur Suna <i>et al.</i> (2016) ²⁹	142 infertile women were divided into three groups. Group A consisted of 30 women diagnosed with infertility. Group B consisted of 31 women, with their men diagnosed as infertile. Group C consisted of 81 women with idiopathic infertility. The incidence of sexual dysfunctions and depression was investigated.	43.3% of group A women, 54.8% of group B women and 51.9% of group C women suffered from some form of sexual dysfunction.
Emec <i>et al.</i> (2017) ²⁴	137 infertile and 142 fertile women. The incidence of sexual dysfunctions was assessed.	78.8% of infertile women reported some form of sexual dysfunction in comparison to 76.8% of fertile women.

Results

For the first research question, eight studies were found¹⁸⁻²⁴. The samples of the studies were different, from the smallest study with 100 to the largest with 407 individuals. Only one study researched the influence of infertility on couples, while the others were focused on women only (4 studies) or men (3 studies). Research findings are summarized in Table 3.

For analysis of the incidence of sexual dysfunctions in infertile couples, eight studies matched the inclusion criteria²³⁻²⁹. The study samples varied from 100 to 604 individuals. One study included both partners, whereas six studies assessed the incidence of sexual dysfunctions in women and one study in men. The results are illustrated in Table 4.

Satisfaction with sexuality was investigated by nine studies^{18,20-21,23-26,30-31}. The largest study sample consisted of 497 individuals, whereas the smallest included 100 individuals. Three studies were performed among infertile couples, one among infertile men, and five among infertile women. The results of the studies are summarized in Table 5.

Discussion

Even though infertility is considered a problem of both partners and diagnostics is always performed on couples, in the previous five years there were only a few studies that investigated sexual function in couples^{27,30-31}. However, when also considering the results

Table 5. Research findings regarding sexual satisfaction of infertile couples

Authors (year)	Description of methodology	Summary of results
Pakpour <i>et al.</i> (2012) ²⁵	410 and 194 women with primary and secondary infertility, respectively. Estimation of sexual satisfaction.	Both groups expressed low levels of sexual satisfaction.
Marci <i>et al.</i> (2012) ¹⁸	30 couples diagnosed with infertility in the previous 2 months, 30 primary infertility couples in the process of infertility treatment, and 52 fertile couples. The research aimed to define sexual satisfaction of all three groups.	Infertile couples were less satisfied with sexuality.
Aggarwal <i>et al.</i> (2013) ²⁶	267 infertile and 233 fertile women. Sexual satisfaction was evaluated.	35% of infertile and 38% of fertile women were sexually unsatisfied.
Ozkan <i>et al.</i> (2015) ²⁰	56 infertile and 48 fertile men. Effects of infertility were measured.	Infertile men were less sexually satisfied.
Direkvand Moghadam <i>et al.</i> (2015) ²¹	384 women were divided into fertile and infertile groups. Sexual satisfaction was estimated.	Infertile women were less sexually satisfied.
Masoumi <i>et al.</i> (2016) ³⁰	125 couples that had been infertile for more than 5 years and 125 fertile couples. Quality of life, sexual and marital satisfaction were measured.	Infertile couples were more sexually satisfied.
Yangin <i>et al.</i> (2016) ³¹	102 infertile couples. The rate of sexual satisfaction was also investigated.	37.3% of women and 33.3% of men were sexually unsatisfied.
Czyżkowska <i>et al.</i> (2016) ²³	50 infertile and 50 fertile women.	Findings revealed significantly lower levels of sexual satisfaction in infertile women.
Emec <i>et al.</i> (2017) ²⁴	137 infertile and 142 fertile women. Sexual satisfaction was measured.	Infertile women were less (but not significantly) satisfied with their sexuality.

of the studies that dealt with the effects of infertility on sexual function in women and separately in men, it can be concluded that infertility negatively influences couple's sexuality. This was confirmed by a study published in 2012¹⁸. The same study revealed that the consequences of infertility on sexuality were worse in women than in men.

Most of the studies evaluating women's sexuality used the standardized Female Sexual Function Index (FSFI); however, one study²³ used the Mell-Krat scale. This might affect comparison of the studies, although the findings did reflect the results of other authors. The majority of studies confirmed that infertile women had problems with sexual function; in a study published in 2014, which used the FSFI to evaluate it, sexual function of infertile women was estimated to 25.7 ± 4.6 , while in fertile women it was 32 ± 1.1 ¹⁹. One year later, another study²¹ confirmed these findings. Their results revealed that infertile women scored lower in all six parameters of the FSFI scale. Similar results were also recorded in a study using the Mell-Krat

scale²³, in which infertile women achieved a mean of 46.68 ± 7.15 points *versus* 56 ± 8.31 points in fertile women. In contrast, one study³² found better sexual function in infertile women; however, the difference on the FSFI was very small (infertile women achieved a mean of 24.83 ± 4.72 and fertile ones 23.85 ± 4.34 points). A study published in 2017²⁴ did not confirm the negative impact of infertility on sexual function; infertile and fertile women achieved 17.49 ± 7.20 and 17.86 ± 6.41 points on the FSFI, respectively. The last two studies were those with smaller samples than the others had; however, more studies in the future would provide a more reliable insight into the impact of infertility on sexual function.

