

Sexual quality of life and female sexual function in women after fetal death

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ABSTRACT

Objectives: Pregnancy loss is associated with distress which can have a significant emotional impact on women and their spouses including a lower sexual quality of life and sexual dysfunction.

The present study aimed to assess sexual quality of life and sexual function in women after fetal death.

Material and methods: A total of 110 women with a history of pregnancy loss hospitalized in the Clinic of Obstetrics and Gynecology were included. In order to evaluate the sexual quality of life and sexual functions the standardized questionnaires - the Sexual Quality of Life (SQoL-F) and Female Sexual Function Index (FSFI), respectively were used.

Results: Women declared a lower sexual quality of life. Most of them (52.73%) were at a risk of sexual dysfunction in the areas of desire (4.15 ± 1.21) and orgasm (3.82 ± 1.48). The older the age and length of the relationship was ($p = 0.002$; $r = -0.298$) the worse the sexual quality of life ($p < 0.001$) and sexual function were ($p < 0.05$). The sexual quality of life ($p < 0.001$) and sexual function in the area of desire ($p = 0.001$), arousal ($p = 0.001$) and orgasm ($p < 0.001$) were significantly better in the women who have experienced one pregnancy loss than in those with more than one pregnancy loss. Sexual function was better in women who did not plan to have a pregnancy. The week in which the pregnancy was lost and the fact of having other children have not been statistically significant.

Conclusions: The sexual quality of life and female sexual function in women after an experience of fetal death were less satisfying.

Key words: pregnancy loss; miscarriage; sexual function; sexual quality of life

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INTRODUCTION

Pregnancy loss is one of the most common reproductive failures [1]. The definitional criteria for this phenomenon refer both to the duration of pregnancy and the weight of the fetus [2]. According to the International Classification of Diseases ICD-10, the termination of pregnancy due to intrauterine death before week 22 is defined as a miscarriage. On the other hand, the termination of pregnancy between weeks 22 and 37 of gestation by extracting a fetus that is not breathing or showing any other sign of life, such as heart rate, umbilical cord pulsation or pronounced voluntary muscle contractions is defined as stillbirth [3]. It is estimated that as many as 10–15% of all pregnancies terminate in a missed abortion, 80% of which occur in the first trimester of pregnancy, and 1–5% of all pregnancies

become non-viable in the second and third trimester [4]. This applies to the termination of clinically diagnosed pregnancy on the basis of available biochemical and ultrasound markers and to the pregnancy confirmed on the basis of certain pregnancy symptoms observed by the woman herself [5].

Physiologically, fetal death signifies the end of pregnancy, however, psychologically it may raise doubts as to reproductive and parental competences, reduce self-esteem, the sense of one's attractiveness or femininity. As a response to such event, many women experience a number of negative reactions, such as sadness, anger, guilt, as well as anxiety or depressive disorders, and even post-traumatic stress disorder (PTSD) [6]. Moreover, coping with this experience is described in terms of the individual stages of the bereavement process [7].

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It has also been shown that pregnancy loss may lead to sexual dysfunction [8]. What is more, despite the fact that most women fairly quickly decide to have sex with the partner after experiencing fetal death, their motivation is usually non-sexual. Most often, sex serves as a solely procreative activity, a method to conceive another child, which may lead to subordinating sexual intercourse to the woman's fertile days, depriving this sphere of the spontaneity and pleasures of sex through its instrumental character [9].

There also occur inverse responses, such as abstaining from sexual intercourse. This may be related to a decrease in libido, sexual aversion after pregnancy loss, fear of penetration (often associated with fearing for the somatic condition of the vagina), intense grief experience, anticipation of the fear of potentially experiencing another loss or the pleasure dissociative orgasmic dysfunction [8]. As a result of personality disorders caused by the belief that one does not deserve a successful sex life since the procreative role has not been accomplished, self-aggressive behaviors may also appear [8, 9].

