

Frequency of Sleep Disturbance and its Relationship with Depression in Menopausal Women

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Abstract: Menopause is a developmental stage in women which is experienced by every woman with the increase of age. The problems in menopausal women include sleep disorders and depression. Thus, the present study was designed with the aim of exploring the frequency of sleep disturbance and its relationship with depression in menopausal women. The present study is of analytical cross-sectional type that was conducted on 1280 menopausal women who had the necessary criteria in selected medical and health centers in the Kermanshah city. The dimpling was random and continuous. The data collections too in this study were demographic particulars form, the Hamilton Depression Rating Scale (HAM-D) and the Pittsburgh Sleep Quality Index (PSQI) that were completed through interview. The software SPSS and descriptive analysis (frequency and standard deviation) and inferential analysis (Pearson's correlation coefficient) were used for data analysis. The results of the study indicated that the mean score for depression in the individuals studied was 9.37 ± 4.62 which indicates mild depression in the population. The depression score in the housewives was higher than the one in the employed women. About 88.4% of the explored individuals had mild sleep disturbance and only 5% of them had severe sleep disturbance. The results of this study indicate that there was a significant relationship between sleep quality and the relationship with husband, being exposed to smoking and adequateness of income. Also, Pearson's test indicated that there is a significant relationship between depression and sleep disturbance and thus, the more the sleep disturbance, the worse the depression ($p = 0.001$). The results of the study indicated that there was a significant relationship between depression and sleep disturbance in menopausal women in a way that women with more sleep disturbance showed higher level of depression.

Key words: Sleep disturbance, depression, menopausal women, scale, Iran

INTRODUCTION

Menopause is a developmental stage in women which is experienced by every woman with the increase of age and may changes occur in women in this stage. Menopause is considered as one of the main phenomena in the life of every women. As currently life expectancy is about 70 years in Iranians, women can be expected to spend about one third of their life after menopause (Bauld and Brown, 2009). In fact, menopause is the most important middle-age event in women which is accompanied by hormonal, mental and physiological changes and indicates the end of the ability to reproduce

and reaching infertility. According to the statistics 467 million menopausal women lived in the world in the year 1990. The aforementioned population is predicted to reach one billion and two hundred thousand individuals, with the increase of 47 million new cases each year, by 2030. Reduction of the estrogen level around menopause period results in a wide range of symptoms the most common of which are vasomotor symptoms such as hot flashes and night sweats. Other menopausal symptoms may include dizziness, fast and irregular heart rate, atrophic vaginal mucosa, bladder irritability, mood changes, memory disturbances, headache, muscle pains, joint pain and difficulty in focusing and sleep disturbance

(Moline *et al.*, 2003). One of the common problems of menopausal women is sleep disturbance. Sleep is a regular and recurring state that is easily reversible and its specifications include relative lack of motion and significant increase of threshold of response to external stimuli, compared with wakefulness state and is necessary for life quality (Gyllstrom *et al.*, 2007; Yirmiya and Bab, 2009) but natural changes due to age, medical problems, physiological problems and mental and social issues during growth and increase of age can change sleep and hence impact the quality of life in adults. About one third of adults in the world have sleep disturbance and this problem deteriorates with the increase of age and affliction with chronic diseases and is increased as much as 69% (Moline *et al.*, 2003). It is estimated that this disturbance occurs in about 12-25% of the general population though this estimate is probably lower than the real rate as there are some evidences that suggest that adults do not report their sleep problems. Sleep is a main circadian cycles and a complex biological pattern.

Sleep patterns mean the effects related to circadian (24 h cycle) and homeostatic processes such as the efficiency of night sleep, sleep quantity, subjective quality of sleep and daytime sleepiness. Paying attention to sleep quality is important due to two reasons: firstly, the complaints related to sleep are common and secondly, low-quality sleep is the paid-attention-to index in many diseases. Low sleep quality is one of the main symptoms of chronic insomnia and one of the most common problems individuals face. Some changes occur in sleep quality and structure and circadian rhythm with the increase of age. These changes results in sleep disorders and repeated complains due to these disorders. In addition, the main causes of sleep problems are not biological changes and circadian rhythm. They are the occurrence of diseases, the effects of medicine, depression, anxiety and movement limitation (Morin and Barlow, 1993).

Women often suffer from disturbance in sleep quantity and quality due to hormonal changes during menopause. Sleep disturbance includes insomnia, hypersomnia, sleep apnea, restless leg syndrome, sleepwalking and nightmares. Sleep disturbance has been reported in 65% of menopausal women and this disturbance is created during menopause due to hot flashes, night sweats, night coughs and breathing disturbance and results in physical weakness, daytime sleepiness, and increase of affliction with mental diseases, irritability and aggression (Baker *et al.*, 1997). The change of sleep pattern is often related to menstrual cycle, pregnancy and menopause. The prevalence of sleep disturbance in menopausal women is reported to be 65%.

