

Sexual Desire, Sexual Function, and Quality of Life in Married Women with Hypoactive Sexual Desire Disorder

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<Abstract>

Objectives: This study was performed to identify the relationship among sexual desire, other domains of sexual function and quality of life (QOL) and to describe the effect of sexual desire on sexual function and QOL in married women with hypoactive sexual desire disorder (HSDD). **Methods:** A total of 397 women with HSDD participated in this study. Data were collected through self-reported questionnaire which were constructed to include general characteristics items, Female Sexual Function Index (FSFI), and QOL tool. Data were analyzed using SPSS/WIN20 for descriptive statistics, t-test, one-way ANOVA, Duncan, partial correlation coefficients, and Hierarchical multiple regression. **Results:** There were significant correlations with sexual desire and other domains of sexual function. And also, sexual desire had a positive correlations with the psychological status and total QOL. The sexual desire was statistically significant predictors for sexual function and QOL. **Conclusions:** Health professionals should direct efforts toward developing sexual health-related counseling or education programs for women suffering from sexual dysfunction with the goal of helping them to achieve satisfying sex lives and improved quality of life.

Key words: Hypoactive sexual desire disorder, Sexual dysfunction, Quality of life, Women

I. Introduction

The last decade has seen a resurgence of scientific interest in female sexual function. The American Foundation for Urological Disease (AFUD) has worked to develop definitions of female sexual dysfunctions based on different domains of sexual function (sexual desire, sexual arousal, orgasm) and sexual pain, similar to the DSM-IV-TR (*Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision*) classifications. Hypoactive sexual desire disorder (HSDD) is defined “as a lack or absence of sexual fantasies and desire for sexual activity that causes marked distress or interpersonal difficulties” (Basson et al., 2000).

In studies outside Korea, sexual desire as a domain of female sexual function was first researched by Kaplan (1977). Since then, researchers have investigated the frequency of female sexual desire disorders using various participants, perspectives, and

measurement tools. Out of all female sexual dysfunctions, sexual desire disorders show the highest prevalence (Shifren, Monz, Russo, Segreti, & Johannes, 2008). The prevalence of HSDD in females was recently estimated at 24-43%, which is 1-15% higher than the prevalence of sexual desire disorders in males (Segraves & Woodard, 2006). There is insufficient epidemiologic research in Korea, but a recent study of married women with a mean age of 39.7 years reported that 48.9% were experiencing sexual desire disorders (Kim & Lee, 2010). Another study found that 44.0% of young women with a mean age of 28.5 years had such disorders (Song, Jeon, Kim, Paick, & Son, 2008). Therefore, there is a higher frequency of sexual desire disorders in Korea than in other countries, and it is evident that females generally do not adjust well to their sex lives compared with males.

Conventional researches have reported that the risk factors of HSDD include stable past and current mental health, positive

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emotional well-being, self-image, positive feelings for partner, partner's factors, aging process, menopause, the presence of co-morbidity, and certain medications (Clayton, 2010; Dennerstein, Koochaki, Barton, & Graziottin, 2006; Warnock, 2002). In other words, diverse variables, such as physiological, psychological, environmental, and personal factors, have been identified as HSDD's risk factors.

Maintaining or improving quality of life (QOL) is a major focus of sexual health practice. With regard to international studies of female sexual desire disorder and QOL, there is insufficient research regarding the QOL among women with HSDD. The Women's International Study of Health and Sexuality (WISHeD) found that women with HSDD are significantly more likely to report dissatisfaction with their sex lives, marriages, or partners compared with women without decreased sexual desire. In addition, women with HSDD are more likely to report feelings of frustration, hopelessness, and anger, as well as a loss of femininity and altered self-esteem (Leiblum, Koochaki, Rodenberg, Barton, & Rosen, 2006). Additionally, Biddle et al. (2009) reported that QOL scores of women with HSDD were lower than those of women with non-HSDD. Thus, sexual desire functioning may have a significant impact on women's sexual function and QOL. And also, considerable research on QOL of women with HSDD has been conducted (Bibble et al., 2009) as have studies of sexual satisfaction and importance of sex life (Leiblum et al., 2006). However, the relationship between sexual function and QOL of women with HSDD has not been fully explored in the literature.

In the treatment of male sexual dysfunction clients, the need has recently surfaced to treat the sexual function of their female partners. In addition, due to the increased social status and

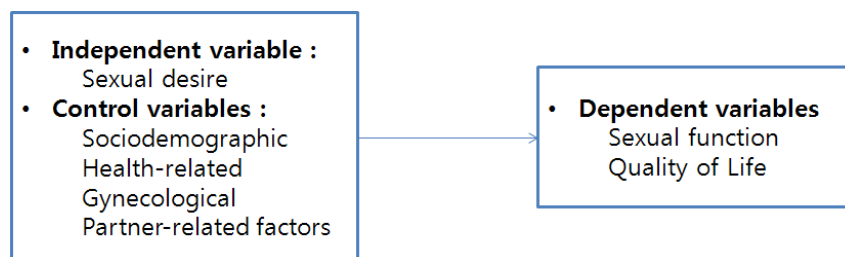
authority of females and the influence of more open Western cultures, females are now playing an active sexual role; thus, there has recently been increased interest in female sexual function and its components (Yang, Hwang, & Park, 2012). In Korea, however, research regarding sexual desire disorders among married women has been limited. Therefore, the overall understanding of sexual treatment is inadequate, and there is a lack of intervention programs to overcome sexual function disorders (Kim & Lee, 2010).

