

FEMALE SEXUAL FUNCTION AND DYSFUNCTION: A CROSS-NATIONAL PREVALENCE STUDY IN SLOVENIA

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SUMMARY – The purpose of the current study was to evaluate the prevalence of female sexual dysfunction in Slovenia. We aimed to explore the prevalence itself, comparison among demographic groups and potential correlations. Data were collected based on the validated standardized Female Sexual Function Index (FSFI) (N=605). Most participants had sexual intercourse with one partner (n=523), and the majority of sexual relationships were heterosexual (n=584). University educated subjects had the highest claims of arousal, followed by those with master/doctoral degrees and college educated ones. The lowest level was expressed by subjects with elementary school. The youngest subjects (18-23 years) expressed the highest levels of desire and arousal, followed by the 24-29 age group. The 42-47 age group reported higher levels of lubrication and orgasm. The claim of satisfaction was highest in the 24-29 age group, while the pain was highest in the 42-47 age group. Strong correlation was found between the claims of desire and arousal ($r=0.585$), arousal and lubrication ($r=0.879$), lubrication and pain ($r=0.856$), orgasm and lubrication ($r=0.856$), satisfaction and orgasm ($r=0.782$), and pain and arousal ($r=0.776$) ($p<0.001$). We identified a 31% prevalence of female sexual dysfunction in Slovenia.

Key words: *Orgasm; Slovenia; Coitus; Arousal; Lubrication; Pain; Sexual dysfunctions, psychological; Sexual dysfunctions, physiological*

Introduction

In general, sexual dysfunction is defined as dyspareunia¹, as well as the absence of sexual desire, arousal, and stages of orgasm. Several studies have focused on different factors of influence that, according to the authors, could contribute to the incidence of female sexual dysfunction (FSD). The influencing factors might be physiological, psychological, negative experiences in relationships, low levels of happiness and overall well-being, emotional distress, sexual desire disorders, sexual arousal disorder, orgasmic disorder, sexual pain dis-

orders, beliefs, past and present experiences/relationships, lifestyle, and other mood disorders²⁻³². Investigations have also focused on linkages between changes in sexual arousal and menopause. Moreover, typical vaginal symptoms such as dryness discomfort are associated with decreased desire due to progressive chronologic aging². FSD traditionally includes sexual desire disorders, sexual arousal disorders, orgasmic disorders, and sexual pain disorders during and/or after sexual intercourse^{15,16,32}. Authors have indicated that this problem remains uninvestigated³³. A high prevalence of FSD predicts lower/poorer female sexual functioning³⁴. It differs in various age groups and achieves high prevalence in more mature ages and relationships^{35,37}.

Most epidemiological studies indicate the prevalence of FSD at 37%-40%^{38,39}, e.g., 25%-63% in the American

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population, or up to 30% in the Asian area (Hong Kong, China, Korea, Taiwan and Singapore)⁴⁰. In 1992, the National Health and Social Life Survey estimated the prevalence of FSD at 43%¹⁴. Another study involving men and women (N=27,500) aged from 40 to 80 years indicated that 39% of sexually active women reported sexual activity disorders⁴⁰. The common denominator of most studies is a decrease in sexual desire followed by orgasmic dysfunction⁴¹.

In relation to FSD, many researchers have used the Female Sexual Function Index (FSFI). The FSFI was designed to be an assessment instrument in clinical trials addressing the multidimensional nature of female sexual function¹⁴. However, the measures have been criticized for their biased results for sexually inactive samples⁴². Some authors argued that measuring sexual desire with the FSFI might be particularly problematic, contending that there is long-standing dissatisfaction with outdated models of female sexual desire³⁹. The relevance of the study based on FSFI is focused on acquiring relevant data because in Slovenia, information on the prevalence of FSD does not exist.

Materials and Methods

Ethical permission for the cross-national survey was obtained from the Slovenian Ethics Committee, and investigations were conducted according to the Declaration of Helsinki principles. All the participants gave a written informed consent before the study. The cross-national and sectional prevalence study started in July 2015 and was concluded in December 2015. Four clinical institutions in three different geographical locations in Slovenia were involved. We intentionally selected one clinical institution in the eastern, two in the central, and one in the western parts of Slovenia.

