# Depression, Poor Sleep, and Sexual Dysfunction in Migraineurs Women

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## ABSTRACT

**Background:** Migraine is a chronic disorder affecting women more than men. Sexual dysfunction is one the complaints of women with migraine, which is not regarded as it should be. The goal of this study was to determine sexual dysfunction in women with migraine, and possible effects of depression and sleep quality on their sexual function.

**Methods:** One hundred married migraineurs women were enrolled. All participants were asked to fill out valid and reliable Persian versions of Pittsburgh Sleep Questionnaire (PSQI), female sexual function index (FSFI) and beck depression inventory (BDI).

**Results:** Mean BDI, PSQI, and FSFI scores were $15.1 \pm 9.1$, $7.6 \pm 4$, and $21.6 \pm 8.8$ in all patients, respectively. Sexual dysfunction found in 68% and 79% were poor sleepers. Mean BDI and PSQI scores were significantly higher in women with sexual dysfunction (FSFI < 26.55). There was significant negative correlation between BDI score and FSFI ($r = -0.1$, $P = 0.001$) as well as significant positive correlation between BDI and PSQI ($r = 0.42$, $P < 0.001$). Multiple linear regression analysis showed that BDI and age were independent predictors of FSFI score.

**Conclusions:** Physicians should consider sexual dysfunction in women with migraine along with depression and poor sleep in such cases.

**Keywords:** Depression, migraine, sexual dysfunction, sleep

## INTRODUCTION

Migraine is a chronic disorder affecting a lot of women all over the world, which is associated with different psychological problems such as depression, poor sleep, and sexual dysfunction.[1-5]

Depression is one of the most common mood disorders in migraineurs. Near 30% of young and elderly cases with migraine suffer from depression.[3,6] There is no exact reason for depression in patients with migraine, but serotoninergic and dopaminergic dysfunction, ovarian hormone fluctuation, central sensitization, and over-use of medications are among probable causes.[7-9]

Another comorbidity in migraineurs is sleep quality impairment, which has been reported between 30% and 50%, respectively.[4,10] As migraine attacks mostly happen at nights, sleep problems will occur.[11] Another reason for poor sleep in patients with migraine is psychological problems such as depression.[12] Poor sleep and depression could have reciprocal effects.

Sexual dysfunction is another complaint in cases with migraine, which is not regarded as it should be. Recent studies showed that all aspects of sexual health in women with migraine are affected.[5,12] Alteration of sexual desire, genital arousal, and orgasm along with pain threshold change are possible examples for sexual dysfunction in migraineurs.[12,13] As there are little studies evaluating sexual function in patients with migraine, we designed this study to evaluate.

Sexual function in women with migraine, and possible effects of depression and sleep quality on their sexual function.

## METHODS

### Study design and participants

In this cross-sectional study, 100 married migraineurs women who attended Outpatient Neurology Clinic of Sina Hospital (affiliated hospital of Tehran University of Medical Sciences) were enrolled.

An inclusion criterion was definite migraine due to the International Headache Society criteria and participation in sexual intercourse at least once within 4 weeks prior to the study.

An exclusion criterion was anti-depressant treatment during last 4 weeks.

All patients filled out informed consent form before entrance to the study. The study had been approved by Ethics Committee of Tehran University of Medical Sciences.

### Study instrument and variable assessment

A structured questionnaire was used to collect data about age, years of education, and mean severity of headache during last month (all by means of visual analogue scale [VAS: 0-10]).

After an inclusive examination by a neurologist, the participants were asked to fill out valid and reliable Persian versions of Pittsburgh Sleep Questionnaire (PSQI), female sexual function

index (FSFI) and beck depression inventory (BDI). BDI including 21 questions (each item scored 0-3) is a self-explanatory questionnaire used to evaluate subjects' feelings in the previous week. Scores from 0 to 9 indicate no depression, 10-18 show mild to moderate depression, 19-29 specify individuals with moderate to severe depression, and 30-63 reveal severely depressed cases. A valid and reliable Persian version of BDI was used in the study.[14]