Thus, this study had the following objectives: 1) to determine the degree of sexual function and QOL in women with HSDD, 2) to determine score differences among sexual desire, sexual function, and QOL of women with HSDD according to their general characteristics, 3) to determine the relationship among sexual desire, sexual function, and QOL of women with HSDD, and 4) to determine the effect of sexual desire on sexual function and QOL of women with HSDD. This study is expected to extend knowledge about sexual dysfunction among married women in Korea and suggest new avenues for sexual health counseling and educating.

II . Methods

1. Study design

This research is a descriptive correlation study attempted by utilizing a questionnaire prepared for understanding of the degree of sexual desire, sexual function, and QOL and confirming the effect of sexual desire on sexual function and QOL of married women with HSDD, and the study model set up by the present study based on the precedent studies is described in [Figure 1].



[Figure 1] Research model framework

2. Data collection

Married Korean women were the target population, and married women 20 years or older living in city G, city D, and county G were the proximity population. From January to June of 2011, participants were approached in the district civil service offices, health offices, and department store culture centers, as described above, by the author and trained assistant researchers. To secure reliability between evaluators, the 3 research investigators studied the content and intent of the questionnaire beforehand, and education was provided for 3 hours on 3 occasions to secure consistency between the different evaluators regarding the answers of the respondent. Then, the questionnaire was administered to 1 standardized subject, and the 3 investigators checked the responses. As the results showed 96.5% consistency, reliability between evaluators was confirmed.

Participants provided written consent to take part in the survey after being told about the purpose and procedure of this study, voluntary participation, guaranteed anonymity, and the choice to abandon the study. The participants were advised that their names would not be associated with a report in any way and that they had the right to withdraw from the study at any time. They were reassured that their private information would not be identifiable in any way. The women who agreed to participate completed the self-reported questionnaires including the sociodemographic, health-related, gynecological and partner characteristics, FSFI (Female Sexual Function Index), and QOL questionnaire while sitting alone in a quiet place. The general characteristics, QOL, and the FSFI took an average of 25 min to complete. After filling out self-reported questionnaires, we gave a small gift as compensation for participating in the study.

According to the nationwide census data by Korea National Statistical Office (2010), the numbers of married women by age groups were reported to be 630,064 in 20s, 3,124,788 in 30s, 3,913,924 in 40s, and 3,248,364 in 50s, and the present study recruited 866 married women samples based on the population age ratio of 1:5.0:6.2:5.2 for those in their 20s, 30s, 40s, and 50s respectively. A total of 866 women in their 20s to 50s were selected as participants (50 in their 20s, 249 in their 30s, 310 in their 40s, and 257 in their 50s). A Korean version of the

female sexual function measurement tool FSFI was used. Following Gerstenberger et al. (2010), participants with a 'cutpoint' score of 5 or less in the sexual desire domain of the FSFI, comprising two questions, were categorized as married women with HSDD. As a result, among the total of 866 participants, 411 (47.5%) were categorized as married women with HSDD, including 20.0% of those in their 20s, 36.1% in their 30s, 48.0% in their 40s, and 57.6% in their 50s.

From the 411 married women with HSDD, 14 participants with incomplete responses were excluded. Hence, the final number of participants for analysis was 397. Using G*Power 3.1.5 and calculating with a multiple regression significance level $\alpha = .05$, effect size of 0.15 (medium), test power of .90, and number of predictors 25 showed that the total number of research participants should be at least 209; thus, the sample was of sufficient size (Faul, Erdfelder, Buchner, & Lang, 2009).

3. Instruments

1) Sociodemographic, health-related, gynecological, and partner characteristics

The participants were asked about their age, duration of marriage, occupation, education level, religion, monthly household income, BMI, presence of chronic disease, use of medication for chronic disease, and duration of chronic disease. BMI was classified as normal weight ($BMI < 23 \text{ kg/m}^2$), overweight ($23 \text{ kg/m}^2 \leq BMI < 25 \text{ kg/m}^2$), and obesity ($25 \text{ kg/m}^2 \geq BMI$). Gynecological and partner characteristics consisted of menopausal state, age of menopause onset, use of hormone pills, types of hormones, number of pregnancies and deliveries, and erectile dysfunction and premature ejaculation of the partner.

2) Female sexual function

The FSFI developed by Rosen et al. (2000) and translated into Korean for Korean women (Kim et al., 2002) was used. The FSFI consists of a total of 19 questions in 6 domains: 2 questions related to sexual desire, 4 related to sexual arousal, 4 related to vaginal lubrication, 3 related to orgasm, 3 related to satisfaction, and 3 related to pain during intercourse.