The literature on the subject most often focuses on analyzing the occurrence of sexual dysfunctions in women after childbirth. There is little data on the assessment of sexual function or sexual dysfunction in women after a loss of pregnancy, regardless of the stage of its duration. Sexuality plays an important role in the overall assessment of the quality of life, and sexual satisfaction is treated as an important indicator not only of the satisfaction from being in a relationship, but also as a determinant of overall mental, physical and social well-being. It seems that problems afflicting sexual functions may lead to a deterioration of well-being and the quality of life.

Assessing the results after experiencing pregnancy loss is therefore necessary both from the point of view of the emotional needs of women and their partners and the direction of the further development of psychology, sexology and gynecology. Even though in recent years the number of these analyses has increased worldwide, they are still far from frequent. The literature concerning Polish women does not offer much in this regard, either. The research started by Błońska and Rawińska [9] assessing the satisfaction with the sexual life of women after the loss of a child in the pre- and perinatal period did not find a wider empirical continuation in other centers domestically. This work will be the first one to develop this research line further.

Therefore, the aim of the data was to determine the quality of life in relation to sex and to analyze the sexual function of women after experiencing fetal death.

MATERIAL AND METHODS

The Bioethics Committee of Jan Kochanowski University approved the study (26/2020), and all the participants gave

their written consent. The study was conducted among women diagnosed with fetal death and hospitalized at the Department of Obstetrics and Gynecology within the area of one voivodeship (province) during the period from September 2020 to August 2021. The research was conducted after 3 months had elapsed from a miscarriage and/or stillbirth.

Therefore, the qualification of the respondents for inclusion in the study was strictly defined and covered the following inclusion and exclusion criteria:

Inclusion criteria:

- hospitalized patients with a diagnosis of fetal death;
- submission of completed questionnaires 3 months after the end of hospitalization;
- 18 years of age and older;
- consent to participate in the study.

Exclusion criteria:

- lack of returned and completed questionnaires;
- comorbidities which could significantly impair sexual function (e.g., diabetes, cardiovascular diseases, cancer, thyroid disorders, autoimmune diseases, neurological diseases (including a history of brain strokes), urinary diseases, endometriosis, hormonal problems, mental disorders);
- age under 18 years;
- lack of consent to participation in the study.

Before sending the questionnaires, the authors of the study had contacted the patients by phone in order to clarify the purpose of the study and obtain initial informal consent to send the material for the research. Therefore, the study was conducted with particular emphasis on ethical principles. The patients were also informed that the study was anonymous, non-commercial and that its use contributed solely to collective analysis. At each stage of data collection, the patients also had an opportunity to benefit from psychological support.

The study used standardized measurement tools and its proprietary questionnaire to collect demographic data, which included single-choice questions, including questions about age, education, marital status, the week of last pregnancy loss, number of total pregnancy losses (if there had been more than one), having children, length of the relationship, duration of the efforts to conceive a child and possible treatment at a Reproductive Health Clinic.

Questionnaires with the described procedure of the study were sent to 201 women hospitalized due to fetal death three months after the end of hospitalization. One hundred and sixteen questionnaires were returned, of which six were incomplete. Therefore, a decision was taken not to include them in the base data. Renewed contact with the women who did not return completed questionnaires or returned them partially completed was considered. However, they did not agree to participate in the study.

Thus, 110 patients were eventually enrolled in the entire study. The analysis of the return rate of the questionnaires was calculated using the standardization proposed by the American Association for Public Opinion Research (AAPOR) [10]. Thus, taking the above into account, the rate of return in this study reached 0.5472, which is approximately 55%.

The Sexual Life Quality Questionnaire (SQoL-F) by Symonds, Boolell, and Quirk was employed to assess the quality of sexual life [11]. The tool is used to assess the impact of sexual dysfunction on the quality of life in aspects such as self-esteem, emotional well-being and relationship. The questionnaire consists of 18 statements about thoughts and feelings related to sexual life. Each of the statements contains possible answers on a six-point scale, from fully agree to completely disagree. The answers correspond to scores from 1 to 6 points, which gives a total score possible of 18 to 108 points. The questionnaire includes four subscales: thoughts about sexual life (7–42 points), relationship satisfaction and sexual satisfaction (5–30 points), self-esteem (3–18 points), sexual repression (3–18 points). However, according to the assumptions of the authors of the questionnaire, the results are calculated as an overall total score, and not as separate domains. Thus, the higher the score, the better the quality of sex life is.

