

# The Relationship between Sleep Quality and Sexual Function in Married Women: The Mediating Role of Stress

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### ABSTRACT

**Objective:** this study aimed to examine the relationship between sleep quality and sexual function mediated by stress among married women.

**Methods and Materials:** The present study is applied and descriptive-correlational in nature. The statistical population consisted of married women in the city of Babol (age range: 25 to 45 years). Using purposive sampling, 318 participants were selected for the study. They were assessed using the Sleep Quality Questionnaire (1989), the Female Sexual Function Index (2000), and the Perceived Stress Scale (1983). Statistical analysis was conducted using simultaneous regression with SPSS version 23.

**Findings:** The results showed that sleep quality is a significant predictor of sexual function. Additionally, the role of sleep quality in predicting perceived stress was significant. The findings indicated that perceived stress is a significant predictor of sexual function, and the relationship between sleep quality and sexual function is mediated by perceived stress ( $P < 0.001$ ).

**Conclusion:** The results of this study can help in developing practical strategies to improve sleep quality and reduce stress in married women, ultimately leading to better sexual function and enhanced marital quality of life.

**Keywords:** Stress, Sleep Quality, Sexual Function, Married Women

## 1. Introduction

Sleep, as one of the basic human needs, plays a significant role in maintaining physical and mental health. Sleep quality refers to the degree of satisfaction with

sleep, which includes the duration of sleep, sleep depth, and the absence of disturbances throughout the night. Good sleep quality leads to deep and uninterrupted sleep, leaving the individual refreshed and prepared for the next day (Salari Hedaki et al., 2021). Sleep is a reversible state that results in

reduced awareness and interaction with the environment, decreased movement and muscle activity, and relative or complete suspension of voluntary behaviors (Hosseinzadeh Lifa Shagird et al., 2013). Sleep quality not only affects individuals' daily performance but also influences various aspects of their lives. One of these aspects is sexual function. Research has shown that insufficient and poor-quality sleep can have negative effects on sexual function (Kling et al., 2021).

Sleep quality has a direct impact on sexual function. Inadequate or poor-quality sleep can lead to reduced sexual desire, arousal, and sexual satisfaction (Kalmbach et al., 2015; Tandler et al., 2019; Van Anders & Dunn, 2016). Sexual function refers to the ability to experience and respond to sexual stimuli, including sexual desire, arousal, orgasm, and satisfaction. Optimal sexual function can improve marital relationships and increase satisfaction with married life (Tarnas et al., 2021).

Despite the existing research, there are still gaps in the current knowledge in this field. For example, many studies have examined sleep quality and sexual function separately, and less attention has been paid to the mediating role of stress in this relationship. Furthermore, most of these studies have been conducted in Western societies, with less focus on other populations. Sleep quality depends on factors such as sleep duration, the number of nighttime awakenings, and the sense of satisfaction with sleep (Moallem Zadegan et al., 2022). Research has shown that quality sleep can have positive effects on physical and mental health. Optimal sexual function can lead to increased marital satisfaction and improved marital relationships. Sexual function problems can reduce marital satisfaction and increase stress (Hosseini & Rostami, 2019). Stress can have negative effects on physical and mental health. Chronic stress can lead to various health problems and reduce quality of life (Shariati & Karimi, 2020).

Stress refers to the body's reaction to changes that require adaptation or a physical, mental, or emotional response. Stress can positively or negatively affect physical and mental health. Chronic stress can lead to various health problems (Salari Hedaki et al., 2021). This research can help fill gaps in knowledge regarding the relationship between sleep quality and sexual function and clarify the mediating role of stress in this relationship. The results of this study can aid in developing intervention programs to improve sleep quality and reduce stress in married women, ultimately leading to improved sexual function and increased marital satisfaction.

## 2. Methods and Materials

### 2.1. Study design and Participant

The present study is applied and descriptive-correlational in nature. The statistical population included married women in the city of Babol. A purposive sampling method was used to select the samples. Initially, 350 individuals were chosen to participate in the study, and after reviewing the inclusion criteria (informed consent, age range of 25 to 45 years, at least a high school diploma, a minimum of two years of marriage, no plans for divorce, willingness to participate in the study, and absence of physical and mental health problems), 318 participants remained. The participants were then assessed using the Sleep Quality Questionnaire (1989), the Female Sexual Function Index (2000), and the Perceived Stress Scale (1983).