Questions 1 and 2 related to sexual desire, in the tool are measured on a 5-point scale, where 1 indicates 'nearly or very low' and 5 indicates 'always or very high.' The other 17 questions are measured on a 6-point scale, where 0 indicates 'no sexual activity,' 1 indicates 'almost never,' and 5 indicates 'always.' Items number 8 and 10 on vaginal lubrication, 12 on orgasm, and 17, 18, and 19 on sexual pain were reversely coded. The domain-specific score is multiplied by the weighted value for each factor, and the scores for all 6 domains are added together to calculate the total sexual function score. The range of measured scores showed a distribution from a minimum of 2 to a maximum of 36. Higher scores signify that the perceived sexual function of the subject is higher.

The reliability of this research was measured using Cronbach's alpha coefficient. At the time of development, the Cronbach's alpha coefficient was 0.97 in the research of Rosen et al. (2000). The Cronbach's alpha coefficient was 0.99 in Kim et al. (2002), and it was from 0.93 to 0.98 in our research.

3) QOL

The self-reporting questionnaire for QOL developed by Noh (1988) was used to measure QOL. The QOL measuring tool of Noh (1988) was developed targeting 2,179 married male and female residents of Seoul, and its relatively high validity and reliability have been confirmed. Furthermore, it is being used to identify the level of QOL in married and middle-aged women (Jin, 2008; Kim, 2003; Kim, 2003), and its reliability in researches, which it was used in, has also been excellent. Therefore, the present study also used the QOL measuring tool of Noh (1988) to identify the level of QOL in married women with HSDD. This tool consists of a total of 47 questions in 6 subcategories: 11 questions for economic factors, 9 questions for physical state and functioning, 6 questions for family relationship, 9 questions for psychological status, 8 questions for self-esteem, and 4 questions for relationship with neighbors. This study measured QOL using 43 questions in 5 categories, excluding the 4 questions related to relationship with neighbors. The 4 questions related to their general relationship with neighbors were decided to be irrelevant to their sexual functions, so they were deleted. The tool is a 5-point scale, where 1 is 'very unsatisfactory' and

5 is 'very satisfactory.' Therefore, the quality-of-life score showed a distribution from a minimum of 43 to a maximum of 215 points, with higher scores signifying higher QOL.

The reliability of this tool was measured by Noh (1988) at the time of its development, and the Cronbach's alpha coefficient was 0.94. The Cronbach's alpha coefficient was from 0.90 to 0.95 in our research.

4. Data analysis

The statistical software package SPSS/WIN 20.0 was used for data analysis (SPSS Inc., Chicago, IL, USA). The characteristics of the participants are expressed in real numbers and percentages. The differences in scores between the sexual desire, sexual function, and QOL according to the participants' characteristics were analyzed using the t-test, one-way ANOVA, and Duncan analysis. To express the participants' degrees of sexual function and QOL, the means and standard deviations were computed. The relationship among sexual desire, sexual function, and QOL was analyzed using partial correlation analysis. Finally, hierarchical multiple regression was used to examine the effect of sexual desire on sexual function and QOL by controlling for participants' characteristics. A 5% level of statistical significance was used.

III. Results

1. Sociodemographic, health-related, gynecological, and partner-related factors for women with HSDD

The percentages of women with HSDD per age groups were 2.5% in their 20s, 22.7% in their 30s, 37.5% in their 40s, and 37.3% in their 50s, respectively. The range of marriage duration was 20-29 years for 39.3% of them. Approximately 58% were unemployed, 73.3% had over or equal to high school graduate, 22.4% had no religion, and 43.1% earned 2-2.99 million won as monthly household income. Regarding health-related characteristics, approximately 54.2% were in the normal weight group, and approximately 20% had chronic diseases, of whom

41.8% had 5-10 years since diagnosis; among the participants with disease, 92.4% were taking medication for chronic disease. Regarding gynecological characteristics, 44.3% were postmenopausal, and the age of menopause onset was 46-50 for 52.3%. Regarding hormone administration for menopausal women, 37.5% were using hormonal medication, 48.8% were using a combination of estrogen and progesterone medicines,

and 51.2% were using low-dose estrogen medication. In addition, 52.4% had been pregnant 4 times or more, and 68.8% had been delivered twice or three times. With regard to the continuity of the partner's erection, approximately 57% were normal (no) and 43.3% were abnormal (yes). Regarding premature ejaculation by the partner, 66.5% responded normal (no) while 33.5% responded abnormal (yes) <Table 1>.