Pittsburgh Sleep Questionnaire, a self-administrative instrument, consists of 19 questions generating seven-component scores (sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction). Each component score ranged from 0 to 3 (0, not in the past month; 1, less than once per week; 2, once or twice per week; and 3, three or more times/week). A valid and reliable Persian version of this test was applied for assessing the quality of sleep in current survey. The total score ranges from 0 to 21 while higher scores indicates poorer sleep quality; A total score ≥ 5 indicates a "poor" sleeper. Valid and reliable Persian version administered.[15]

Female sexual function index is a 19-item self-report instrument to measure female sexual function providing scores on six domains of sexual function as well as a total score. These domains include: Desire (2 items, questions 1, and 2), arousal (4 items, questions 3 and 4 and 5 and 6), lubrication (4 items, questions 7 and 8 and 9 and 10), orgasm (3 items, questions 11 and 12 and 13), satisfaction (3 items, questions 14 and 15 and 16), and pain (3 items, questions 17 and 18 and 19). The addition of the 19 items provides the total FSFI score. Valid and reliable Persian version administered.[16]

### Statistical analysis

Data were analyzed using SPSS version 18 and presented as mean ± standard deviation. The Student's *t*-test applied for continuous as well as the Pearson Chi-square test with Fisher's exact test were used for categorical variables assessment. Correlation coefficient calculated for evaluating relationship between variables. Multiple linear regression analyses with FSFI and PSQI score as dependent variables and the scores of BDI, age and education level as independent variables conducted to assess their relevance for sexual function or sleep quality.

$P < 0.05$ was considered statistically significant.

## RESULTS

One hundred married women with migraine participated in this study. The mean age and education level of cases were 38.6 ± 9.3 and 13.6 ± years, respectively. Mean headache severity by means of VAS was 7.4 ± 2.2.

Mean BDI, PSQI, and FSFI scores were 15.1 ± 9.1, 7.6 ± 4, and 21.6 ± 8.8 in all patients, respectively.

There was no statistically significant difference between BDI, PSQI, and FSFI subscales in patients with different levels of headache severity [Table 1].

Mean BDI score was significantly higher in patients with higher PSQI score [Table 2].

Mean BDI and PSQI scores were significantly higher in women with sexual dysfunction (FSFI < 26.55) [Table 3].

Multiple linear regression analysis between the PSQI as a dependent variable and age, BDI, headache severity, and education level as independent variables showed that BDI is an independent predictor of PSQI [Table 4].

Age and BDI were significantly correlated with total FSFI score and all its subscales [Table 5].

Multiple linear regression analysis between the FSFI as a dependent variable and age, BDI, headache severity, and education level as independent variables showed that BDI and age are independent predictors of FSFI [Table 6].

## DISCUSSION

We found that 68% of patients had sexual dysfunction, while BDI score and age were predictive factors for this score.

**Table 1:** BDI, PSQI and FSFI scores in patients with different headache severity scores

|  | Severity ≤3 | 4≤severity <6 | 6≤severity <10 | P value |
|---|---|---|---|---|
| BDI | 16.4±9.5 | 16.1±10.3 | 14.3±8.7 | 0.7 |
| PSQI | 7.8±2.9 | 6.1±3.5 | 7.9±4 | 0.2 |
| FSFI | 18±9.5 | 25.2±6.7 | 21.5±8.7 | 0.1 |
| Desire | 2.5±1.3 | 3.6±1.1 | 3.1±1.2 | 0.1 |
| Arousal | 2.6±1.5 | 3.6±1 | 3.3±1.5 | 0.4 |
| lubrication | 3.4±1.9 | 4.6±1.5 | 3.8±1.9 | 0.2 |
| Orgasm | 3.2±1.9 | 4.2±1.4 | 3.6±1.9 | 0.3 |
| Satisfaction | 3.6±1.7 | 4.5±1.2 | 3.6±1.6 | 0.1 |
| Pain | 2.5±1.9 | 4.5±1.7 | 3.9±1.8 | 0.1 |

BDI=Beck depression inventory, PSQI=Pittsburgh sleep quality index, FSFI=Female sexual function index

In a previous study, Bestepe *et al*. found that all aspects of sexual health (sex drive, arousal, vaginal lubrication, ability to reach orgasm, and orgasmic satisfaction) in patients with migraine are more impaired than healthy controls.[5] Which is compatible with our results?