One highly significant finding was highlighted by a study comparing secondary and primary infertility women¹⁹, which showed that sexual function was most seriously impaired in women with secondary infertility. This should have important implications, i.e. women with such diagnoses would need even more support and help. Lower levels of sexual function among these

women are also inferred from older studies²⁵. Additional studies investigating secondary infertility should also take into consideration marital satisfaction and other life circumstances (levels of anxiety, depression, and stress).

There are fewer studies investigating the effect of infertility on men. The majority of studies performed on men used the International Index of Erectile Function as an instrument to estimate male sexual function. A study published in 2015²⁰ identified lower sexual function in infertile men in all parameters except for erectile function, in which there was no significant difference. A year later, a study by Song *et al.*²² confirmed these findings, pointing out that sexual function of men is more deprived in the fertile period of their partner's cycle, which can be attributed to sexual anxiety³². However, it should be noted that they used the visual analog scale as a research tool, which has not been validated for measuring sexual function. Nevertheless, their study found erectile dysfunction to be the most common sexual dysfunction (50.9%), whereas another study²⁸ concluded that premature ejaculation was most common. This confirms the previous results of a literature review¹⁶.

However, studies confirm that more women than men have sexual dysfunctions when diagnosed with infertility^{27,29} because infertility treatment also causes stress in partners, which can result in sexual dysfunctions²⁷. Since marital problems are inter-related, it can also be assumed that sexual dysfunction of one partner can provoke sexual dysfunctions in the other. This might explain the high rates of sexual dysfunctions in women. The study by Kucur Suna *et al.*²⁹, for example, confirmed that sexual dysfunctions affected mostly women when their partner was diagnosed as infertile.

Dysfunctions can be defined as problems only if they are disturbing to partners⁸. Therefore, we were also interested in estimating sexual satisfaction of infertile couples. Most studies confirm that sexual satisfaction among infertile couples is lower than among fertile couples^{20,21,23,33}. Different results were found by other studies^{24,26,30} in which researchers did not find any statistically significant differences. More studies would be needed in order to define whether the levels of sexual satisfaction are lower in the case of infertility.

The studies included in the analysis suffered from some limitations. Some of them had very small samples^{20,23,27}, others^{22,25,28,30,31} did not have control group

of fertile individuals, and not all studies used the same research tool to evaluate the impact of infertility on sexual issues. The majority of the research was performed in Turkey^{15,31}, Iran^{20,30}, and India²⁶, thus the specifics of the culture could have affected the results. Studies of infertile men remain very rare and provide a limited insight into their dealing with the issue; therefore, such studies should be encouraged in the future.

For future research, we would recommend multicultural samples of couples, with a control group. Since infertility also affects other parameters of partnership (not only sexuality), other measures should also be considered (marital satisfaction, intimacy, etc.) when interpreting sexual satisfaction.

Conclusion

The majority of studies confirmed the negative effects of infertility on couples' sexuality. This impact was found to be most pronounced in women with secondary infertility. The results also imply that infertility treatment may increase the risk of sexual dysfunctions. This gives certain indices for clinical improvements of infertility management.

Couples who go through the process of infertility treatment are never evaluated for sexual dysfunctions¹¹, but they should be, and they should also be offered help in case of diagnosis of sexual dysfunction³⁵⁻³⁷. In the case of unwilling childlessness, sexual therapy should be offered to clients, so that the quality of sexuality is at least the same as before the infertility treatment¹⁶.

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Sažetak

NEPLODNOŠĆ I SEKSUALNI POREMEĆAJI: SUSTAVNI PREGLED LITERATURE

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Ova studija je imala za cilj istražiti utjecaj neplodnosti i njezinog liječenja na seksualnost para. Izvršena je sustavna analiza literature s naglaskom na seksualnu disfunkciju žena i muškaraca zbog neplodnosti. Metoda je bila opisna uz primjenu meta-sinteze znanstvenih istraživanja objavljenih između 2012. i 2017. godine na engleskom jeziku. Pretraživanje odgovarajućih studija provedeno je u bazama podataka Medline, CINAHL, PubMed i ScienceDirect koristeći sljedeće ključne riječi: neplodnost, seksualne disfunkcije, par. Može se zaključiti da neplodnost negativno utječe na seksualnost neplodnog para, što dodatno dokazuje visok postotak seksualnih disfunkcija (43%-90% među ženama i 48%-58% među muškarcima). Parovi iskazuju manje zadovoljstvo u seksualnom odnosu. Budući da su slabije zadovoljstvo i disfunkcije usko povezane s neplodnošću i njenim liječenjem, parovi bi mogli imati koristi od seksualne terapije i psihološke potpore tijekom procesa liječenja neplodnosti. Daljnja bi se istraživanja trebala usredotočiti na evaluaciju različitih psiholoških intervencija koje bi se bavile seksualnošću kod parova kad im se dijagnosticira i liječi neplodnost.

Ključne riječi: *Neplodnost; Seksualnost; Eretilna disfunkcija; Seksualne disfunkcije, psihološke*