Original Article

Role of mental health in prediction of sexual function in infertile women, Babol, Iran

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Abstract:

BACKGROUND: Infertility is one of the main concerns in women's lives that may lead to psychological imbalance and disrupt their sexual relationship. The study was conducted with the aim of evaluating role of mental health in prediction of sexual function in infertile women.

MATERIALS AND METHODS: This analytic-descriptive study was conducted in 2015–2016 in 424 infertile women referring to Fatemeh Zahraa Infertility and Reproductive Health Center, Babol, Iran. The participants filled out the Female Sexual Function Index ($\alpha = 0.72$–0.90), General Health Questionnaire (GHQ-28, $\alpha = 0.86$), and demographics questionnaires. Linear regression used to analyze the data.

RESULTS: The mean of total GHQ was 23.57 ± 12.06. The highest mean of GHQ subscales was social dysfunction (8.68 ± 3.69). There was a negative association between GHQ with the overall sexual function of infertile women ($r = -0.397$, $P < 0.0001$). The higher mental health disorder was associated with lower sexual function. Furthermore, there was an inverse significant association between all the subscales of mental health and sexual function. Based on the multiple linear regression analysis, the variables of anxiety and sleep disorder ($\beta = -0.143$, $P < 0.035$), social dysfunction ($\beta = -0.139$, $P < 0.003$), depression symptoms ($\beta = -0.121$, $P < 0.046$), sexual intercourse frequency ($\beta = 0.272$, $P < 0.0001$), and educational level ($\beta = -0.110$, $P < 0.016$) were the significant predictors of perceived sexual dysfunction after adjusting for other variables. The strongest predictor of the GHQ subscale was anxiety and sleep disorder.

CONCLUSIONS: Undesirable conditions of mental health and its adverse effects on sexual function and also other predictors emphasize the need to develop more effective screening and supportive strategies with the help of the psychologists.

Keywords:

Female sexual function index, infertility, mental health, sexual dysfunction

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Introduction

Mental health is a dynamic state of internal balance which represents harmonious relationship between body and mind, ability to express, recognize, and adjust one's own emotions, as well as empathize with others.[1] It involves multiple dimensions of physical, psychological, emotional, and social health, enabling people to beware of their potential ability, cope with normal stresses of life, contribute to their communities, and control interactions with others.[2] Mental health is a completely positive affect, marked by sense of happiness and feelings of mastery over the surroundings.[3] Healthy mental development plays an essential role in general satisfaction with life. Poor mental health can lead to marital distress and conflict.[4,5] Mental disorder epidemiology indicates a frequent health problem in the general population.[6] Studies have reported

that the highest level of mental problems is observed in couples who are confronted with infertility.[7,8] Cunha *et al*. reported that the prevalence of mental problems was approximately 53.3% in infertile women.[9] Basically, infertility is a crisis in life, and failure to fulfill the wish for a child is associated with unfavorable effects on physical, psychological, and social dimensions of mental health.[10] Emotional sequel such as stress, anxiety, and depression have also been observed in a large number of infertile women, which may lead to interpersonal sensitivity, lack of sexual satisfaction, and unsuccessful treatment of infertility.[11-15] Several studies have revealed a link between mental problems and sexual dysfunction in infertile women and mental disorder may impair sexual function. Zemishlany and Weizman reported that anxiety and depression could be a factor of sexual dysfunction.[16] Infertile women with mental disorders experience higher rates of sexual dysfunction and marital conflict.[17] Correti and Baldi stated that psychological components were important in the pathogenesis of sexual dysfunction; for example, anxiety had an important role in sexual dysfunction.[18] Basically, physical and mental health of couples is one of the pillars of healthy sexual function and stable marital relationships.[19] Scientific studies confirm the fact that marital satisfaction is associated with the quality of life and mental health.[5] Furthermore, investigations showed that sexual dysfunction is multifactor, and numerous elements including sociodemographic characteristics such as age, occupation, economic situation, and education could affect sexual function and marital intimacy.[20,21] Furthermore, clinical predictors such as infertility type, duration of infertility, period of marriage, infertility cause, and previous assisted reproductive technology play an important role in sexual dysfunction, and it is necessary to identify these factors to envisage sexual function in infertile women.[22-24]

With attention to the high rate of psychotic morbidity and sexual dysfunction in infertile women and its impact on mental health, marital relationships, as well as fertility, this study was conducted to evaluate the role of mental health in prediction of sexual function in infertile women.

