

Socio-demographic Determinants of Low Sexual Desire and Hypoactive Sexual Desire Disorder: A Population-based Study in Iran

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Abstract

Background: Various socio-demographic factors are determinants of Low Sexual Desire (LSD), but whether these are the determinants of Hypoactive Sexual Desire Disorder (HSDD) are unclear. The aim of this study is to evaluate the Socio-demographic determinants of LSD and HSDD in Iranian women of reproductive age.

Methods: This was a population-based, cross-sectional study of 1000 Iranian women of reproductive age (15-49 years) who met the inclusion criteria and were chosen through systematic random sampling from all the healthcare centers in Sari, Iran. LSD was defined as a score no higher than 33 on the Sexual Interest and Desire Inventory-Female (SIDI-F); sexually related personal distress was defined as a score of at least 11.0 on the Female Sexual Distress Scale-Revised (FSDS-R); and HSDD was defined as a combination of these scores. Descriptive statistics were used to describe demographic characteristics while for analyzing grouped variables, chi-square test was applied. Multivariate regression test was also used to adjust the effect of confounding variables.

Results: The mean score of sexual interest/desire among women who referred to healthcare centers in the city of Sari is estimated as 30.6 ± 10.5 . After adjusting the effect of the confounder variables by logistic regression multivariate analysis, the age at first intercourse, the length of time spent in marriage, and the level of satisfaction with income were variables significantly associated with LSD and HSDD ($P < .01$). Although increasing individual's age ($P < .001$) and body mass index ($P < .01$) were predictors of LSD in women, HSDD was not statistically significant.

Conclusion: There are some factors that are associated with LSD in women but are not related to HSDD. In other words, some factors associated with LSD do not cause personal distress which are one of the criteria necessary for HSDD.

Background

Hypoactive sexual desire disorder (HSDD) is one of the most common type of female sexual dysfunction which can affect women of all ages. First, it is important to remember that HSDD is separate from low sexual desire (LSD) which is often experienced in daily life[1]. A sexual complaint can only be considered a sexual disorder when the diagnostic and statistical association criteria for sexual dysfunctions are met and that sexual problem has caused personal distress[2]. According to the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision* (DSM-IV-TR), low or decreased sexual desire which can cause marked personal distress is the primary indicator of HSDD. Based on research data, in the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (DSM-5), HSDD is categorized under female sexual interest/arousal disorder (FSIAD). This amendment has remained among controversial reforms. Regardless of the benefits of change in diagnostic criteria, decades of research based on DSM-IV-TR criteria for HSDD has shaped the basis of our understanding from the primary symptoms of LSD distress, its epidemiology, clinical management, and its treatment[3]. In fact, assertions about the epidemiology of FSIAD have been based on extrapolation of studies using HSDD rather than FSIAD criteria[4]. The prevalence of LSD - depending on the population studied-varies from 11–53%. However, only 22%-65% of these women reported having LSD-related distress required for diagnosis of HSDD[5].

Sexual desire is multi-causal and multidimensional phenomenon, with large individual, couple, cultural, and value differences that need to be addressed if we want to deal with it properly[6]. The etiology of HSDD is also multi-factorial, including biological, psychological, sexual factors and it is related to social context[7]. Compared to women without HSDD, women diagnosed with HSDD reported greater sexual and marital dissatisfaction, hopelessness, frustration, anger, loss of femininity and low self-esteem[8].

Regarding the Socio-demographic factors impacting LSD and HSDD, various studies have reported different results. Some of these studies indicate that LSD and HSDD increase with age [7, 9, 10], Whereas in other studies, LSD has been the only factor associated with increasing age (not HSDD)[5]. Understanding these factors is essential in screening individuals for the diagnosis of LSD and HSDD.

Based on researches, very few international studies have been conducted in this field so far, yet no study has been conducted to identify demographic factors associated with LSD and HSDD among reproductive-aged married women in Iran. Therefore, the present study intends to investigate the demographic factors associated with LSD and HSDD. It is hoped that raising awareness of this issue among Iranian women could be a major step forward in planning future national policies towards sexual and reproductive health promotion.

Methods

Design and data collection

This cross-sectional questionnaire-based study is reported according to Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (for checklist, see supplementary information)[11].

This population-based cross-sectional study was conducted with a 2-stage cluster sampling design in Sari, Iran. First, the necessary scientific permissions were attained from the Mazandaran University of Medical Sciences. Subsequently, approval was obtained from the Ethics Committee of Mazandaran University of Medical Sciences (IR.MAZUMS.REC.94.1734).