We used a validated standardized FSFI questionnaire¹⁴. In every clinical institution, we distributed 250 questionnaires, with the exception of the central part of Slovenia, where we distributed 500 questionnaires (two in each clinical institution). The recruitment process was based on the following inclusion conditions: (a) adulthood (age ≥ 18 years); (b) physician's verbal explanation; and (c) personal acceptance and return of the questionnaire understood as consent.

Out of the 1000 questionnaires, 623 were returned. Three hundred and twenty-seven questionnaires were fully and 257 partially completed. On statistical analy-

sis, we included all partially completed questionnaires (with the exception of some missing demographic data and data in relation to endometriosis, all FSFI claims were entirely completed). We did not include female participants with mental (n=11; 1.8%) and sexual (n=7; 1.1%) disorders. The final sample included 605 female participants; the realization of the sample was 60.5%. The Cronbach alpha coefficient showed an appropriate internal consistency for each claim of FSFI questionnaire (desire, arousal, lubrication, orgasm, satisfaction, and pain)¹⁴ (Table 1).

Table 1. Internal consistency for claims

Claim	Questions	%	(α)
Desire	1,2	1-5	0.856
Arousal	3, 4, 5, 6	0-5	0.950
Lubrication	7, 8, 9,10	0-5	0.961
Orgasm	11, 12, 13	0-5	0.934
Satisfaction	14, 15, 16	0 (or 1)-5	0.897
Pain	17,18,19	0 (or 1)-5	0.977
All terms			0.973

All participants were asked about their demographic variables including pregnancy and number of children, presence of endometriosis and menopause, number of sexual partners and sexual orientation, and the six major dimensions of female sexual function (desire, subjective arousal, lubrication, orgasm, satisfaction, and pain) in the previous four weeks. For FSFI, we used a validated questionnaire with 19 multiple-choice questions on a 5- or 6-point Likert scale¹⁴. Domain scores were calculated by summing responses to items in each domain, then scaling this total with a multiplier that constrains all domains to the same range. Linguistic validation of the questionnaire was performed based on translation from English to Slovenian language and *vice versa*. Cultural validation was not required, based on the constant cultural proportion and the lack of cultural diversity in Slovenia.

Statistical analysis

Data were analyzed using the SPSS 17.0 statistical software. The Kolmogorov-Smirnov test and Shapiro-Wilk test were applied to evaluate whether values had a gaussian distribution to choose between parametric and nonparametric statistical tests. The Kolmogorov-

Smirnov test and Shapiro-Wilk test on six claims of FSFI showed a non-normal distribution. Based on this finding, we used a non-parametric statistical analysis by use of Pearson correlation coefficient and χ^2 -test. Statistical significance was set at $p < 0.05$.

Results

The sample consisted of the following age groups: 30-35 ($n=122$; 20.2%), 24-29 ($n=118$; 19.5%), 36-41

Table 2. Age groups ($N=605$)

Age (years)	f	%
18-23	62	10.2
24-29	118	19.5
30-35	122	20.2
36-41	90	14.9
42-47	66	10.9
48-53	69	11.4
54-59	44	7.3
60-65	26	4.3
≥66	8	1.3