Materials and Methods

This descriptive-analytical study was carried out on 424 infertile women referred to Fatemeh Zahra Infertility and Reproductive Center in Babol, Iran (2015–2016). After giving a brief explanation concerning the aim of the study and how to complete the questionnaires, written informed consent was obtained from infertile women. The sampling was done as convenient method. The Ethics Committee of the Babol University of Medical Sciences has approved this study. The inclusion criteria contained: literacy, infertility for over 1 year,

living with a spouse, no having remarried, no having a foster child, and having sexual activity lasting at least 4 weeks. Participation who had a past history of clinically diagnosed psychiatric disorders, recent history of stressful events or death in the family (3 months ago), chronic medical condition such as diabetes mellitus, cardiovascular disease, hypertension, hyperthyroidism, hypothyroidism, epilepsy, and somatic problem include spinal cord injury, amputation, and limb abnormality, excluded from the study.

Data were gathered by demographic questionnaire, General Health Questionnaire (GHQ), and the Female Sexual Function Index (FSFI). Demographic Characteristic Questionnaire includes questions of age, husband age, husband's job, education level, husband education level, current settlement type, and also fertility variables including duration of the marriage, treatment effort, and coitus count use were gathered using a self-constructed questionnaire. Sexual dysfunction was assessed through the FSFI in infertile women. FSFI Scale has 19 items and six different domains (desire, arousal, lubrication, orgasm, satisfaction, and pain). Each item changed between 1 and 5 (item 1–2 and 15–16) or o–5 for all other items. The score was estimated using multiplies of the factors.[25] Score equal or below of 26.55 shows "at-risk" for sexual dysfunction. Cronbach's alpha ranged from 0.72 to 0.90 and also it had excellent construct validity in Iranian infertile women.[4,26,27] Furthermore, participants completed a Persian validated GHQ-28. GHQ-28 was introduced by Goldberg and Hillier[28] to assessing mental health. The scale concludes 28 items, each item is rated on the 4-point Likert scale (0 = never; 1 = usual; 2 = better than usual; and 3 = much better than usual). This instrument has four subscales and each scale has seven items; somatic symptoms, anxiety and sleep disorder, social dysfunction, and depression symptoms. The total score will be obtained from the sum of scores of four sub-scales. The test score of the total score was from 0 to 84, and each subscale was from 0 to 21. High scores in this exam address the high mental health problems. A score of over 6 in each subscale and over 23 in the overall questionnaire is considered "at-risk" for mental health problems.[29-31] The GHQ-28 has been standardized and applied extensively in Iran.[32] Cronbach's alpha and intraclass correlation with 95% confidence interval for a total score of mental health were 0.86.[33] A valid Persian version of the GHQ-28 was used in this study.

The demographic variables, mental health, and its dimensions were measured as possible predictors of sexual function. The association between the noted variables and sexual function was evaluated by applying Chi-square and independent *t*-tests. If $P < 0.1$, the independent variables were entered into linear regressions. Data were analyzed using the Statistical

Package for the Social Sciences, version 22(SPSS, IBM Crop., Armonk, NY, USA). A P <0.05 considered for level significance.

Results

The mean (standard deviation) age of infertile women and their husbands was 28/43 (5.6) and 32.27 (6.09) years, respectively. The mean of the duration of the marriage was 6/14 (4.01) (range 2–20 years). Most infertile women referred for the first time (65.6%) and had primary infertility (70.8%). The frequency of sexual intercourse per week in more half of infertile women was 1–2 times per week (59.9%). The majority of infertile women and their husbands had an educational level of more than 12 years(71.2% and 61.3%, respectively). Most infertile women were housekeepers (80.7%) and lived in urban (58%). The husband's occupation in nearly half of the cases was self-employed (48.8%). The demographic features are shown in Table 1.