<Table 1> Mean differences of sexual desire, sexual function, and QOL according to the characteristics of women with hypoactive sexual desire disorder

(n=397)

Characteristics	n (%)	Sexual desire			Sexual function			Quality of life		
		Mean±SD	Duncan	t or F (p)	Mean±SD	Duncan	t or F (p)	Mean±SD	Duncan	t or F (p)
Age(years)										
20-29	10 (2.5)	2.28 ± 0.79	a	16.44 (<.001)	16.10 ± 8.12	a	9.81 (<.001)	3.17 ± 0.78	a	6.74 (<.001)
30-39	90 (22.7)	2.19 ± 0.71	a		16.28 ± 8.71	a		3.25 ± 0.72	a	
40-49	149 (37.5)	2.15 ± 0.68	a		16.57 ± 8.18	a		3.08 ± 0.54	ab	
50-59	148 (37.3)	1.70 ± 0.57	b		11.56 ± 8.56	b		2.97 ± 0.56	b	
Duration of marriage(years)										
<5	15 (3.8)	2.36 ± 0.77	a	18.53 (<.001)	16.01 ± 8.57	a	17.49 (<.001)	3.41 ± 0.67	a	7.54 (<.001)
5-9	36 (9.1)	1.87 ± 0.70	bc		12.17 ± 8.50	c		3.10 ± 0.86	bc	
10-19	101 (25.4)	2.37 ± 0.61	a		19.53 ± 8.40	a		3.25 ± 0.56	a	
20-29	156 (39.3)	1.96 ± 0.69	b		14.72 ± 8.49	b		3.01 ± 0.68	b	
≥30	89 (22.4)	1.62 ± 0.49	c		9.87 ± 8.22	c		2.96 ± 0.50	c	
Occupation				0.66 (.506)		1.37 (.170)				6.37 (<.001)
Employed	168 (42.3)	2.04 ± 0.69			15.38 ± 9.08			3.26 ± 0.47		
Unemployed	229 (57.7)	1.96 ± 0.68			14.15 ± 8.64			2.96 ± 0.45		
Education				-3.23 (.038)		-4.64 (<.001)				-7.82 (<.001)
Under middle	106 (26.7)	1.86 ± 0.62			11.15 ± 7.95			2.79 ± 0.36		
Above High	291 (73.3)	2.05 ± 0.67			15.88 ± 8.63			3.19 ± 0.47		
Religion				-1.32 (.178)		-2.61 (.009)				-1.22 (.222)
Have	308 (77.6)	1.99 ± 0.68			14.06 ± 9.11			3.07 ± 0.49		
Have not	89 (22.4)	2.01 ± 0.72			16.81 ± 7.53			3.14 ± 0.42		
Monthly household income(10,000won)				9.23 (<.001)		8.70 (<.001)				0.42 (.740)
<200	43 (10.8)	2.48 ± 0.66	a		20.36 ± 8.65	a		3.14 ± 0.56		
200-299	171 (43.1)	1.89 ± 0.69	b		13.04 ± 7.69	b		3.08 ± 0.77		
300-399	142 (35.8)	1.96 ± 0.66	b		15.20 ± 8.32	b		3.06 ± 0.43		
≥400	41 (10.3)	2.03 ± 0.58	b		13.70 ± 7.88	b		3.12 ± 0.67		
BMI(kg/m ²)				8.79 (<.001)		7.21 (<.001)				13.28 (<.001)
Normal	215 (54.2)	2.05 ± 0.68	a		15.87 ± 8.48	a		3.17 ± 0.65	a	
Over	89 (22.4)	2.13 ± 0.70	a		14.81 ± 8.51	a		3.08 ± 0.72	a	
Obesity	93 (23.4)	1.74 ± 0.63	b		11.77 ± 8.43	b		2.87 ± 0.44	b	
Presence of chronic disease				-3.54 (.012)		-4.99 (<.001)				-3.35 (.001)
Yes	79 (19.9)	1.68 ± 0.58			10.35 ± 8.50			2.92 ± 0.47		
No	318 (80.1)	2.08 ± 0.69			15.75 ± 8.61			3.12 ± 0.48		
Use of Medication for chronic disease*				-1.92 (.130)		-1.41 (.210)				-1.10 (.245)
Yes	73 (92.4)	1.62 ± 0.75			10.62 ± 8.15			2.93 ± 0.42		
No	6 (7.6)	1.82 ± 0.69			11.82 ± 8.68			2.99 ± 0.48		
Duration of chronic disease* (years)				3.36 (.022)		1.57 (.051)				0.87 (.354)
<1	33 (41.8)	1.96 ± 0.74	ab		11.56 ± 9.12			2.96 ± 0.67		
1-4	8 (10.1)	2.40 ± 0.56	a		12.70 ± 8.56			2.80 ± 0.55		
5-10	33 (41.8)	1.69 ± 0.60	b		11.89 ± 9.76			2.79 ± 0.45		
≥10	5 (6.3)	1.68 ± 0.66	b		11.77 ± 9.45			2.78 ± 0.47		
Menopausal state				14.67 (<.001)		6.19 (<.001)				5.31 (<.001)
Pre or peri	221 (55.7)	2.12 ± 0.67			17.02 ± 8.56			3.20 ± 0.47		
Post	176 (44.3)	1.75 ± 0.61			11.72 ± 8.33			2.94 ± 0.45		
Onset age of menopause(years)**				1.80 (.168)		2.32 (.101)				0.41 (.661)
<45	39 (22.7)	1.75 ± 0.70			12.13 ± 8.45			2.95 ± 0.56		
46-50	92 (52.3)	1.67 ± 0.58			10.95 ± 8.32			2.90 ± 0.78		
≥51	45 (25.0)	1.89 ± 0.62			14.30 ± 8.45			2.97 ± 0.43		