Female Sexual Function Index (FSFI) [12] in the Polish adaptation by Nowosielski et al. [13] — (PL-FSFI) — allows for assessing the sexual functions of a woman during the period of 4 weeks preceding the survey with the questionnaire. The tool contains 19 questions in 6 subscales: desire, arousal, lubrication, orgasm, satisfaction and pain. The scores for subscales range from 0 to 6 (for arousal, lubrication, orgasm, and pain), from 1.2 to 6 for the desire domain, and from 0.8 to 6 for the satisfaction scale. The result of 0 means that the examined person has not engaged in sexual activity in the last 4 weeks. For each domain, the points are summed up, which means that the higher the point index, the better the functioning in each domain is. The overall score may reach from 2 to 36 points. A higher score is an indicator of better sexual functioning. The optimal cut-off point in Polish adaptation studies was the threshold of 27.5 points. The Polish version of the questionnaire achieved satisfactory psychometric values in terms of reliability and validity measured with various methods. Cronbach's alpha coefficients ranged from .71 to .96, ICC from .66 to .96.

Statistical analysis

The analysis of quantitative variables was performed by calculating the mean, standard deviation, median and quartiles. The analysis of the qualitative variables was performed by calculating the number and percentage of the incidence of each value. The comparison of the values of quantitative variables in two groups was performed us-

ing the Mann–Whitney test. The comparison of the values of quantitative variables in three or more groups was performed using the Kruskal–Wallis test. After detecting statistically significant differences, post-hoc Dunn test analysis was conducted in order to identify groups which differed with statistical significance. The correlation between the quantitative variables was analyzed using the Spearman's rank correlation coefficient. The significance level of 0.05 was adopted in the analysis. Therefore, all p-values below 0.05 were interpreted as showing significant relationships. The analysis was carried out in the R program, version 4.1.1. [14].

RESULTS

One hundred and ten women aged 19 to 44 participated in the study. The mean age \pm SD was 31.97 ± 5.25 years. Most of the women were married ($n = 83$; 75.45%), the rest were in partnerships ($n = 26$; 23.64%). Only one woman declared that she was not in any relationship at that moment (0.91%). Most women had higher education ($n = 78$; 70.91%), the rest had secondary education ($n = 21$; 19.09%) as well as technical and/or vocational education ($n = 11$; 10%). Most of the surveyed women lived in a city being a provincial capital ($n = 52$; 47.27%) with their husband or partner ($n = 104$; 94.55%) and were employed ($n = 87$; 79.09%). Eighty-five patients (77.27%) had experienced fetal death in the first trimester, 24 (21.82%) in the second and only one woman in the third trimester. The week of the loss of the last pregnancy ranged between weeks 5 and 36. The mean pregnancy loss was 11.17 ± 5.09 . Most of the surveyed women experienced one ($n = 68$; 61.82%) and/or two pregnancy losses in total ($n = 22$; 20%). Two patients experienced five or more pregnancy losses (1.82%). In the subjective assessment of the patients, the vast majority ($n = 85$; 77.27%) declared that the pregnancy had been planned. The shortest duration of procreative efforts was one month, and the longest was 120 months. The mean duration of procreative efforts was \pm SD 9.85 ± 15.37 . Half of the patients ($n = 55$) had children, of whom 36 had one child (32.73%), the rest had two or more. Five patients (13.64%) used the services of a Reproductive Health Clinic.