The Sample

The research was conducted with a 2-stage cluster sampling design. In the first stage, all the healthcare centers of Sari city were included in the study, as maximum heterogeneity was attained. In the second stage, reproductive age women were selected at systematic random sampling method from each center. The sample in each center was determined considering the probability of selection in proportion to population size (or estimated population size). In each center, a list of eligible women in each center was provided and numbered and a fixed sampling interval was determined. The interval was attained by dividing the population size by the desired sample size. Then the individuals were contacted and invited to participate in the study.

Participants

A total of 1000 reproductive age women from 20 health centers of Sari participated in the study, conducted between October and January 2015–2016. The study population was aware of the nature of the survey, and their verbal and written informed consent was achieved. Note that, none of the study participants were under the age of 16, so there was no need for parental or guardian consent.

Participants in this study included reproductive-aged women who have been married and lived with their sexual partner for at least 6 months and were willing to participate in the study. In addition, women who were pregnant or breastfeeding for the first six months, and those who went through premature ovarian failure were excluded from the study.

Outcome Measurements

Women who participated in the study were initially questioned on their socio-demographic characteristics including age, age of first intercourse, number of children, duration of marriage, body mass index, level of satisfaction with income, education level, physical activity, current smoking and alcohol use. Subsequently, women were asked to fill in the Sexual Interest and Desire Inventory-Female and Female Sexual Distress Scale-Revised forms.

Sexual Interest and Desire Inventory-Female (SIDI-F) were designed by Clayton et al in 2006 and consisted of 13 items plus 5 diagnostic items. The probable score range for each individual falls within 0 to 51, and a higher score indicates better sexual desire. The reliability of this tool has been excellent and the internal consistency coefficient of this tool was reported with the Cronbach's Alpha 0.90%. The validity of this tool was also examined by observing and correlating it with other valid instruments of sexual function[12]. Moreover, the validity and reliability of the Persian version of this tool was assessed in Iran. In the Persian version, the internal consistency was obtained with the Cronbach's Alpha 0.90% and the evaluation of the test-retest with a two week interval showed the proper reliability of this tool[13].

Since personal distress as a key factor is used in diagnosing HSDD, female sexual distress scale-revised version (FSDS-R) was used to assess it. This is a 13-item questionnaire with items marked on a 5-point Likert scale ranging from 0 (never) to 4 (always), with the higher score (11 and above) indicating greater sexual distress. The original version of FSDS-R has shown acceptable reliability with the Cronbach's alpha falling within the range of 0.87–0.93% and a higher test-retest reliability (the internal correlation coefficient of 74–86%). For determining the reliability of the Persian version FSDS-R, internal consistency and reliability were assessed using test-retest method. Furthermore, Alpha coefficients were determined as a measure of internal consistency, while the reliability for correlation coefficients was assessed using test-retest measurement (repeatability index). The homogeneity of 70% and more was considered acceptable. Using test-retest method, the internal consistency and reliability were calculated to be > 0.70. Therefore, the Persian version FSDS-R is considered a valid and reliable tool for assessing distress related to sexual dysfunction in Iranian women and can be used for screening patients with HSDD[14].

Women with low Sexual desire (SIDI-F score ≤ 33.0) and sexually related personal distress (FSDS-R score ≥ 11) were classified as having HSDD. When combined with a requirement for personally related sexual distress, this provides a robust definition of HSDD for use in an epidemiologic context.

Statistical Methods

In the study on women aged 20–60 years, the reported prevalence of sexual desire problems using Female Sexual Functioning Index (FSFI) in 28 cities of Iran was 35% ($p = 35\%$)[15]. With an estimated precision of 3% ($d = 0.03$) at 2-tailed 5% significance difference (α) ($Z = 1.96$), and a nonresponse rate of 10%, a sample size of 1000 women was obtained.

Statistical analyses were performed using SPSS software version 18. The distribution, mean, and SD values were initially obtained using descriptive statistics. The socio-demographic factors linked to LSD and HSDD were then obtained using the chi-square test.

A P value lower than 0.20 in chi-square test was adopted as representing the critical level for the selection of variables. Those variables with a P value greater than 0.20 were maintained as adjusting factors into the multivariate logistic regression analysis[16].

Multivariate regression analysis was conducted to estimate the strength of associations.

After adjustment in accordance with the variables in multivariate regression analysis, the associations between the variables investigated and HSDD and LSD for which P values of 0.05 or lower were considered statistically significant.

Results

A total of 1000 women of reproductive age (15 to 49 years with the mean \pm SD values age of 32.09 ± 7.33) participated in the study. The demographic characteristics and correlation with LSD and HSDD are shown in Table 1. All of the demographic characteristics were significantly associated with LSD. Although moderate alcohol consumption and physical

activity were associated with LSD, they were not associated with HSDD. Other demographic variables were associated with HSDD.