f = frequency

Table 3. Estimation of claims according to age groups

Age group (years)		Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain
18-23	M	4.11	4.50	4.99	4.37	4.85	5.12
	SD	1.07	1.29	1.43	1.66	1.44	1.61
24-29	M	3.95	4.49	5.12	4.69	5.05	5.26
	SD	0.90	1.28	1.42	1.61	1.16	1.45
30-35	M	3.68	4.07	4.69	4.43	4.58	4.67
	SD	1.08	1.72	2.01	1.96	1.72	2.12
36-41	M	3.61	4.37	4.86	4.65	4.69	5.12
	SD	0.98	1.61	1.76	1.80	1.51	1.82
42-47	M	3.66	4.26	5.13	4.83	4.97	5.34
	SD	1.01	1.50	1.46	1.53	1.33	1.55
48-53	M	2.99	3.66	4.46	4.17	4.50	4.97
	SD	1.15	1.62	1.81	1.87	1.52	1.78
54-59	M	3.13	3.61	4.06	4.41	4.79	4.90
	SD	1.20	1.61	1.77	1.69	1.32	1.67
60-65	M	2.79	2.79	3.29	3.43	3.55	3.88
	SD	1.18	1.76	2.13	2.18	1.91	2.42
≥66	M	2.10	1.56	1.74	2.33	4.10	2.13
	SD	0.99	1.68	2.34	2.61	1.68	2.55
Total	M	3.60	4.11	4.73	4.46	4.72	4.96
	SD	1.11	1.60	1.78	1.81	1.50	1.84
	p	0.000	0.000	0.000	0.003	0.002	0.000

M = mean; SD = standard deviation; p = level of statistical significance

($n=90$; 14.9%) and 48-53 ($n=69$; 11.4%). Other groups are shown in Table 2. Based on Pearson coefficient, we found no positive correlations (see Table 8).

The youngest subjects (age 18-23) expressed the highest levels of desire and arousal, followed by the 24-29 age group. The 42-47 age group reported the highest levels of lubrication and orgasm. The claim of satisfaction and pain was highest in the 24-29 and 42-47 age group, respectively (Table 3).

Concerning the level of education, study subjects had completed elementary school ($n=30$; 0.3%), secondary school ($n=275$; 45.5%), professional college ($n=53$; 8.8%), college ($n=73$; 12.1%), university ($n=139$; 23%), and master/doctoral degree ($n=33$; 5.5). Two (0.3%) of the respondents did not state their education level. The claim of arousal and orgasm was best estimated by university educated subjects, followed by those with master/doctoral degree and college. The lowest level was expressed by subjects with elementary school (Table 4).

Most of the study participants were not pregnant ($n=491$; 81.2%). Others were pregnant in the 1st ($n=34$; 5.6%), 2nd ($n=36$; 6%) and 3rd trimester ($n=37$; 6.1%).

Table 4. Level of education

Education		Arousal	Orgasm
Elementary school	M	3.39	3.98
	SD	1.45	1.79
Secondary school	M	3.90	4.24
	SD	1.66	1.88
Professional college	M	4.03	4.39
	SD	1.61	1.79
College	M	4.27	4.58
	SD	1.52	1.76
University	M	4.52	4.84
	SD	1.47	1.65
Master/doctoral degree	M	4.38	4.75
	SD	1.58	1.74
Missing	M	6.00	6.00
	SD		
Total	M	4.11	4.46
	SD	1.60	1.81
	p	0.001	0.035

M = mean; SD = standard deviation; p = level of statistical significance

Three (0.5%) respondents gave birth less than six weeks after the study ($p=0.000$; $\chi^2=620.045$; $M=1.36$; $SD=0.89$). Four (0.7%) respondents did not provide their pregnancy status. Based on the Pearson correlation coefficient, we did not find positive correlations with claims (see Table 8). Most of the participants did not have children ($n=225$; 37.2%), 147 (24.3%) had one child, 198 (32.7%) had two children, and 35 (5.8%) had three or more children ($p=0.000$; $\chi^2=140.897$; $M=2.08$; $SD=0.96$) (Table 5). Based on the Pearson correlation coefficient, we did not find positive correlations with claims (see Table 8).

Menopause was not detected in 503 (83.1%) participants. The sample included eight (1.3%) menopausal women on hormone replacement therapy and 85 (14%) menopausal women without hormone replacement therapy ($p=0.000$; $\chi^2=1115.613$; $M=1.16$; $SD=0.44$).