### 2.2. Measures

#### 2.2.1. Sleep Quality

The Sleep Quality Questionnaire was developed by Buysse, Reynolds, Monk, Berman, and Kupfer (1989) at the Pittsburgh Psychiatric Institute to assess individuals' sleep quality and patterns. This questionnaire contains 18 items that evaluate seven aspects of sleep over the past month. These aspects include subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. Each of the seven subscales of this questionnaire is scored from 0 to 3, with higher scores indicating poorer sleep quality. Buysse et al. (1989) reported an internal consistency of 0.83 using Cronbach's alpha. Kessine and Kalikoglu (2009) reported a Cronbach's alpha of 0.83 in their study. The validity of this questionnaire has been confirmed for the Iranian population by the Tehran Psychiatric Institute, and a Cronbach's alpha of 0.83 was obtained (Farhadinasab & Azimi, 2008). In another study, the reliability of the questionnaire was reported with a Cronbach's alpha of 0.46 and a split-half reliability of 0.52 (Heydari, Ehteshami Zadeh, & Marashi, 2010). In the present study, a Cronbach's alpha of 0.80 was obtained.

#### 2.2.2. Sexual Function

The Female Sexual Function Index was developed by Rosen, Myers, and Hattie (2000) and validated in a group of women with sexual arousal disorder. It consists of 19 questions that assess women's sexual function in six

domains: desire, psychological arousal, lubrication, orgasm, satisfaction, and sexual pain. The items are scored using a five-point Likert scale. A score of zero indicates no sexual activity in the past four weeks. This questionnaire has been widely used in international studies and shows a high degree of internal consistency and reliability. The Cronbach's alpha coefficient was 0.70 or higher for each domain and the total scale, consistent with findings from Rosen et al. (2010) (0.89 or higher), Meston (0.74 or higher), and Wiegel et al. (0.80 or higher). The validity and reliability of this index for the Iranian population were standardized by Mohammadi et al. (2008). According to Mohammadi's study, the reliability of the index for each of the six domains and the total scale was calculated using Cronbach's alpha ( $r = 0.85$ ). The cut-off scores for the total scale and subscales were also determined in Mohammadi's study, as follows: total scale = 28, desire = 3.3, psychological arousal = 3.4, lubrication = 3.4, orgasm = 3.4, satisfaction = 3.8, and sexual pain = 3.8. Higher scores indicate better sexual function (Mohammadi et al., 2008). In the present study, a Cronbach's alpha of 0.78 was obtained.

### 2.2.3. Stress

The Perceived Stress Scale was developed by Cohen et al. (1983). This scale consists of 14 items, with 7 positive and 7 negative items. The negative factor assesses lack of control and negative emotional responses, while the positive factor evaluates the ability to cope with external stressors over the past month. Each item is scored on a five-point scale ranging from "never" (0) to "very often" (4). Cohen et al.

(1983) reported good validity and reliability for this scale. In the study by Hosseinzadeh et al. (2013), the internal consistency reliability of the scale ranged from 0.84 to 0.86 using Cronbach's alpha in two groups of students and one group of smokers in a cessation program. The Perceived Stress Scale is significantly correlated with life events, depressive and physical symptoms, health service utilization, anxiety, and lower life satisfaction. The content validity of this questionnaire was confirmed by 10 experts from Mashhad University of Medical Sciences (Hosseinzadeh Lifa Shagird et al., 2013). The reliability of the Persian version was calculated using Cronbach's alpha by Mousavi et al. (2014), with a coefficient of 0.74 (Mousavi et al., 2014). In the present study, a Cronbach's alpha of 0.73 was obtained.

### 2.3. Data Analysis

The data were analyzed using simultaneous regression analysis with SPSS version 23.

## 3. Findings and Results

This study was conducted with the participation of 318 married women from the city of Babol (aged 25 to 45 years). The mean and standard deviation of the participants' age were 32.24 (SD = 7.01). Among them, 44.3% had a diploma or associate degree, 31.5% had a bachelor's degree, and 24.2% had a master's degree or higher.

In Table 1, the mean, standard deviation, skewness, and kurtosis of the research variables are reported (Table 1).