The Sexual Life Quality Questionnaire (SQoL-F) was used to assess sex-related quality of life in women after experiencing pregnancy loss. The questionnaire consisted of 18 statements concerning thoughts and feelings related to sexual life, to which the examined woman responded on the scale ranging from 1 to 6. The grades were summarized, and the overall score was calculated, indicating the sex-related quality of life for the respondents. In the studied group, the results could have ranged from 18 to 108 points. The mean value of the general quality of life index in relation to sex for all 110 surveyed women was 77.09 points. The highest rating was 108 points and the lowest was 31 points. Therefore,

Table 1. Descriptive statistics for sexual quality of life in women

SQoL-F										
Points	n	Missing data	Mean	SD	Mean of question	Median	Min.	Max.	Q1	Q3
18–108	110	0	77.09	23.12	4.28	81	31	108	57.25	98.75

SQoL-F — sexual quality of life in women; SD — standard deviation

Table 2. Questionnaire sexual quality of life in women — items

Item	Mean	SD
When I think about my sexual life, it is an enjoyable part of my life overall (1–6)	4.85	0.97
When I think about my sexual life, I feel frustrated (1–6)	4.14	1.61
When I think about my sexual life, I feel depressed (1–6)	4.11	1.72
When I think about my sexual life, I feel like less of a woman (1–6)	3.99	1.77
When I think about my sexual life, I feel good about myself (1–6)	4.11	1.45
I have lost confidence in myself as a sexual partner (1–6)	3.77	1.85
When I think about my sexual life, I feel anxious (1–6)	4.13	1.84
When I think about my sexual life, I feel angry (1–6)	4.76	1.56
When I think about my sexual life, I feel close to my partner (1–6)	5.10	1.04
I worry about the future of my sexual life (1–6)	4.20	1.77
I have lost pleasure in sexual activity (1–6)	3.80	1.73
When I think about my sexual life, I am embarrassed (1–6)	4.47	1.70
When I think about my sexual life, I feel that I can talk to my partner about sexual matters (1–6)	4.86	1.08
I try to avoid sexual activity (1–6)	4.29	1.50
When I think about my sexual life, I feel guilty (1–6)	4.24	1.81
When I think about my sexual life, I worry that my partner feels hurt or rejected (1–6)	4.29	1.78
When I think about my sexual life, I feel like I have lost something (1–6)	3.78	2.05
When I think about my sexual life, I am satisfied with the frequency of sexual activity (1–6)	4.20	1.43

SQoL-F — sexual quality of life in women; SD — standard deviation

the respondents agreed with the statement “my sex-related quality of life is good” to a small degree. The results obtained in SQoL-F has been presented in Table 1 as mean values (M) and standard deviations (SD).

The obtained data demonstrates that after having experienced fetal death, women lost their self-confidence in the role of a sexual partner (3.77 ± 1.85). When they thought about their sex life, they felt as if they had lost something (3.78 ± 2.05), sexual activity had stopped giving them pleasure (3.80 ± 1.73) and they felt less valuable as women (3.99 ± 1.77). This means that in these areas the degree of sex-related quality of life was very low. The statement “When I think about my sex life I feel closely bonded to my partner” achieved the highest mean value (5.10 ± 1.04), which means that after pregnancy loss, women perceived their sex-related quality of life the best at the level of emotional closeness. The above values were presented in Table 2.

Spearman’s rank correlation analysis showed a statistically significant ($p < 0.001$) and negative ($r = -0.365$) correlation between age and duration of relationship ($p = 0.002$;

$r = -0.298$) and sex-related quality of life. This means that the older the age and the longer the duration of a relationship are, the worse the sex-related quality of life is. The sex-related quality of life was better in the group of women who had not planned the pregnancy that had been lost ($p = 0.005$). The time of conception also turned out to be relevant. It was reported that the longer the efforts were, the worse the sex-related quality of life was ($p = 0.011$; $r = -0.276$). Taking into account the number of all diagnosed pregnancy losses, the quality of life in relation to sex was significantly better in the women who had experienced one pregnancy loss than in the other groups. Moreover, in the women after two pregnancy losses, it was significantly better than in the women after more than three pregnancy losses (Tab. 3). The sex-related quality of life in was also significantly better in the group of women who had not been treated at a Reproductive Health Clinic ($p < 0.001$).