Table 1
Demographic Characteristics of Study Subjects & Results of the chi-square test of LSD & HSDD among women of reproductive age

Variables & Categories	Total	LSD			HSDD		
	Frequency(Percentage)	Frequency	Percentage	P/value	Frequency	Percentage	P/value
Age (years)							
< 30	409(40.9)	163	39.9	0.000	64	15.6	0.03
30–35	276(27.6)	149	54.0		55	19.9	
36–40	164(16.4)	115	70.1		40	24.4	
> 40	151(15.1)	116	76.8		37	24.5	
age at first intercourse							
9–17	180(18.0)	111	61.7	0.002	55	30.6	0.000
18–20	291(29.1)	172	59.1		61	21.0	
21≤	529(52.9)	260	49.1		80	15.1	
Education level							
Primary-illiterate	25(2.5)	15	60.0	0.000	4	16.0	0.000
secondary	391(39.1)	249	61.9		105	26.9	
university	584(58.4)	286	49.0		87	14.9	
duration of marriage							
< 2	76(7.6)	19	25.0	0.000	7	9.2	0.000
2–5	256(25.6)	100	39.1		25	9.8	
6–10	253(25.3)	130	51.4		58	22.9	
> 10	415(41.5)	294	70.8		106	25.5	
Body mass index							
< 25	466(46.6)	213	45.7	0.000	81	17.4	0.17
25–30	374(37.4)	215	57.7		77	20.6	
≥ 30	160(16.0)	115	71.9		38	23.8	
Number of children							
None	288(28.8)	102	35.4	0.000	41	14.2	0.005
One	348(34.8)	192	55.2		66	19.0	
Two or more	364(36.4)	249	68.4		89	24.5	
Satisfaction of income level							
never	154(15.4)	100	64.9	0.000	43	27.9	0.000
low	217(21.7)	145	66.8		62	28.6	
Moderate	558(55.8)	269	48.2		86	15.4	

Variables& Categories	Total	LSD			HSDD		
	Frequency(Percentage)	Frequency	Percentage	P/value	Frequency	Percentage	P/value
Much	71(7.1)	29	40.8		5	7.0	
Physical activity							
never	583(58.3)	340	58.3	0.008	125	21.4	0.04
rarely	303(30.3)	151	49.8		45	14.9	
almost	114(11.4)	52	45.6		26	22.8	
Current smoking							
yes	29(2.9)	14	48.3	0.01	9	31.0	0.11
no	971(97.1)	529	54.5		187	19.3	
alcohol Use							
Yes(Moderate use)	62(6.2)	18	29.0	0.000	10	16.1	0.4
no	938(93.8)	529	56.0		186	19.8	

The obtained findings from multivariate logistic regression between socio-demographic, LSD, and HSDD are indicated in Table 2. As demonstrated, Our results suggest that the odds of LSD and HSDD are 50% -60% lower in women with age at first intercourse ≥ 21 (OR:0.56; 95% CI:0.3–0.9) and (OR:0.4; 95% CI:0.2–0.7), respectively.

Table 2
Results from the multivariate logistic regression analysis of LSD & HSDD in Women of Reproductive Age

Variables& Categories	LSD		HSDD	
	Odds ratio (95% CI)	P/value	Odds ratio (95% CI)	P/value
Age (years)				
< 30	1.0(ref.)		1.0(ref.)	
30–35	1.4 (0.9-2.0)	0.083	1.1(0.7–1.9)	0.57
36–40	2.1 (1.2–3.7)	0.005	1.2(0.6–2.4)	0.48
> 40	3.1 (1.6–5.8)	<0.0001	1.3(0.6–2.7)	0.35
age at first intercourse				
9–17	1.0(ref.)		1.0(ref.)	
18–20	0.81 (0.5–1.3)	0.39	0.5(0.3–0.9)	0.01
21≤	0.56 (0.3–0.9)	0.01	0.4(0.2–0.7)	0.002
Education level				
Primary	1.0(ref.)		1.0(ref.)	
secondary	2.1(0.8–5.4)	0.10	3.0(0.9–9.6)	0.06
university	2.1(0.8–5.3)	0.11	2.0(0.6–6.5)	0.24
duration of marriage				
< 2	1.0(ref.)		1.0(ref.)	
2–5	1.6(0.8-3.0)	0.10	1.0(0.4–2.6)	0.88
6–10	1.7(0.9–3.5)	0.09	3.0(1.1-8.0)	0.02
> 10	2.4(1.1–5.4)	0.02	3.2(1.0-9.6)	0.03
Body mass index(BMI)				
< 25	1.0(ref.)		1.0(ref.)	
25–30	1.1(0.8–1.5)	0.36	1.0(0.7–1.5)	0.78
≥ 30	1.8(1.1–2.8)	0.006	0.9(0.5–1.5)	0.89
Number of children				
None	1.0(ref.)		1.0(ref.)	
One	1.3(0.8–1.9)	0.18	0.6(0.3-1.0)	0.08
Two or more	1.2(0.7-2.0)	0.45	0.5(0.2-1.0)	0.06
Satisfaction of income level				
never	1.0(ref.)		1.0(ref.)	
low	1.1(0.6–1.7)	0.65	1.0(0.6–1.7)	0.72
Moderate	0.5(0.3–0.7)	0.002	0.5(0.3–0.8)	0.007