**Table 1**

*Descriptive Statistics of Research Variables*

Variable	Mean	SD	Skewness	Kurtosis	Tolerance	VIF
Sexual Function	29.1	5.425	-0.497	-1.049	Criterion	Criterion
Sleep Quality	12.34	3.476	0.219	0.329	0.944	1.060
Perceived Stress	28.69	7.509	0.143	-0.893	0.944	1.060

To examine the assumption of univariate normality, skewness and kurtosis were evaluated. Based on Kline's (2016) view, the skewness and kurtosis indicators in Table 1 show that the univariate distribution of data in this study is normal, as none of the skewness and kurtosis values exceed  $\pm 2$ . Additionally, to evaluate multicollinearity, the variance

inflation factor (VIF) and tolerance index were reviewed. The results in Table 1 indicate that multicollinearity did not occur, as VIF values were below 10 and tolerance values were above 0.10. The correlation between the study variables is reported in Table 2.

**Table 2**

*Correlation Between Research Variables*

Variable	1	2	3
Sexual Function	1		
Sleep Quality	-0.301*	1	
Perceived Stress	-0.361*	0.238*	1

\*p < 0.05, \*\*p < 0.01

The findings indicate that the correlation between sexual function scores and sleep quality ( $r = -0.301$ ) as well as perceived stress ( $r = -0.361$ ) was negative and significant at the 0.01 level. The correlation between sleep quality and perceived stress ( $r = 0.238$ ) was positive and significant at the 0.01 level. (According to the scoring system of the questionnaires, a higher score in the sexual function questionnaire indicates better sexual function, a higher score in the sleep quality questionnaire indicates poorer sleep quality, and a higher score in the perceived stress questionnaire indicates higher perceived stress. Therefore, as sleep quality and perceived stress scores increase, sexual function scores decrease.)

To investigate the mediating role of stress in the relationship between sleep quality and sexual function, Baron and Kenny's (1986) step-by-step regression analysis (hierarchical simultaneous regression) was used, with the results presented in Table 3.

The findings based on Baron and Kenny's (1986) four-step method were as follows: In the first step, sleep quality was entered into the regression equation as a predictor of sexual function, and the significance of the obtained beta coefficient ( $\beta = -0.301$ ,  $P < 0.001$ ) indicated that sleep quality is a significant predictor of sexual function. Thus, the

first condition for mediation was met. In the second step, the role of sleep quality in predicting perceived stress was examined. Given the significance of the obtained beta coefficient ( $\beta = 0.238$ ,  $P < 0.001$ ), it can be concluded that the second condition for mediation was also met. The third condition is that the mediator should correlate with the criterion variable. The results showed that perceived stress is a significant predictor of sexual function ( $\beta = -0.361$ ,  $P < 0.001$ ). In the fourth step, sleep quality and perceived stress were entered into the regression equation as predictors of sexual function. According to Baron and Kenny's (1986) recommendation, if the initial predictor's coefficient moves toward zero or decreases when the mediating variable is added to the equation, mediation is confirmed. In other words, a reduction in beta indicates the mediating role of the new variable in the relationship between the previous variable and the criterion variable. The results showed that when perceived stress was entered as a mediator in the relationship between sleep quality and sexual function, the relationship decreased ( $\beta = -0.242$ ,  $P < 0.001$ ). Based on the results in Table 3, the partial mediating role of stress in the relationship between sleep quality and sexual function was confirmed.

**Table 3**

*Regression Analysis Results for Stress Mediation in the Relationship Between Sleep Quality and Sexual Function*

Step	Predictor Variable	Criterion Variable	R	R <sup>2</sup>	F	b	SE	$\beta$	t	Sig.
1	Sleep Quality	Sexual Function	0.301	0.091	29.17	-0.479	0.089	-0.301	-5.401	0.001
2	Sleep Quality	Stress	0.238	0.058	16.62	0.51	0.125	0.238	4.077	0.001
3	Stress	Sexual Function	0.361	0.130	44.77	-0.264	0.040	-0.361	-6.692	0.001
4	Sleep Quality	Sexual Function	0.445	0.198	34.28	-0.388	0.089	-0.242	-4.367	0.001
	Stress					-0.24	0.041	-0.321	-5.797	0.001

Furthermore, to estimate the size and significance of this indirect effect, the Sobel test was manually conducted. The results of the Sobel test also confirmed the mediating role of stress in the relationship between sleep quality and sexual function ( $t = 2.564$ ,  $P < 0.005$ ).