Variables such as marital status, education, employment, residence, mode of residence, week or trimester of the last pregnancy loss, having children and the number

Table 3. Sexual quality of life in women in relations to the total of pregnancy losses

SQoL-F [points]	Total of pregnancy losses (PL)				P
	1 PL (n = 68) — A	2 PL (n = 22) — B	3 PL (n = 12) — C	More than 3 PL (n = 8) — D	
SD	84.66 ± 21.05	68.82 ± 22.43	68.5 ± 13.95	48.38 ± 20.61	p < 0.001
median	93,5	68	71,5	40	
quartiles	65–102	52.25–82	56.5–80	36.25–54.75	A > B, C, D B > D

SQoL-F — sexual quality of life in women; SD — standard deviation

of children did not determine the level of sex-related quality of life ($p > 0.05$).

The FSFI questionnaire assesses female sexual function in six domains: desire, arousal, lubrication, orgasm, satisfaction and pain. In each of them, the results range from 0 or 1 to 6 points. A higher score equates better functioning in that area. The sum of the scores for all domains is the total score ranging from 2 to 36 points. In the Polish adaptation, the value 27.5 is adopted as the cut-off point. This means that a score of 0 to 27.5 indicates a risk of developing sexual dysfunction. In the present study it was shown that 58 out of 110 surveyed women (52.73%) were at a risk of dysfunction, and 52 of the respondents (47.27%) achieved the normal result (Tab. 4). In the study group, the women after pregnancy loss function the best in the areas of pain (4.88 ± 1.29) and lubrication (4.76 ± 1.3) and their functioning is the worst in the areas of desire (4.15 ± 1.21) and orgasm (3.82 ± 1.48).

Age correlates significantly ($p < 0.05$) and negatively ($r < 0$) with each of the subscales of the FSFI questionnaire, hence the older the age was, the worse the functioning in all the areas was. Detailed results have been presented in Table 5.

Sexual function in the area of desire was significantly better in the group of the women living without a partner or with their parents ($p = 0.549$).

Significant statistical relationships were also obtained regarding the total number of diagnosed pregnancy losses. Both general sexual function ($p < 0.001$; 28.81 ± 5.68) and sexual function in the area of desire ($p < 0.001$; 4.54 ± 1.17), arousal ($p = 0.001$; 4.65 ± 1.12), orgasm ($p < 0.001$; 4.29 ± 1.28) and sexual satisfaction ($p = 0.001$; 4.99 ± 1.04) were significantly better among the women after one pregnancy loss than in the other groups. Sexual function in the area of lubrication was significantly better among the women after one pregnancy loss than in the other groups ($p < 0.001$; 5.09 ± 1.19). Moreover, among the women after two pregnancy losses it was significantly better than among the women who had experienced more than three pregnancy losses ($p < 0.001$; 4.58 ± 1.33). Analyzing the results in relation to pain, sexual function was significantly better among the women after one pregnancy loss than among

Table 4. Female Sexual Function Index (FSFI)

FSFI — points	Interpretation	n	%
0–27.5	Risk of disorders	58	52.73%
27.51–36	Normal result	52	47.27%

Table 5. Femal Sexual Function Index in relations to age

FSFI	Age
Spearman's correlation coefficient	
Total points FSFI	$r = -0.38, p < 0.001^*$
Desire	$r = -0.237, p = 0.013^*$
Arousal	$r = -0.33, p < 0.001^*$
Lubrication	$r = -0.256, p = 0.007^*$
Orgasm	$r = -0.362, p < 0.001^*$
Satisfaction	$r = -0.423, p < 0.001^*$
Pain	$r = -0.343, p < 0.001^*$

FSFI — Femal Sexual Function Index

the women after two and more than three pregnancy losses ($p < 0.001$; 5.26 ± 0.99) and moreover, among the women who had suffered three pregnancy losses it was significantly better than among the women who had experienced more than three pregnancy losses ($p < 0.001$; 4.95 ± 1.03).

The duration of the relationship is also significantly and negatively correlated. It means that the longer relationship with the husband/partner was the worse functioning in all the areas was ($p < 0.001$).