Most of the participants were free from endometriosis ($n=576$; 95.2%). Fourteen (2.3%) women were diagnosed with endometriosis and had undergone one surgical therapy ($n=14$; 2.3%), while another four

Table 5. Number of pregnancy and children in the sample

Pregnancy	f	%	Children	f	%
None	491	81.2	None	225	37.2
1 st trimester	34	5.6	One	147	24.3
2 nd trimester	36	6.0	Two	198	32.7
3 rd trimester	37	6.1	Three or more	35	5.8
Delivery (within less than six weeks)	3	0.5			
Missing	4	0.7			
Total	605	100		605	100

f = frequency

Table 6. Number of sexual partners ($N=619$)

Sexual partners	f	%
One partner	535	86.4
Two different partners	11	1.8
Three different partners	3	0.5
No sexual intercourse	23	3.8
Missing	45	7.4
Total	605	100

$p=0.000$; $\chi^2=1714.417$; $M=1.12$; $SD=0.86$

p = level of significance; M = mean; SD = standard deviation; f = frequency

(0.7%) had undergone additional surgical therapies. Four (0.7%) women had not been involved in any surgical procedure. Seven (1.2%) participants did not answer this part of the questionnaire ($p=0.000$; $\chi^2=2192.289$; $M=1.04$; $SD=0.34$). Based on the Pearson correlation coefficient, we did not find positive correlations between menopause, endometriosis, and claims from the questionnaire (see Table 8).

Most of the respondents had sexual intercourse with one partner ($n=535$; 86.4%). The rest of the respondents were involved in sexual intercourse with

Table 7. Sexual relationship (N=604)

Sexual relationship	f	%
Heterosexual	584	96.5
Homosexual	2	0.3
Bisexual	4	0.7
Missing	15	2.7
Total	605	100

$p=0.000$; $\chi^2=1714.417$; $M=0.99$; $SD=0.25$

p = level of significance; M = mean; SD = standard deviation; f = frequency

two ($n=11$; 1.8%) and three ($n=3$; 0.5%) different partners. Twenty-three (3.8%) respondents reported no sexual activity (Table 6). Based on the Pearson coefficient, we did not find positive correlations with these claims (see Table 8).

Most of the sexual relationships were heterosexual ($n=584$; 96.5%). A small proportion were bisexual ($n=4$; 0.7%) and homosexual ($n=2$; 0.3%) (Table 7). Based on the Pearson correlation coefficient, we did not find positive correlations with these claims (Table 8).

Table 8. Correlations between independent variables and claims

		Education	Pregnancy	Menopause	No. of children	Endometriosis	Sexual orientation	Sexual intercourse
DESIRE	Frequency	0.07	-0.006	-0.236**	-0.153**	0.012	-0.032	-0.129**
	Level	0.098*	0.042	-0.173**	-0.177**	0.008	-0.047	-0.191**
AROUSAL	Frequency	0.215**	-0.015	-0.176**	-0.088*	-0.002	-0.06	-0.271**
	Level	0.167**	-0.038	-0.148**	-0.065	0.015	-0.016	-0.328**
	Confidence	0.157**	0	-0.154**	-0.093*	0.005	-0.028	-0.340**
	Satisfaction	0.181**	-0.035	-0.144**	-0.062	0.003	-0.015	-0.311**
LUBRICATION	Frequency	0.143**	-0.038	-0.167**	-0.093*	-0.006	-0.028	-0.315**
	Difficulty	0.083*	-0.032	-0.112**	-0.018	0.005	-0.005	-0.361**
	Frequency of maintaining	0.175**	-0.018	-0.148**	-0.057	-0.008	-0.024	-0.319**
	Difficulty in orgasm	0.098*	-0.03	-0.093*	-0.005	-0.011	0.005	-0.366**
ORGASM	Frequency	0.196**	-0.006	-0.097*	0.032	0.041	-0.022	-0.232**
	Difficulty	0.124**	-0.018	-0.056	0.023	0.009	0.022	-0.328**
	Satisfaction	0.113**	-0.012	-0.049	0.02	0.029	-0.044	-0.326**
SATISFACTION	With amount of closeness	0.117**	0.001	-0.068	-0.058	0.01	-0.026	-0.407**
	With sexual relationship	0.084*	0	-0.068	-0.032	0.019	-0.014	-0.380**
	With overall sex life	0.163**	0.007	-0.099*	-0.027	0.018	-0.036	-0.195**
PAIN	With frequency during penetration	0.093*	-0.061	-0.089*	0.009	-0.017	-0.004	-0.394**
	Frequency following penetration	0.07	-0.043	-0.101*	-0.009	-0.01	-0.017	-0.405**
	Intensity during or following penetration	0.090*	-0.035	-0.107**	-0.016	0.002	-0.004	-0.398**