Based on GHQ, 44.9% of infertile women had mental health disorders. The mean of total GHQ was 23.57 ± 12.06 (range 2–74) [Table 1]. The highest mean score of the GHQ subscales was related to social dysfunction 8.68 ± 3.69 (range 0–19), indicating the higher prevalence of these disorders among the infertile women (69.1%). This percentage in anxiety and sleep disorder, somatic symptoms, and depression subscales was 42.3%, 33%, and 18.3%, respectively.

There was a negative correlation between GHQ with the sexual function of infertile women (r=-0.397, P < 0.0001). Higher mental health disorder was associated with lower sexual function. There was an inverse significant association between all subscales of mental health and sexual function [Table 2].

The results of the multiple linear regression analysis showed six predictors of sexual dysfunction including anxiety and sleep disorder ($\beta = -0.143$, $P < 0.035$), social dysfunction ($\beta = -0.139$, $P < 0.003$), depression symptoms ($\beta = -0.121$, $P < 0.046$), sexual intercourse of frequency ($\beta = 0.272$, $P < 0.0001$), and educational level ($\beta = -0.110$, $P < 0.016$). Higher anxiety and sleep disorder and social dysfunction were associated with lower sexual function. The frequency of sexual intercourse was a predictor of sexual dysfunction in infertile women. The sexual dysfunction in women with sexual intercourse ≥3 times per week was less than those who had sexual intercourse 1–2 times per week. There was a negative significant association for reported educational levels with sexual function. The sexual dysfunction was higher among women with an education level of equal or more than 12 years relative to those with an education level of <12 years [Table 3].

There were not the demographic predictors for sexual function including age, husband age, settlement house type, occupation, husband occupation, and marriage duration. According to multiple linear regression analysis, the variables of anxiety and sleep disorder, social dysfunction, depression symptoms, frequency of sexual intercourse, and educational level were the predictors of perceived sexual function among infertile women and totally predicted 25% of the perceived sexual function variance among infertile women.

Discussion

In this study, nearly half of infertile women suffered from mental health problems. The highest ratio of GHQ

Table 1: Demographic characteristics and general health questionnaire in infertile women

Variables	Mean (SD) or *n* (%)	Variables	Values
Age (years)	28.43±5.6	Educational level	
husband age (years)	32.27±6.09	<12 (years)	122 (28.8)
Duration of marriage (years)	6.14±4.01	≧12 (years)	302 (71.2)
Occupation		Husband educational level	
Housekeeper	342±80.7	<12 (years)	164 (38.7)
Employed	82±19.3	≧12 (years)	260 (61.3)
Husband occupation		Treatment effort	
Unemployed	10±2.4	First time	277 (65.6)
Worker	125±29.5	Several times	145 (34.4)
Employee	82±19.3	Infertility type	
Self-employed	297±48.8	Primary	300 (70.8)
Current settlement type		Secondary	124 (29.2)
Urban	246±58	GHQ	23.57±12.06 (range 2-74)
Rural	178±42	Somatic symptoms	5.4±3.52 (range 0-20)
Sexual intercourse frequency		Anxiety and sleep disorder	6.19±4.25 (range 0-21)
<3 times/week	254±59.9	Social dysfunction	8.68±3.69 (range 0-19)
≥3 times/week	170±40.1	Depression symptoms	3.27±3.85 (range 0-21)

Values are mean±SD or *n* (%). The values do not add up to 424 due to missing values. SD=Standard deviation, GHQ=General health questionnaire

Table 2: Correlation coefficient between general health questionnaire and female sexual function index dimensions using Peasrson correlation coefficient in infertile women

GHQ	Overall sexual function	Sexual desire	Excitement	Lubrication	Orgasm	Sexual satisfaction	Sexual pain
Overall general health	−0.397*	−0.201*	−0.296*	−0.292*	−0.312*	−0.302*	−0.253**
Somatic symptoms	−0.308*	−0.153**	−0.229*	−0.204*	−0.235*	−0.235*	−0.220*
Anxiety and sleep disorder	−0.344*	−0.174*	−0.256*	−0.302*	−0.274*	−0.255*	−0.184*
Social dysfunction	−0.279*	−0.184*	−0.200*	−0.174*	−0.243*	−0.201*	−0.166***
Depression symptoms	−0.316*	−0.121****	−0.242*	−0.227*	−0.226*	−0.257*	−0.228*

*$P<0.0001$, **$P<0.002$, ***$P<0.001$, ****$P<0.013$. GHQ=General health questionnaire