Significant statistical indicators were also obtained for the question "Was the lost pregnancy planned?". It was noted that sexual function in the area of arousal ($p = 0.046$; 4.72 ± 1.03) and lubrication ($p = 0.04$; 5.21 ± 0.96) was significantly better among the women who had not planned pregnancy. The duration of efforts for the pregnancy that had been lost, in turn, correlates significantly ($p = 0.048$) and negatively ($r = -0.215$) with the quality of life in the area of arousal. This means, therefore, that the longer the reproductive efforts had been, the worse the functioning in this area was.

Receiving treatment at a Reproductive Health Clinic turned out to be of key importance. It was noted that the functioning in each area was significantly better in the group of women who had not received this type of treatment ($p < 0.05$).

Variables such as marital status, education, employment, place of residence, the week and trimester when the last pregnancy had been lost, having children and their number did not determine the level of sexual function in particular areas ($p > 0.05$).

In order to explore the entirety of the above issue, the study sample was analyzed not only from the level of two features, *i.e.*, SQoL-F and FSFI, but a decision was taken to determine if they were interrelated. The Spearman correlation coefficient was used for the analysis. It was noted that the sex-related quality of life correlates significantly ($p < 0.05$) and positively ($r > 0$) with each domain of the FSFI questionnaire. This means that the better the quality of life in relation to sex was, the better functioning in the areas of desire, arousal, lubrication, orgasm, satisfaction, and pain experienced during intercourse was. Conversely, the better functioning in certain areas was, the better the sex-related quality of life was. The above dependencies were presented in Table 6.

DISCUSSION

Fetal death has been shown to be a predisposing factor of sexual dysfunctions. It is associated with distress and anxiety, which may have a significant emotional impact on women and their partners [15], especially when they experience more than one pregnancy loss [16].

In this study, it was noted that the women who had experienced a fetal loss had a reduced sex-related quality of life, had lost confidence in being a sexual partner, had stopped enjoying sexual activity, and felt less valuable as women. It is consistent with the studies of other authors [9], which have shown a relationship between general satisfaction with sexual life and self-esteem regarding physical appearance among women after a fetal demise. This result also suggests that the women who have lost their pregnancy and have a successful sex life are more satisfied with the appearance of their bodies. Sexual satisfaction is associated with many factors influencing the quality of a relationship, including the level of self-esteem.

Sexual arousal in general is a function of sexual excitability and readiness for sexual reaction. It is an emotional state combined with a physiological response to sexual stimuli. Whereas orgasms are the culminating phase of arousal, it is an autonomic physiological response to sexual stimulation and is characterized by an intense feeling of pleasure [17]. Based on the assessment of each of the FSFI domain scores, it was observed that problems with satisfaction, arousal

Table 6. Correlation between sexual quality of life in women and Femal Sexual Function Index

FSFI	SQoL-F
	Spearman's correlation coefficient
Total points FSFI	$r = 0.835, p < 0.001^*$
Desire	$r = 0.768, p < 0.001^*$
Arousal	$r = 0.768, p < 0.001^*$
Lubrication	$r = 0.683, p < 0.001^*$
Orgasm	$r = 0.73, p < 0.001^*$
Satisfaction	$r = 0.829, p < 0.001^*$
Pain	$r = 0.549, p < 0.001^*$

FSFI — Femal Sexual Function Index; SQoL-F — sexual quality of life in women

and orgasm are the main causes of women's sexual problems after experiencing fetal loss. Moreover, in the study group, the women functioned best in the domains of pain and lubrication. It can therefore be assumed that the stress caused by the loss of pregnancy affects the psychological or relational aspect of sexuality (desire, arousal) more than the physiological aspects (pain, lubrication). This is confirmed by studies conducted among women receiving treatment for infertility [18]. It was the stress caused by infertility that turned out to be the factor that had the most significant impact on arousal, experiencing orgasm, and overall sex life satisfaction.