* $p<0.005$; ** $p<0.001$

Table 9. Pearson correlation coefficient among claims

	Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain
Desire	-	0.585*	0.470*	0.434*	0.455*	0.348*
Arousal	0.585*	-	0.879*	0.856*	0.770*	0.776*
Lubrication	0.470*	0.879*	-	0.839*	0.749*	0.856*
Orgasm	0.434*	0.856*	0.849*	-	0.782*	0.757*
Satisfaction	0.455*	0.779*	0.749*	0.782*	-	0.717*
Pain	0.348*	0.765*	0.856*	0.757*	0.717*	-

*Correlation significant at the 0.01 level (2-tailed)

The respondents used different methods of contraception. It should be noted that the majority (n=304; 50.2%) did not use any of the contraception methods listed in the questionnaire. We should note that 110 (18.2%) respondents were pregnant or had given birth. Some (n=19; 3.1%) used interruption of sexual intercourse as a method of contraception. From the list of contraception methods, the respondents most commonly used condoms (n=112; 18.5%) and contraceptive pills (n=80; 13.2%).

Based on the Pearson correlation coefficient, we detected strong linear associations between desire and arousal (r=0.856), arousal and lubrication (r=0.879), lubrication and arousal (r=0.879), orgasm and arousal (r=0.862), satisfaction and orgasm (r=0.782), and pain and lubrication (r=0.782) (Table 9).

The estimation of FSD was based on the Receiver Operating Characteristic (ROC) and Classification and Regression Trees (CART) analysis⁴³. The prevalence was estimated based on the model that contains one variable, which represents the total score of points in all domains. If the total number of points is equal to or greater than 26.55, sexual dysfunction is not present in 88.1% of cases. However, if the result is lower, sexual dysfunction is present in at least one of the domains in 77.7% of cases. Accordingly, the risk of sexual dysfunction is present in each subject with a total score of 26.55 or lower.

To calculate the prevalence, we initially divided the sample into two groups: one group including women with a total score of FSFI higher than 26.55 and the other one with a lower score. In each group, we calculated the sum of all female subjects. In the first group, we recorded a higher overall result in 375 (69%) and in the second group in 169 (31%) subjects. The results obtained yielded the prevalence of FSD in Slovenia of 31%.

Discussion

Based on our research, the prevalence of sexual dysfunction in Slovenia is 31%. Several exogenous and endogenous factors influence the subjective meaning of sexuality. Among endogenous factors, the organic substratum, i.e. pathology and pathophysiology of tissues, should be mentioned. The psychological factors also play a significant role in the individual perception of the appropriate or inappropriate sexual stimuli. Basson *et al.*¹⁵ argued that depression interfered with female sexual response, with a negative association among desire, arousal, satisfaction, orgasm, and pain. Future studies should not just involve individual perceptions and (mis)understandings, but as Meils *et al.*⁴⁴ argued, the impact of the couple's relationship quality in sexual function should be investigated.

With the growth and development of the female body, changes occur in the perception, understanding and needs of sexual stimuli. The youngest females (18-23 and 24-29 age groups) reported higher levels of the physiological and psychological stimuli linked with desire, arousal and satisfaction. At later ages (42-47 age group), changes also occur, focused on lubrication, orgasm, and pain. In addition to age, the level of education represents a strong influential factor. Sexual stimuli are oriented on arousal and orgasm.

In addition to growth, development, chronologic age and education, sexual stimuli are influenced by several other factors, such as acquisition of knowledge, adoption of values, and spiritual growth⁴⁵⁻⁴⁷.