In current study, the mean FSFI score was 21.6 which correlated negatively with BDI score and age. Nappi *et al*. have reported median score for FSFI near 24 in migraineurs, which was higher than the score in the tension-type group.[17]

**Table 2:** BDI, FSFI and its subscales in patients with and without sleep quality impairment

|  | PSQI<5 N=21 | PSQI≥5 N=79 | P value |
|---|---|---|---|
| BDI | 10.7±8.1 | 16.3±9 | 0.01 |
| Total FSFI | 23.8±9 | 21±8.7 | 0.4 |
| Desire | 3.4±1.3 | 3.1±1.1 | 0.2 |
| Arousal | 3.8±1.5 | 3.1±1.4 | 0.08 |
| Lubrication | 4.1±1.8 | 3.7±2 | 0.4 |
| Orgasm | 4.2±1.7 | 3.4±1.8 | 0.1 |
| Satisfaction | 4±1.3 | 3.7±1.6 | 0.3 |
| Pain | 4.1±1.7 | 3.8±1.9 | 0.4 |

BDI=Beck depression inventory, PSQI=Pittsburgh sleep quality index, FSFI=Female sexual function index

**Table 3:** BDI and PSQI scores in patients with and without sexual dysfunction

|  | FSFI≤26.55 N=68 | FSFI>26.55 N=32 | P value |
|---|---|---|---|
| BDI | 16.8±8.4 | 11.5±9.6 | 0.007 |
| PSQI | 8.2±4.1 | 6.4±3.5 | 0.04 |

BDI=Beck depression inventory, PSQI=Pittsburgh sleep quality index, FSFI=Female sexual function index

**Table 4:** Linear regression analysis predicting PSQI score in patients with migraine

|  | B | P value |
|---|---|---|
| BDI | 0.42 | <0.001 |
| Age | −0.1 | 0.8 |
| Years of education | 0.02 | 0.8 |
| Headache severity | 0.06 | 0.5 |

We found significant negative correlation between BDI score and FSFI (*r*= −0.1, *P*=0.001) as well as significant positive correlation between BDI and PSQI (*r*=0.42, *P*<0.001). BDI=Beck depression inventory, PSQI=Pittsburgh sleep quality index, FSFI=Female sexual function index

**Table 5:** Correlation coefficients FSFI and its subscales and different variables

|  | Total FSFI | Desire | Arousal | Lubrication | Orgasm | Satisfaction | Pain |
|---|---|---|---|---|---|---|---|
| Age | r=−0.49, P<0.001 | r=−0.56, P<0.001 | r=−0.54, P<0.001 | r=−0.43, P<0.001 | r=−0.43, P<0.001 | r=−0.33, P=0.001 | r=−0.33, P=0.001 |
| Headache severity | r=0.02, P=0.82 | r=0.08, P=0.4 | r=0.07, P=0.4 | r=0.04, P=0.6 | r=0.08, P=0.4 | r=0.08, P=0.3 | r=0.05, P=0.6 |
| BDI | r=−0.39, P=0.001 | r=−0.33, P=0.001 | r=−0.25, P=0.01 | r=−0.27, P=0.005 | r=−0.24, P=0.01 | r=−0.25, P=0.01 | r=−0.32, P=0.001 |

BDI=Beck depression inventory, FSFI=Female sexual function index

**Table 6:** Linear regression analysis predicting FSFI score in patients with migraine

|  | B | SE | P value |
|---|---|---|---|
| BDI | −0.2 | 0.09 | 0.003 |
| Age | −0.46 | 0.09 | <0.001 |
| Years of education | −0.83 | 0.21 | 0.4 |
| Headache severity | −0.34 | 0.38 | 0.7 |
| PSQI | −0.03 | 0.22 | 0.7 |

BDI=Beck depression inventory, FSFI=Female sexual function index, PSQI=Pittsburgh sleep quality index