Studies have shown depression rates in women after miscarriage reach up to 55% [6, 19] and anxiety rates of 28–45% both immediately after the event and even six months after it [20]. Interesting research on this subject was carried out by Neugebauer et al. [21], who assessed the psychological well-being of women after 2 and 6 weeks and 6 months after a miscarriage in comparison with pregnant and non-pregnant women. The research shows that the depression rate in those who had suffered a miscarriage was 3.4 and 4.3 greater 2 weeks after the loss, while after 6 weeks and after 6 months, this rate was 2.6 and 3 times greater, respectively. The frequency of anxiety disorders within six months after miscarriage was verified by Klier et al. [22]. These results are confirmed by other data, in which it was noted that women may experience depression and anxiety for at least 3 years after the miscarriage, even after subsequent live births [23].

Sexual problems are very often an indication of mental health disorders [24]. It has also been reported that sexual dysfunction has a two-way relationship with depression [25]. Symptoms such as inability to experience joy, fatigue, and lowered self-esteem can reduce the sex-related quality of life. Additionally, sexual dysfunctions may indirectly lead to secondary infertility by reducing the number of sexual intercourse events [26]. A study by Fabre and Smith [27]

demonstrated that with the increase in depression levels, the deterioration of sexual function in women after a miscarriage becomes more severe. Depression is also closely connected with decreased libido, dyspareunia and orgasm disorders [28]. Even in the absence of clinical symptoms of depression, a depressed mood may lead to sexual dysfunctions, and positive or negative sexual experiences may affect mental well-being during the day [29]. Moreover, depression is also associated with a 50–70% reduction in the sex-related quality of life, and that sexual dysfunction increases the risk of depression by 130–200% [30].

Some research attempts have focused on analyzing sexual function and depression in women with a history of recurrent pregnancy loss (RPL). A Portuguese study demonstrated that women with a history of recurrent miscarriage suffered from depression twice as often and experienced severe sexual dysfunction because of it [31]. Moreover, another study in Sweden showed that sexual dysfunction in women after more than one pregnancy loss is closely related to depression and anxiety [32]. This is also confirmed by the results of this study. It was demonstrated that the sex-related quality of life and sexual function (both in the areas of arousal, desire, lubrication, orgasm and satisfaction) were significantly better in women after one pregnancy loss than in women who experienced two or more losses.

The relationship between depression and sexual dysfunctions in women undertaking infertility treatment [18] and polycystic ovary syndrome treatment [33, 34] has also been described. It was noted that difficulties related to procreation, the inability to conceive and the stress associated with treatment can lead to significant sexual dissatisfaction in the studied group of women. This is partially confirmed by the results of this study. It was demonstrated that the longer the efforts for a lost pregnancy had been, the worse quality of life in relation to sex and sexual function was. Moreover, the quality of life in the domains of arousal and lubrication was significantly better in those women who had not planned pregnancy. The length of procreative activities is also closely related to sexual function in the arousal domain. The longer one had attempted to get pregnant, the worse their function in this domain was. The quality of sex life was also better in the group of women who had not planned pregnancy. Therefore, it can be assumed that the motivation to have sexual intercourse in a situation of long-term efforts that do not bring the expected result is strictly non-sexual, and the intercourse itself is treated simply as a task of procreative activity, serving to conceive another child and only subject to the woman's fertility cycle.

It appears that the mother's age is another important factor that may impart greater significance to pregnancy and affect functioning following the experience of pregnancy loss. From the medical point of view, the risk of miscar-

riage increases with age, which is associated with a declining number and quality of egg cells. Advanced maternal age was a risk factor for adverse pregnancy outcomes as well [35]. On the other hand, from the perspective of developmental psychology, a woman is aware of the inevitability of the passage of time and, consequently, has a lesser ability to fulfil the parental role, which may have a negative impact on sexual activity. This concept is confirmed by the results of this study. It was demonstrated that the more advanced the age was, the worse the quality of life in relation to sex and the worse sexual function in specific areas of sex were.