Based on our study, we conclude that arousal is linked to desire, orgasm, and lubrication. Lubrication affects desire and pain, and orgasm plays a vital role in satisfaction (Fig. 1). Theoretically, from the physiological/psychological point of view, we could conclude that the sexual cycle first involves desire, arousal, lubrica-

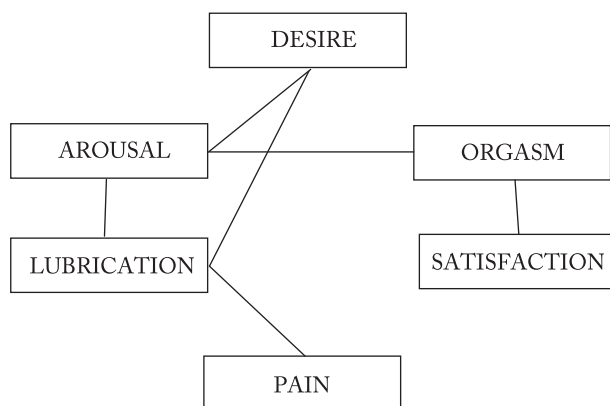


Fig. 1. Schematic presentation of correlations.

tion, orgasm, and finally satisfaction. It is interesting that the claim of orgasm is not linked to desire and lubrication. Theoretically, orgasm cannot occur without arousal and lubrication, and previously without desire.

More studies will be required to respond to the issue of whether orgasm can occur during the rape of female victims⁴⁸.

Limitations

The current research had some limitations. We should note that sexual dysfunction itself has a diverse etiology, and we could not be entirely objective. Other limitations arose from the methodology: 1) we did not use face-to-face interviews because they could embarrass people when talking about privacy issues, although, according to some authors, data compiled through methods such as online surveys are fraught with bias and misinformation; and 2) the unequal distribution of the questionnaires might affect the demographic correlations made in the study.

Conclusions

This study was one of the first attempts to assess the prevalence of sexual dysfunction among female adults in Slovenia. We took a well-validated, commonly used questionnaire for fast and accurate screening of FSD. The study significantly contributed to the understanding of female sexual function and the influence of age and level of education on the perception, understanding and needs of sexual stimuli, and on the prevalence of FSD in Slovenia.

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Sažetak

SEKSUALNA FUNKCIJA I DISFUNKCIJA ŽENE: NACIONALNO ISTRAŽIVANJE UČESTALOSTI U SLOVENIJI

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Cilj ovoga istraživanja bio je procijeniti učestalost seksualne disfunkcije kod žena u Sloveniji. Ispitala se učestalost disfunkcije s usporedbom demografskih skupina i moguće korelacije. Podaci su prikupljeni pomoću potvrđenog standardiziranog Indeksa seksualne funkcije žene (N=605). Većina sudionica u istraživanju imala je seksualni odnos s jednim partnerom (n=523) i većina seksualnih odnosa bila je heteroseksualna (n=584). Najveće zahtjeve za uzbuđivanje imale su osobe s fakultetskim obrazovanjem, a nakon njih one s magisterijem i doktoratom te osobe s višom školom. Najnižu razinu izrazile su osobe s osnovnom školom. Najmlađa dobna skupina (18-23 godine) izrazila je najviše razine želje i uzbuđenja, a nakon nje dobna skupina od 24-29 godina. Dobna skupina od 42-47 godina izrazila je najviše razine lubrikacije i orgazma. Zahtjev zadovoljavanja bio je najviši u skupini od 24-29 godina, dok je bolnost bila najviša u skupini od 42-47 godina. Utvrđena je snažna korelacija između zahtjeva želje i uzbuđivanja ($r=0,585$), uzbuđivanja i lubrikacije ($r=0,879$), lubrikacije i boli ($r=0,856$), orgazma i lubrikacije ($r=0,856$), zadovoljenja i orgazma ($r=0,782$) te boli i uzbuđivanja ($r=0,776$). Utvrđena je učestalost seksualne disfunkcije kod žena u Sloveniji od 31%.

Ključne riječi: *Orgazam; Slovenija; Koitus; Uzbuđenje; Lubrikacija; Bol; Seksualne disfunkcije, psihološke; Seksualne disfunkcije, fiziološke*