**Table 7:** Logistic regression analysis predicting sexual dysfunction in patients with migraine

|  | OR | 95% CI | P value |
|---|---|---|---|
| BDI | 0.95 | 0.89-1 | 0.2 |
| Age | 0.9 | 0.84-0.96 | 0.004 |
| Years of education | 1 | 0.87-1.1 | 0.8 |
| Headache severity | 0.99 | 0.96-1 | 0.5 |
| PSQI | 0.91 | 0.78-1 | 0.2 |

BDI=Beck depression inventory, PSQI=Pittsburgh sleep quality index

In their study, age correlated negatively with total FSFI score and subscales of FSFI except arousal, while in current study age correlated significantly with FSFI score and all its subscales. This difference could be due to different factors such as ethnicity, duration of marriage, and duration of the disease.

As there are limited studies evaluating sexual function in migraineurs women, the exact causes of sexual dysfunction in these women are not obvious.

Changes in sexual desire, genital arousal, and orgasm along with pain threshold alteration are considered as possible causes.[17,18] On the other hand, medications prescribed for migraine prevention such as antiepileptic agents, beta-blockers and pain killers, as well as vasoactive agents alter balance of neurotransmitters and modulators which are effective in central and peripheral sexual responses.[19]

On the other hand, hormonal changes such as estrogen withdrawal are considered as triggers for migraine.

Before menstruation, during the pill-free period in women using oral hormone replacement therapy, in hysterectomized women with bilateral oophorectomy, and delivery period, estrogen withdrawal is associated with migraine attacks. Conversely, higher estrogen level which occurs in second and third trimester of pregnancy could prevent migraine attacks.[20]

In current study, we also found that 79% of patients had poor sleep, and mean PSQI score was significantly higher in women with sexual dysfunction than in cases without sexual dysfunction. This can be indicative that patients with sexual dysfunction had poorer sleep, which could be due to mood comorbidities such as depression.

As our results showed, BDI score was significantly higher in cases with poor sleep. There was a significant positive correlation between BDI and PSQI score ($r = 0.42$, $P < 0.001$). BDI score was the only independent predictor of PSQI score.

This could show that psychological comorbidities such as depression play an important role in sleep quality of migraineurs.

In our study, mean PSQI score was not significantly different in patients with different headache severities, and headache severity was not an independent predictor of PSQI score. This finding is against Kelman *et al*. and Naughton *et al*. findings who found that headache severity influence sleep quality.[4,21]

In a study conducted by Zhu *et al*., poor sleep was detected in 61% of migraineurs. They found that patients with higher headache severity

evaluated through VAS, headache frequency, and Hospital Anxiety and Depression Scale had poorer sleep. Migraine history and comorbid anxiety and/or depression were determined as predictors of sleep quality in their study.[22]

This difference among our study and previous studies could be due to sampling variation. The concept of cases about headache severity and subjective assessment of headache severity are the other possible reasons.

Different hypothesis are suggested for poor sleep in patients with migraine: Over-use of different medicines, chronobiological mechanisms, occurrence of most attacks at night, experiencing nightmares, and comorbid psychological problems such as depressions.

Depression is a common mood disorder cases with migraine which affects different aspects of their lives. Its exact cause is not clear, but alteration in brain metabolites, hormonal fluctuations, over-use of medications, and serotoninergic dysfunction are considered as possible causes. Polymorphisms in the serotonin (5-HT) transporter is associated with migraine occurrence and attacks.[23,24] Anti-depressant agents such as selective serotonin reuptake inhibitors, serotonin norepinephrine reuptake inhibitors and tricyclic anti-depressants such as amitriptyline and nortriptyline could prevent migraine attacks.[25]

This study had some limitations. First, we did not have control group and evaluated only patients. Second, we did not evaluate women's partners to assess possible confounders.

In future studies, assessing effects of anti-depressant agents on sleep quality and sexual function of women with migraine is recommended.

On the other hand, larger, multicenter studies are needed to evaluate possible causes of poor sleep and sexual dysfunction in migraineurs women and evaluate effects of depression treatment on such problems.

## CONCLUSIONS

Physicians should consider sexual dysfunction in women with migraine along with depression and poor sleep in such cases.

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