The authors of the study also assumed that the duration of the relationship may play a protective role after experiencing a loss. It seems that the longer lasting the relationship is, the more it is based on trust and mutual commitment. Open communication, accepting differences in experiencing grief, and supportive behavior may be important skills that can further strengthen a relationship and help partners gain confidence that the relationship will withstand the hardships of life. However, the results of the research did not confirm this hypothesis. It was observed that with the lengthening of the duration of the relationship not only was the sex-related quality of life worse after experiencing a miscarriage, but also sexual function in all areas of FSFI deteriorated. However, it is worth noting that, apart from the strictly volitional aspect, aversion to intercourse may also be a consequence of dyspareunia (which can be a result of postoperative consequences and infections) or vaginismus (which may be caused by the lack of a sense of security on the partner's side or a persistent dyadic conflict, including fear for health or fear of the likelihood of experiencing another loss). Low self-esteem and/or a decrease in attractiveness resulting from post-pregnancy changes also occur frequently, the consequences of which are sexual aversion and sexual disharmony [8]. It seems that these factors may appear regardless of the duration and intensity of the relationship, but primarily, they are a consequence of the experienced trauma related to pregnancy loss. Nevertheless, other studies have demonstrated that the relationships of couples after experiencing miscarriage were similar to those before the event, and the couples did not report difficulties in communicating about sex in the context of pregnancy loss [36]. Moreover, as the results of this study also demonstrated, women felt very close emotionally to their partner; they felt that their sex-related quality of life was the best at that level. Therefore, attention should be drawn to the distinction between emotional and intimate closeness, even when considering the act of engaging in sexual intercourse.

The presented studies did not show any correlation between sexual function and the number of children or the week and/or trimester of pregnancy when the fetal death

occurred. Therefore, it can be assumed that the situation of pregnancy loss, imparting personal significance thereto and, above all, the loss of dreams and ideas about motherhood and the bond with the child to be born, constitutes such a difficult experience (regardless of the stage of pregnancy development) that perhaps the character of this moment in human life cannot be reduced to a single, all-encompassing pattern, which can be explained for example by the heterogeneity of the studied population. Moreover, the lost images and projections of parenthood that follow miscarriage can be of secondary character, taking the form of a sense of worthlessness, a decline of one's sexuality or femininity which results from the perception of the inability to rely on one's body and giving birth successfully. Therefore, further research in this direction seems to be particularly important, primarily in order to allow for undertaking adequate support programs for women and their partners after pregnancy loss, including considerations for the non-medical aspect too. Unfortunately, the small number of publications on this subject makes it extremely difficult to relate them to the results presented in this work, as well as to attempt to draw broader conclusions. It is also unsatisfactory that there has been no possibility to compare the results of this research with the results from other centers in Poland.

This study has several limitations. Firstly, a relatively small sample of 110 women surveyed after suffering pregnancy loss limits the representativeness of the results and the statistical power of the obtained analyses. Secondly, the data was obtained from only one clinical center. No trend should therefore be extrapolated to a wider (or general) population from such a small sample. For these reasons, the results should be interpreted with caution.

The strength of this study lies in its objective. In Poland, there are practically no studies on female sexuality regarding experiencing fetal loss. There are also no studies analyzing women's sexual function in specific areas, such as desire or arousal. However, more research needs to be done to improve the mental and sexual health of patients with a record of pregnancy loss.

CONCLUSIONS

The study has demonstrated that women who have lost their pregnancies have a lower quality of sex life and worse sexual function in each domain of the FSFI questionnaire. The week in which the pregnancy was lost and the fact of having more children appeared out to be statistically insignificant.

However, the more advanced the age and the duration of the relationship were, the more the quality of sexual life and functioning deteriorated. The quality of sex life and sexual function in terms of desire, arousal and orgasm were significantly better in the women after one fetal loss

in comparison to those who had suffered more than one, and in those women who had not planned to become pregnant. The length of procreative efforts culminating in lost pregnancy and treatment at a Reproductive Health Clinic were also important. Therefore, prophylactic interventions focused on women are required to minimize the risk of adverse psychological and sexual outcomes, including sexual dysfunctions.

Conflict of interest

All authors declare no conflict of interest.

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