Table 3: Multiple linear regression analysis of mental health dimensions on sexual function of infertile women

Variables	B (standardized)	t	P	95%CI	
				Lower	Upper
Constant	–	14.060	0.0001	19.897	26.365
Somatic symptoms	−0.108	−1.832	0.068	−0.260	0.009
Anxiety and sleep disorder	−0.143	−2.119	0.035	−0.265	−0.010
Social dysfunction	−0.139	−2.949	0.003	−0.256	−0.051
Depression symptoms	−0.121	−2.005	0.046	−0.255	−0.003
Sexual intercourse frequency					
<3 times in month	0	0	0		
≥3 times in week	0.272	6.365	0.0001	3.080	5.833
Educational status (years)					
<12	0	0	0		
≧12	−0.110	−2.415	0.016	−1.810	−0.186
Husband educational status (years)					
<12	0	0	0		
≧12	−0.024	−0.521	0.602	−0.967	0.561
Treatment effort					
First time	0	0	0		
Several times	−0.061	−1.425	0.155	−1.248	0.199
Adjusted R			0.500		
Adjusted R^2			0.250		

CI=Confidence interval

subscales was related to social dysfunction. Numerous studies have demonstrated the effect of infertility on mental health and the fact that it is more common in women with infertility.[7,8,34] A similar study showed a higher prevalence of GHQ in infertile women.[9] Furthermore, Baghiani Moghadam *et al.* evaluated the general health of couples with infertility and revealed that the mean level of social dysfunction was higher in all subscales of GHQ among infertile women.[35] Principally, infertility is a unique psychosocial challenge that can have a negative consequence on mental health status, which may threaten the interpersonal and sexual life of infertile women. Research literature shows that infertility has serious social implications and is thus important in terms of public health.[36] Sense of loneliness and isolation, low self-efficacy, and low self-esteem are factors associated with infertility[11,13,37,38] that may influence social relationship and endanger social health. It seems that infertile women are an important group in a society because they do not receive enough support and essential skills to confront infertility problems, which can influence their social communication.

Our findings revealed that mental health disorder had a negative association with sexual function in infertile women. Higher frequency of mental health problems is associated with lower sexual activity. Zarepour and Asoodeh reported a significant association between general health and sexual intimacy. Better mental health is correlated with more marital satisfaction.[5] In an epidemiological study of risk factors of sexual dysfunction by Lewis *et al.*, it was reported that general health status and psychiatric/psychological problems were common risk factors associated with sexual dysfunction.[22] There was a significant, negative relationship between general health and overall sexual function.[31] Basically, frequent physician office visits, invasive procedures, daily monitoring for treatment management, and sex on demand were associated with adverse psychological consequences. The infertile women experienced more problems related to the diagnostic and therapeutic approach, which influenced their sexual dysfunction.[13,39] It is worth mentioning that mental health disturbances can contribute to sexual disorder and vice versa.

The result of the study showed that each of the four dimensions of mental health disorder had an inverse correlation with all subscales of sexual function. Somatic symptoms were negatively correlated with sexual desire, arousal, lubrication, orgasm, satisfaction, and pain. A review of literature showed a significant correlation between somatic symptoms with libido, orgasm, and sexual satisfaction.[31] Somatic disorders are considered as part of symptoms in individuals who suffer from sexual problems and can exacerbate sexual disorder, decrease sexual desire, and frequency of sexual intercourse.[40]

This study revealed the inverse relationship between anxiety and sleep disorder with all subscales of sexual function. A similar research indicated that higher irritation and anxiety can lead to less sexual desire in women.[41] Furthermore, another study concluded the association between anxiety and insomnia disorder with all the dimensions of sexual activity.[31]

Another result of the present study was that poorer general health in the social dysfunction dimension was associated with decreased desire, orgasm, sexual satisfaction, and sexual function. This finding was in contrast with the results reported by Shayan *et al*., who revealed no significant correlation between any of sexual function subscales and social dysfunction[31] but was in line with the findings of Sadock and Sadockresearch. They concluded that the lack of suitable communication can diminish sexual desire.[42] Nonphysical factors such as social beliefs may affect sexual activity. Furthermore, social function and social status may influence sexual satisfaction.[43]