Characteristics	n (%)	Sexual desire			Sexual function			Quality of life		
		Mean±SD	Duncan	t or F (p)	Mean±SD	Duncan	t or F (p)	Mean±SD	Duncan	t or F (p)
Use of hormone pills**										
Yes	66 (37.5)	1.89 ± 0.66		0.87 (.312)	13.39 ± 7.78		1.47 (.143)	2.97 ± 0.41		0.04 (.965)
No	90 (62.5)	1.68 ± 0.60			11.61 ± 9.09			2.99 ± 0.57		
Types of hormone***										
Estrogen pills	44 (51.2)	1.45 ± 0.37		-0.25 (.650)	12.91 ± 8.04		-0.59 (.557)	2.91 ± 0.42		0.25 (.894)
Estrogen+Progesterone	42 (48.8)	1.91 ± 0.70			13.90 ± 7.53			2.86 ± 0.37		
Frequencies of pregnancy(times)										
0-1	28 (7.1)	2.35 ± 0.72	a	12.70 (<.001)	17.60 ± 8.53	a	12.36 (<.001)	3.33 ± 0.82	a	11.84 (<.001)
2-3	161 (40.6)	2.13 ± 0.65	a		16.80 ± 8.45	a		3.17 ± 0.72	a	
≥4	208 (52.4)	1.84 ± 0.67	b		12.64 ± 8.75	b		2.98 ± 0.71	b	
Frequencies of delivery(times)										
0-1	48 (12.1)	2.31 ± 0.70	a	8.80 (<.001)	17.82 ± 8.71	a	9.10 (<.001)	3.30 ± 0.71	a	10.67 (<.001)
2-3	273 (68.8)	2.00 ± 0.69	a		15.05 ± 8.54	b		3.10 ± 0.78	b	
≥4	76 (19.1)	1.79 ± 0.58	b		11.33 ± 8.67	c		2.90 ± 0.46	c	
Partner's erectile dysfunction										
No(normal)	225 (56.7)	2.12 ± 0.72		10.82 (<.001)	19.11 ± 6.02		13.94 (<.001)	3.16 ± 0.47		3.83 (<.001)
Yes(abnormal)	172 (43.3)	1.84 ± 0.61			8.87 ± 8.59			2.98 ± 0.47		
Partner's premature ejaculation										
No(normal)	264 (66.5)	2.14 ± 0.69		14.74 (<.001)	19.14 ± 5.88		19.58 (<.001)	3.15 ± 0.52		4.09 (<.001)
Yes(abnormal)	133 (33.5)	1.71 ± 0.58			6.94 ± 7.06			2.95 ± 0.45		

Note: *sample size=79 **sample size=176 ***sample size=86

2. Sexual function and QOL scores of women with HSDD

In this study, the sexual function score of married women with HSDD was 14.67. The mean score for each subcategory of sexual function was 1.99 for sexual desire, 2.00 for sexual arousal, 2.73 for vaginal lubrication, 2.29 for orgasm, 2.28 for

sexual satisfaction, and 3.39 for pain during intercourse. The QOL score for women with HSDD was 2.19. The mean score for each subcategory of QOL was 2.12 for economic life, 2.10 for physical state and functioning, 2.23 for family relationship, 2.21 for psychological status, and 2.28 for self-esteem<Table 2>.

<Table 2> Sexual function and QOL scores of women with hypoactive sexual desire disorder

(n=397)

Division	Range	Weight	Mean ± SD
Sexual function sub-scales			14.67 ± 8.84
Sexual desire	1-5	0.6	1.99 ± 0.68
Sexual arousal	0-5	0.3	2.00 ± 1.42
Lubrication	0-5	0.3	2.73 ± 1.94
Orgasm	0-5	0.4	2.29 ± 1.67
Sexual satisfaction	0(or 1) - 5	0.4	2.28 ± 1.67
Sexual pain	0-5	0.4	3.39 ± 2.37
Quality of life sub-scales		-	2.19 ± 0.48
Economic state	1-5	-	2.12 ± 0.56
Physical status and function	1-5	-	2.10 ± 0.47
Family relationship	1-5	-	2.23 ± 0.63
Psychological status	1-5	-	2.21 ± 0.71
Self-esteem	1-5	-	2.28 ± 0.67

3. Mean differences of sexual desire, sexual function, and QOL according to the characteristics of women with HSDD

Regarding the sexual desire score according to sociodemographic, health-related, gynecological, and partner-related factors, significant differences existed for age ($F=16.4$, $p<.001$), duration of marriage ($F=18.53$, $p<.001$), level of education ($t=-3.23$, $p=.038$), monthly household income ($F=9.23$, $p<.001$), BMI ($F=8.97$, $p<.001$), presence of chronic disease ($t=-3.54$, $p=.012$), duration of chronic disease ($F=3.36$, $p=.022$), menopausal status ($t=14.67$, $p<.001$), number of pregnancies ($F=12.70$, $p<.001$), number of deliveries ($F=8.80$, $p<.001$), partner's erectile dysfunction ($t=10.82$, $p<.001$), and partner's premature ejaculation ($t=14.74$, $p<.001$). On the other hand, there were no differences in the sexual desire score according to occupation, religion, use of medication for chronic disease, age of menopause onset, and use/types of hormone pills.