Variables& Categories	LSD		HSDD	
	Odds ratio (95% CI)	P/value	Odds ratio (95% CI)	P/value
Much	0.4(0.2–0.8)	0.01	0.1(0.06–0.5)	0.001
Physical activity				
never	1.0(ref.)		1.0(ref.)	
rarely	0.7(0.5-1.0)	0.07	0.7(0.4-1.0)	0.11
almost	0.5(0.3–0.9)	0.02	1.1(0.7-2.0)	0.50
Current smoking				
no	1.0(ref.)		1.0(ref.)	
yes	0.9(0.3–2.4)	0.96	1.7(0.7–4.2)	0.22
Alcohol consumption				
no	1.0(ref.)		-	
Yes(Moderate use)	0.4(0.2–0.8)	0.01	-	

The odds of LSD diagnosis were 3.1 and 2.1 times higher among those aged 35–40 years (OR:2.1; 95% CI:1.2–3.7) and over 40 years of age (OR:3.1; 95% CI:1.6–5.8) than women under 30 years. However, the woman's age was not a factor associated with HSDD.

Moreover, women with Body mass index (BMI) ≥ 30 were at 1.8-fold greater risk for LSD compared with women having Body mass index (BMI) > 25 (OR:1.8; 95% CI:1.1–2.8). But women's body mass index was not related to HSDD.

The odds of reporting LSD and HSDD are approximately 2.4 and 3.2 times higher in women with 10 years or more of marriage compared with women who have been married less than 2 years(OR:2.4; 95% CI:1.1–5.4) and (OR:3.2; 95% CI:1.0-9.6), respectively.

women with moderate and high Level of Satisfaction with income were associated with lower levels of LSD ((OR:0.5; 95% CI:0.3–0.7), (OR:0.4; 95% CI:0.2–0.8)) and HSDD ((OR:0.5; 95% CI:0.3–0.8), (OR:0.1; 95% CI:0.06–0.5)), respectively.

Among the personal habits, moderate alcohol consumption and having more physical activity were associated with lower levels of LSD ((OR: 0.4; 95% CI: 0.2–0.8), (OR: 0.5; 95% CI: 0.3–0.9)), respectively. But, these variables were not associated with HSDD.

Among the meaningful factors that affect LSD, we emphasize on woman's age < 40 ($P < .001$), Body mass index (BMI) ($P < .01$) and Moderate Satisfaction of income level ($P < .01$) has shown the most significant relationship. However, the most important factors affecting HSDD were age at first intercourse and Moderate Satisfaction of income level ($P < .01$).

Discussion

The present study was conducted to determine demographic factors associated with LSD and HSDD. Among the factors investigated, socio-demographic variables associated with LSD were age, years of marriage, age of the first intercourse, alcohol consumption, physical activity, body mass index and the level of satisfaction with income, whereas income satisfaction, years spent in marriage and age of the first intercourse were the only variables associated with HSDD.

In what follows, the significant relationship between the socio-demographic factors with LSD and HSDD obtained from multivariate logistic regression analysis is discussed.

Body Mass Index (BMI): The present study indicated that by controlling other variables, BMI increasing has led to an increased LSD (the odd ratio for LSD in the women BMI \geq 30 has been 1.8 times than those with BMI > 25) which did not result in an increased HSDD.

Duration of Marriage: The findings of the present study show that by adjusting other variables, as the amount of time spent in marriage increases, the LSD and HSDD also increase.