#### 4. Discussion and Conclusion

Based on the findings, it can be concluded that stress mediates the relationship between sleep quality and sexual function. Sleep and sexual function are two essential factors in improving individuals' health and life satisfaction. Quality sleep can have numerous positive effects on physical and mental health, which in turn can lead to improved sexual function. Improving sleep quality increases energy, reduces fatigue, and enhances general well-being, all of which can contribute to increased sexual desire and function (Abbasi &

Mahmoudi, 2021). Studies have shown that insufficient and poor-quality sleep can lead to reduced sexual desire and problems with arousal and orgasm. For example, a study by Kalmbach et al. (2015) found that poor sleep quality is associated with reduced sexual desire and problems with sexual arousal (Kalmbach et al., 2015). Systematic reviews by Tandler et al. (2019) have shown that low-quality sleep can lead to decreased sexual desire and other sexual issues (Tandler et al., 2019).

Poor sleep quality can have many negative effects on sexual function. Individuals with insufficient sleep may experience reduced sexual desire, arousal issues, and decreased sexual satisfaction. This situation can, in turn, increase stress and reduce marital satisfaction. Improving sleep quality can lead to increased sexual desire, improved arousal, and increased sexual satisfaction. For example Van Anders and Dunn (2016) demonstrated that improved sleep quality can lead to significant improvements in women's sexual function (Van Anders & Dunn, 2016).

Sleep is one of the key factors in maintaining general and mental health. Sleep quality can have significant effects on various aspects of life, including sexual function. One mechanism through which sleep quality affects sexual function is stress. Chronic stress resulting from insufficient sleep can negatively impact sexual desire and satisfaction in sexual relationships. Additional research consistent with the present study includes a study by Hirschowitz et al. (2015), which showed that individuals with poorer sleep quality are less likely to engage in sexual activities. This study suggests that insufficient sleep can have negative effects on sexual desire and activity, and improving sleep quality can help resolve these issues (Hirshkowitz et al., 2015).

Stress can negatively affect both sleep quality and sexual function. Chronic stress can reduce sleep quality, increase nighttime awakenings, and decrease deep sleep. This situation can lead to reduced energy, increased fatigue, and decreased sexual desire. Considering the results of previous studies, it is important to pay attention to interventions that help reduce stress and improve sleep quality and sexual function. These programs can include stress management techniques, sleep improvement methods, and sexual counseling.

Stress can affect sleep quality and sexual function through various mechanisms. For example, stress can lead to increased stress hormones such as cortisol, which negatively affect sleep quality and sexual desire. Stress can also lead to increased anxiety and depression, which in turn can negatively impact sexual function. Examining the mediating

role of stress in the relationship between sleep quality and sexual function can provide a better understanding of how these three variables interact. This topic can lead to the development of intervention strategies that help reduce stress and improve sleep quality and sexual function. Additionally, this study found that stress can act as a mediator in this relationship, amplifying the negative effects of sleep quality on sexual function.

Finally, attention to improving sleep quality and reducing stress can contribute to enhanced sexual function and increased marital quality of life. Numerous studies have shown that improving sleep quality can lead to increased sexual desire, improved arousal, and increased sexual satisfaction. Additionally, reducing stress can have positive effects on sleep quality and sexual function. Therefore, it is recommended that individuals and health professionals pay attention to these factors and use appropriate strategies to improve sleep quality and reduce stress.

## 5. Limitations and Suggestions

In terms of the study's limitations, it should be noted that this research was conducted on married women in the city of Babol. Therefore, caution should be exercised when generalizing the findings to men or women with different characteristics. Regarding future research, it is recommended to use clinical interviews and qualitative methods in subsequent studies and compare the results with those of the current research. The findings of this study can help develop intervention programs to improve sleep quality and reduce stress in married women, ultimately leading to enhanced sexual function and increased marital satisfaction.

## Authors' Contributions

Authors contributed equally to this article.

## Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

## Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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### Declaration of Interest

The authors report no conflict of interest.

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### Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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