Regarding the sexual function score according to sociodemographic, health-related, gynecological, and partner-related factors, significant differences existed for age ($F=9.81$, $p<.001$), duration of marriage ($F=17.49$, $p<.001$), level of education ($t=-4.64$, $p<.001$), religion ($t=-2.61$, $p=.009$), monthly household income ($F=8.70$, $p<.001$), BMI ($F=7.21$, $p<.001$), presence of chronic disease ($t=-4.99$, $p<.001$), menopausal status ($t=6.19$, $p<.001$), number of pregnancies ($F=12.36$, $p<.001$), number of deliveries ($F=9.10$, $p<.001$), partner's erectile dysfunction ($t=13.94$, $p<.001$), and partner's premature ejaculation ($t=19.58$, $p<.001$). On the other hand, there were no differences in the sexual function score according to occupation, use of medication for chronic disease, age of menopause onset, and use/types of hormone pills<Table 1>.

Regarding the QOL score according to sociodemographic, health-related, gynecological, and partner-related factors,

significant differences existed for age ($F=6.74$, $p<.001$), duration of marriage ($F=7.54$, $p<.001$), occupation ($t=6.37$, $p<.001$), level of education ($t=-7.82$, $p<.001$), BMI ($F=13.28$, $p<.001$), presence of chronic disease ($t=-3.35$, $p=.001$), menopausal status ($t=5.31$, $p<.001$), number of pregnancies ($F=11.84$, $p<.001$), number of deliveries ($F=10.67$, $p<.001$), partner's erectile dysfunction ($t=3.83$, $p<.001$), and partner's premature ejaculation ($t=4.09$, $p<.001$). On the other hand, there were no differences in the QOL score according to religion, monthly household income, use of medication for chronic disease, duration of chronic disease, age of menopause onset, and use/types of hormone pills<Table 1>.

4. Partial correlation among sexual desire, other domains of sexual function, and QOL of women with HSDD

The relationship among the sexual desire, sexual function, and QOL were examined by partial correlation analysis while controlling for variables that could influence sexual desire<Table 3>. We controlled for extraneous variables described in the 'General Characteristics of the Participants' in our analysis. The sexual desire of women with HSDD was positively correlated with sexual arousal ($r=.691$, $p<.001$), lubrication ($r=.753$, $p<.001$), orgasm ($r=.591$, $p<.001$), sexual satisfaction ($r=.626$, $p<.001$), sexual pain ($r=.457$, $p<.001$), and total sexual function ($r=.643$, $p<.001$). For QOL, there was a positive correlation with psychological status ($r=.556$, $p<.001$) and total QOL ($r=.248$, $p=.043$). On the other hand, there was no correlation between economic status, family relationship, self-esteem, physical state, and sexual desire functioning<Table 3>.

<Table 3> Partial correlation among sexual desire, sexual function, and QOL of women with hypoactive sexual desire disorder

(n=397)

	Sexual desire*
	r (p)
Sexual function sub-scales	.643 (<.001)
Sexual arousal	.691 (<.001)
Lubrication	.753 (<.001)
Orgasm	.591 (<.001)
Sexual satisfaction	.626 (<.001)
Sexual pain	.457 (<.001)
Quality of life sub-scales	.248 (.043)
Economic status	.207 (.066)
Physical status and function	.049 (.665)
Family relationship	.074 (.514)
Psychological status	.556 (<.001)
Self-esteem	.081 (.473)

Note: *Variables controlled: Age, duration of marriage, education level, monthly household income, BMI, presence of disease, duration of chronic disease, menopausal state, frequency of pregnancy & delivery, and partner's erectile dysfunction and premature ejaculation

5. Hierarchical multiple regression results with sexual function and QOL as dependent variable

1) Sexual function

Because all participants' characteristics, including age, duration of marriage, job, education level, religion, monthly household income, BMI, presence of disease, menopausal state, frequency of pregnancy & delivery, and partner's erectile dysfunction and premature ejaculation, were significantly influenced to sexual function, these variables were included in the equation for hierarchical multiple regression analysis. <Table 4> shows that in model 1 all participants' characteristics variables accounted for 42.6% of the sexual function variance, with BMI ($\beta=-.100$, $p=.013$) and menopausal state(post) ($\beta=-.121$, $p=.029$), and premature ejaculation ($\beta=-.704$, $p<.001$) being statistically significant variables. In model 2, sexual desire explained an additional 17.1% of the total variance, with sexual desire ($\beta=.394$, $p<.001$), BMI ($\beta=-.107$, $p=.004$), and premature ejaculation ($\beta=-.591$, $p<.001$) being statistically significant

variables.