Therefore, after ten years or more of marriage, the possibility of having LSD and HSDD in women would be 2.4 and 3.2 times more than women who have been married less than two years. Similar to the findings of the present study, many studies have confirmed the inverse relationship between the duration of marriage and sexual desire problems. The results of another study conducted on 356 women aged 20-70 years indicated that women who had been in relationship lasting for 20-29 years, experience higher levels of disaffection compared to women who were in relationship less than 5 years[24]. Faus's study (2009) also indicated that after controlling age variables, relationship and sexual satisfaction; women's sexual desire has a significantly inverse relationship with marriage duration[25]. Kim (2013) also reported that women with HSDD who have been in long-term relationship tend to have lower scores for sexual desire[26]. Therefore, these findings show the necessity of taking preventive interventions based on couples' sexual health promotion over the course of their married life.

Age at First Intercourse: The results of the present study indicated that having the first sexual intercourse at a very young age can be considered a risk factor for having LSD and HSDD. However, this finding contradicts with the study conducted by Abdo (2011) in Brazil. According to the results of his study, women whose age at first intercourse was more than or equal to 21 were 1/5 times more likely to experience HSDD compared to women whose first intercourse were between 9-17 years of age[7]. In spite of that, Safarinejad's study in Iran indicated that lower marriage age significantly increases sexual problems[15]. The possible causes of this discrepancy can be the differences in the geographical location of the community under study, individual's life, plus cultural and attitudinal differences that exist on the appropriate age of the first intercourse. In European societies women usually experience their first intercourse at a very young age, but in Iranian societies any intimate relationship (specially the sexual type) between men and women outside of marriage bond is socially, culturally, legally, and religiously forbidden.

Level of Satisfaction with Income: Controlling other demographic variables showed that increasing satisfaction in monthly income will decrease the possibility of having LSD and HSDD, thus income satisfaction act as a protective factor against developing HSDD. It appears that Satisfaction with income level reduces LSD and HSDD through decreasing tensions and stress in the women's lives.

This finding matches with the result from Ghanbarzadeh's study (2013) indicating financial problems as significant factors of being diagnosed with LSD in women[27]. Results obtained from another study indicated that the emergence of sexual desire problems in face of financial dependency are significantly higher[15]. In a study conducted on 1000 married women between 16-49 years of age in Egypt indicated that most of the participants believed that LSD is associated with socio-economic conditions such as economic stressors and lower income[28]. In contrast, a study conducted in China (2006) showed that by controlling variables such as age, education level, and marriage age, the average monthly income growth in women has resulted in an increased reluctance in sexual relationship[29]. It can only be justified that higher income leads to higher independency, which is in fact dependency from spouse and lack of sexual relationship as dependency cause false interest in couples to have sex.

One of the strengths of this study has been the fact that it was conducted on a large-scale population of women of reproductive age with a large sample size from all health centers in Sari city, Iran. Furthermore, since sexual distress is an

essential factor in identifying HSDD, Sexual Interest and Desire Inventory-Female (SIDI-F) as well as female sexual distress scale-revised version (FSDS-R) were used for diagnosis of HSDD.

The present study has some limitations. This study is limited to women of reproductive age (15-49 years) who were not pregnant or breastfeeding. Furthermore, all the effective factors on sexual desire including psychological and biological factors were not studied. Thus it should be noted that more extensive studies need to be conducted in order to have a thorough examination of other factors involved and collect more information on the sexual desire status of women in other groups such as pregnant, lactating, and menopausal women.

Conclusions

In conclusion, while there are some common factors between LSD and HSDD, the socio-demographic factors associated with LSD and HSDD are different. The difference in research community, sample size, and the applied tool for defining and identifying LSD and HSDD can justify different socio-demographic factors associated with LSD and HSDD in various studies.

Abbreviations

LSD: Low Sexual Desire; HSDD: Hypoactive Sexual Desire Disorder; DSM-IV-TR: Disorder *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision*; DSM-5: *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition*; FSIAD: Female Sexual Interest/Arousal Disorder; SIDI-F: Sexual Interest and Desire Inventory-Female; FSDS-R: Female Sexual Distress Scale-Revised.

Declarations

Ethics approval and consent to participate

This study was approved by the ethical committee of Mazandaran University of Medical Sciences, Sari, Iran (grant number: 1734). Written informed consent from the study participants was also obtained before conducting this study. Since all participants in the study were over the age of 16, there was no need for parental or guardian consent.

Consent for publication

Not applicable.

Availability of data and material

The raw data produced in this study are not available publicly due to the likelihood that they will be used in future new analyses, but are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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No funding was received for this study.

Authors' contributions

MM conceived the idea and wrote the proposal, participated in the data collection process, analyze data, and draft the paper. ZH approved the proposal with some revisions, participated in data analysis, and reviewed the manuscript in the role

of Supervisor. MM critically reviewed the data analysis and interpretation. SK and MP contributed to the revisions of the manuscript. All the authors approved the final version of the manuscript.

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