The collection of data demonstrated that the depression dimension of GHQ was negatively correlated with six subscales of sexual function. Research has revealed that sexual problems can be considered as the symptoms of depression. Furthermore, numerous researches have shown that depression leads to a decrease in sexual function subscales.[42,44-46] Low sexual desire and orgasm are common among depressed women, and the severity of sexual problems had the highest correlation with the severity of depression.[47]

Based on results, anxiety and sleep disorder negatively affect the sexual function of women with infertility and is a predictor of sexual function after adjusting for other variables, which is supported by several investigations. Anxiety and sleep disorder have been reported by some authors to be negatively associated with sexual function. Higher anxiety scores are correlated with low sexual function. Furthermore, anxiety and sleep disorder have an inverse influence on sexual intimacy and marital satisfaction.[5,13,17,31] Kalmbach *et al*. concluded that sufficient sleep was one of the important

factors in improving sexual activity, sexual desire, and genital arousal in women,[48] and low sleep quality was associated with sexual dysfunction.[49]

The gathered data revealed that social dysfunction was a negative predictor of sexual function after adjusting for other variables. A review of literature showed that infertility can cause social isolation and severe social distress, which can extend to sexual dysfunction.[35] In contrast, Shayan *et al*. reported that there was no significant relationship between social dysfunction and sexual activity.[31]

The present study showed that depression symptoms can inversely predict sexual activity after adjusting for other variables. Pasha *et al*. in a study entitled "Comparative effectiveness of antidepressant medication versus psychological intervention on depression symptoms in women with infertility and sexual dysfunction" showed that there was statistically significant negative relationship between mean of BDI score with FSFI score.[46] In the same study, it was reported that sexual disorder was more common in depressed women compared to those without depression. Therefore, the importance of screening depressed women for female sexual dysfunction should be considered for early diagnosis and treatment.[50] Sexual problems and depression are interchangeable so that the promotion of one may improve the other.[46]

After adjusting for other variables, the results remain a significant for the educational level in infertile women, and it was a negative predictor of sexual function in infertile women. The sexual dysfunction was higher among holders of academic degrees and high school diploma relative to those with an educational level of <12 years. A previous study emphasized the relationship between educational level and marital satisfaction. Bakhshayesh and Mortazavi in the study of the relationship between sexual satisfaction, general health, and marital satisfaction in couples showed a negative significant association between sexual satisfaction and education level. It seems that a higher literacy level of couples can increase their expectations, which is a harmful factor in a marital relationship.[51] In contrast with the findings of this research, a few studies revealed that lower educational levels were associated with sexual problems.[52]

Our finding revealed a positive association between the frequency of sexual activity and sexual function after adjusting for other variables. A review of literature showed that the frequency of sexual intercourse may be considered a measure of general marital health, which is different for every couple based on personal expectations, cultural differences, aging, marital

relationship, etc.[53] Basically, average sexual intercourse frequency in a married couple can range from 2 to 3 times per week.[54] Although this rate may increase in infertile women following the infertility treatment process, it seems that human sexual activity has a behavioral and amorous aspect, which shares emotions and may improve sexual satisfaction. In the same study, it was explored the relationship between sexual activity and sexual satisfaction so that participants with low sexual activity had the least sexually satisfied.[55]

There is some limitation in our study. First, data gathering was obtained in a sample of Iranian infertile women; therefore, it is suggested that future studies will consider Iran wholly. Second, all of our population studies were Muslim women, so the effect of religious and cultural differences on outcomes should be considered. One of the strengths of the present study is the use of a validated general mental health (GHQ) and FSFI. The second strength is the probability reduction of researcher bias in assessing outcome due to using self-reported questionnaires. It should be mentioned that talking and collecting data were difficult from Iranian infertile women regarding sexual problems because of traditional culture. Therefore, the result of this study provides valuable information on this topic.

Conclusions

The results of the present study revealed that mental health and its subscales, demographic characteristics, and fertility variables were predictors of sexual dysfunction. It is essential that sexual health professionals be aware of this issue in the treatment of infertile women plan an effective intervention. The results of this study can be used in infertility centers along with infertility treatment protocol to improve the infertility process in infertile couples.

Conflicts of interest
There are no conflicts of interest.

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