2) QOL

Because all participants' characteristics, including age, duration of marriage, job, education level, BMI, presence of disease, menopausal state, frequency of pregnancy & delivery, and partner's erectile dysfunction and premature ejaculation, were significantly influenced to QOL, these variables were included in the equation for hierarchical multiple regression analysis. Table 4 shows that in model 1 all participants' characteristics variables accounted for 13.5% of the QOL variance, with education (above high school) ($\beta=.176$, $p=.008$), BMI ($\beta=-.149$, $p=.008$), and premature ejaculation ($\beta=-.167$, $p=.046$) being statistically significant variables. In model 2, sexual desire explained an additional 11.5% of the total variance, with sexual desire ($\beta=.176$, $p<.001$), education (above high school) ($\beta=.156$, $p=.018$), and BMI ($\beta=-.147$, $p=.008$) being statistically significant variables.

<Table 4> Hierarchical multiple regression results with sexual function and QOL as dependent variable

(n=397)

Variables	Sexual function		Quality of life	
	Model 1 β (p)	Model 2 β (p)	Model 1 β (p)	Model 2 β (p)
Age	-.089 (.439)	-.105 (.322)	-.072 (.943)	-.036 (.817)
Duration of marriage	.024 (.831)	.012 (.907)	.130 (.384)	.138 (.351)
Job (employed)	-	-	.006 (.902)	-.022 (.647)
Education (above high school)	.033 (.754)	.024 (.884)	.176 (.008)	.156 (.018)
Religion (yes)	.023 (.521)	.032 (.340)	-	-
Monthly household income	-.053 (.142)	.026 (.436)	-	-
BMI	-.100 (.013)	-.107 (.004)	-.149 (.008)	-.147 (.008)
Presence of disease (yes)	-.070 (.076)	-.040 (.274)	-.017 (.751)	-.007 (.901)
Menopausal status (post)	-.121 (.029)	-.076 (.143)	-.127 (.089)	-.117 (.113)
Frequencies of pregnancy	-.096 (.054)	-.050 (.277)	-.026 (.711)	-.029 (.673)
Frequencies of delivery	.003 (.953)	-.018 (.717)	-.086 (.221)	-.068 (.328)
Partner's erectile dysfunction (yes)	-.048 (.441)	-.014 (.804)	-.001 (.993)	-.002 (.977)
Partner's premature ejaculation (yes)	-.704 (<.001)	-.591 (<.001)	-.167 (.046)	-.056 (.647)
Sexual desire	-	.394 (<.001)		.176 (.006)
R ²	.440	.609	.160	.276
Adjusted R ²	.426	.597	.135	.250
F	40.17	60.89	6.51	7.67
p	<.001	<.001	<.001	.006

IV. Discussion

Sexual function is an important element of human health and QOL. In most cultures, the sexual satisfaction of males is considered more important than that of females; for this reason, there have been more studies regarding male sexual function disorders, such as erectile dysfunction and premature ejaculation, and various treatment methods have been developed. On the other hand, female sexual dysfunction and its subcategories have attracted research attention only recently due to social, cultural, and personal restrictions (Yang et al., 2012). Female sexual desire disorders show an especially high prevalence both in Korea and internationally, but there is a lack of research regarding the QOL of women with these disorders.

First, in this study, the sexual desire score of married women with HSDD was 1.99. Rosen et al. (2012) evaluated sexual desire of 701 U.S. women (mean age 46.2) recruited at 20 clinical sites by using FSFI, and reported its resulting sexual desire score of 1.9 from women with HSDD, which was showed to be similar to the sexual desire functioning in the present study's samples' score of 1.99.

In this study, the sexual function scores of married women with HSDD (mean age 45.6) had a mean of 14.67 out of a total of 36. This is well below the previously reported cutpoint of 26.6 between women with and without sexual dysfunction (Wiegel, Menston, & Rosen, 2005). Several other studies in Korea have evaluated sexual function using the FSFI (Bae, 2004; Kim & Lee, 2010; Song et al., 2008). Bae (2004), who

investigated the sexual function of Korean women in their 20s to 50s, reported a sexual function score of 19.97, while Kim & Lee (2010) reported a score of 20.6 in a study conducted on married Korean women (mean age 39.6). Song et al. (2008) reported a sexual function score of 25.4 after evaluating sexual dysfunction frequency among 504 Korean women with a mean age 28.5. Connor et al. (2011) measured the degree of sexual function in pre-menopausal women with HSDD and reported a sexual function score of 16.4. However, since the participants in the study mentioned above were younger than those of the present study with the average age of 45.6 years, we think their sexual function score was reported lower. When the participants' sexual desire score of the present research is compared with that of other researches with similar sample ages, Rosen et al. (2012) measured the degree of sexual function in women with HSDD (mean age 46.7) and reported a sexual function score of 15.4, which is higher than the score of 14.7 in our study. Kim & Lee (2010) reported that, with a mean sexual function score of 20.6, 57.5% of married women complained of sexual dysfunction. Therefore, the frequency of sexual dysfunction among married women with HSDD was significantly higher in our study compared with other research results.

In our study, the QOL score of married women with HSDD was somewhat low: 2.19 out of 5. Several other studies in Korea have measured QOL with the same tool (Kim, 2003; Noh, 1988). Kim (2003) reported that the QOL score of middle-aged women after menopause was 2.54. Noh (1988), who developed the tool used in this research, reported that the QOL score of middle-aged women, ranging from 30-59 years, was 3.28. Although it is not the same QOL tool as that (Noh, 1988) used in the present study, when the QOL of women with HSDD is compared to the study using SF-12 (Short Form-12 Health Survey) as measuring tool, Biddle et al. (2009) reported that the QOL score of women with HSDD was 45.8 points out of 100, which is lower than non-HSDD women's 49.5 points. If the QOL score of our participants were converted into 100-point system, the calculation would yield a QOL score of 43.8 points, which was lower than that of Biddle et al. (2009)'s participants. Thus, these studies reported higher scores than our

study. Although the characteristics of research participants in these earlier studies were slightly different, it is notable that the QOL among married women with HSDD was lower than that among other groups of women.

While the focus of this study was on sexual desire, there were significant correlations with other domains of female sexual function, including sexual arousal, orgasm, lubrication, sexual satisfaction, and sexual pain examined by partial correlation analysis while controlling to factors that could be related to sexual desire. Scores for sexual desire and those for sexual arousal, orgasm, and sexual pleasure were highly correlated, indicating that low sexual desire is frequently associated with decreased functioning in other aspects of sexual response. Basson & Schultz (2007) reported that sexual desire problems were usually associated with difficulties in all phases of the sexual response cycle. For instance, orgasm cannot occur without arousal, and a lack of arousal often results in a lack of desire because sexual activity is not enjoyable. In addition, sexual pain disorders and a lack of sexual arousal may also be linked, as intercourse without arousal and associated lubrication can cause pain and lead to avoidance of sexual activity. Thus, our findings indicate that restoring a women's sexual desire may help to improve her overall satisfaction regarding her own sexual functioning.

In this research, sexual desire had a positive correlation with the psychological status and total QOL through the partial correlation analysis. In other studies, women with HSDD were significantly more likely to report dissatisfaction with their sex life and marriage or partner compared with women without decreased sexual desire. In addition, women with HSDD were more likely to report feelings of frustration, hopelessness, and anger, as well as loss of femininity and altered self-esteem (Leiblum et al., 2006). Furthermore, Lutfey, Link, Rosen, Wiegel, & McKinlay (2009) reported that depression was strongly and positively associated with sexual problems, as well as age and global mental health functioning. In addition, as a result of an analysis using hierarchical multiple regressions to understand whether the sexual desire would influence sexual function and QOL after controlling general factors that influence

on sexual function and QOL, as shown in <Table 1>, the sexual desire was proven to be an influencing factor on both HSDD women's sexual function and QOL.

Sexual desire occupies the highest place in frequency among female sexual dysfunction domains (Shifren et al., 2008), sexual desire functioning is positively correlated with other sexual function domains and total QOL, and was proven to be a predicting factor of sexual function and QOL. Therefore, in order to increase sexual function and QOL of women with HSDD, it will be necessary to enhance sexual desire functioning. In other words, sexual education and counseling program (sexual consultation for couples, marriage preparation class, sexual consultation program by ages, sexual health improvement program, etc.) will need to be developed by considering sociodemographic, health-related, gynecological, and partner-related factors. Particularly, at the time of developing materials for sexual education, factors influencing on sexual desire should be included in those educational materials.

In addition, It is not yet natural in Korea to talk about sex at an open place. As such, there are women who want to participate in sexual health promotion education and counseling programs but cannot take part due to lack of courage, and it is also uneasy to attend the programs when they want to receive education again for getting answers to some questions after competing a sexual health promotion program. Thus, the sexual health promotion education using the Internet has very positive and greater effects on this side. If we develop an e-educating program using the Internet and computers (Shin, Park, & Hong, 2010), we can give educational opportunities to many women, help them check up their levels of education by themselves, and enable sex education and counseling without temporal and spatial restrictions.

Finally, our study has several limitations. First, we failed to consider all related variables that influence sexual desire (especially, neurobiological and psychosocial factors, etc.). In consequence, we consider repetitive researches will be needed in the future since assessments on risk factors, such as nerve and brain disease, depression, marital intimacy, and body image etc. that can influence sexual desire have not been executed. Second,

as the research participants were all married and ranged in age from 20s to 50s, it is difficult to generalize to all females in the country. However, despite these limitations, this study is meaningful because it was conducted on a large scale (based on the age ratio of married women in Korea) and because it examined through one-on-one surveys the relationships among sexual desire, other domains of sexual function, and QOL among married women in Korea with HSDD.

V. Conclusion

Sexuality is considered to be an essential part of women's lives. In our present analysis, sociodemographic, health-related, gynecological, and partner-related factors were identified as variables that influenced the sexual desire. Low sexual desire is associated with decreased functioning in other aspects of sexual response and declined QOL. And the sexual desire was statistically significant predictors for sexual function and QOL. Therefore, strategies to improve sexual desire are necessary to enhance the other domains of sexual function and QOL among women with HSDD. Health professionals should direct efforts toward developing sexual health related counseling or education programs for women suffering from sexual dysfunction with the goal of helping them to achieve satisfying sex lives and improved QOL. Further research will provide additional insights into the other related factors including neurobiological and psychosocial factors that can contribute to sexual desire in women of all ages, with the ultimate goal of achieving more effective intervention in women who are distressed by low sexual desire.

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