Some studies have reported the prevalence to be about 50% (Erluk *et al.*, 1981). In the study by Reed *et al.* (2007) the prevalence has been reported to be 43%. Also, in the study by Blumel *et al.* (2012) 56.6% of the women explored suffered from insomnia, low sleep quality or both. The prevalence of this problem in women is increased with the increase of age in a way that the prevalence has been reported to be 39.7% in women ages 40-44 and 45.2% in women ages 55-59 years. The prevalence of this problem in menopausal women in Tehran has been reported by Tavooni *et al.* (2011) to be 70%.

In fact one of the problems of women during menopause in different societies is psychological problems, especially depression. Depression is one of the most common mental diseases that is not limited to a specific time, place or individual and affects all groups and classes in the society. According to the existing statistics 15-20% of adults significantly suffer from depression (Rutledge *et al.*, 2001). The prevalence of depression during menopause has been reported in different studies. For example, in the study by Reed *et al.* (2007) the prevalence of depression during menopause was found to be 18%. In the study by Yassary 34.7% of menopausal women were found to have depression. Cooke believes that menopause accompanies the increase of depression symptoms in women in a way that the highest prevalence of depression is in the stage around menopause period and due to more hormonal changes. Depression during menopause results in some problems such as physical problems due to depression, mental and psychological problems created in the family, the transfer of depression to others and finally, suicide which is usually seen following an untreated depression (Blumel *et al.*, 2012). Also, in the study by Black (2006) there was no significant statistical relationship between menopause-associated vasomotor symptoms and severity of depression. In the study by Parry *et al.* (2006) titled Sleep, Rhythms and Women's Mood it was seen that sleep disorders and insomnia can result in mental damages and disturbance in memory and focusing. According to Shojaeian *et al.* (2007) the symptoms (such as hot flashes and sleep disorder) created in menopausal women do not impact the severity of depression in menopausal women.

Overall, a review of the studies conducted on the relationship between menopausal symptoms and psychological disorders such as anxiety and depression indicates that these studies have reached conflicting results. On the other hand, efforts for treatment of depression and anxiety result in the lower quality of life in menopausal women, in addition to imposing economic burden on family and society (Kim *et al.*, 2011). Mental

problems such as anxiety can result in different complications such as irritable bowel syndrome in the individual (Alavijeh *et al.*, 2011). As life quality in menopausal women's an important health issue which is paid attention to in different societies and is considered as one of the main aims of medical cares during the period, determining whether menopausal symptoms such as hot flashes and night sweats can pave the way for other psychological disorders such as anxiety and depression, helps in the prevention of depression and anxiety and thus can improve the quality of life in menopausal women by treating the menopausal symptoms (Kim *et al.*, 2011). The aforementioned points show the importance of intervening planning and solutions for prevention or reduction of depression in menopausal women. However, the necessary requirement for any planning is knowledge of the existing condition and the problem. In line with this, experts believe that epidemiological studies are the first step in designing a program (Alavijeh *et al.*, 2015, 2016; Moghadam *et al.*, 2012; Hosseini *et al.*, 2016; Jalilian *et al.*, 2016).

On the other hand, none of the above-mentioned studies have explored the three factors (sleep disturbances, depression and menopause) together. Also, as no study has been conducted in this regard in the population of Kermanshah, the present study explored the frequency of sleep disturbance and its relationship with depression in menopausal women.

MATERIALS AND METHODS

The present study is descriptive-analytical (of cross-sectional type). The numbers of samples were selected from each center in proportion to the family population of each district and overall, 1280 individuals were selected from the selected centers. The number of subjects selected was more in centers which covered more population. The selection of menopausal women was done by examining the family files in the centers and by written the particulars, address and phone number. Invitation for participation was done through calling or through medical staff and if the individuals did not visit the medical centers, the interview was done in front of their houses. If there were no menopausal women in the selected addresses, the left or right neighbors would be selected as replacement. The sampling was continued until the intended numbers of samples were specified. The interview was done after obtaining oral and written consent of the individuals and explaining to them that all the questionnaires were without name and completely confidential and that the individuals could stop participating whenever they want. About 30 min were

considered for interview with each person. Finally, 277 questionnaires were completed in individuals' houses and 1003 questionnaires were completed by the individuals who visited the medical centers. This research has been approved by the Institutional Review Board at the Kermanshah University of Medical Sciences (KUMS.REC.1394.437).

Afterwards, the scores of sleep disorder questionnaire were calculated and classified; a score of 5 or more was considered sleep disturbance and this was itself categorized to three categories: the individuals having a score of 6-10 were in the mild category, the individuals having a score of 11-15 were in the moderate category and those with a score of 16 and higher were in the severe category. The individuals who obtained a score of 7 or higher from the Hamilton Depression Rating Scale had depression and these individuals too were categorized into three categories: individuals with a score of 8-13 were in the mild category, the individuals with a score of 14-18 were in the moderate category and those with a score of 19 and higher were in the severe category. The conditions for inclusion in the study were: Menopausal women who have stopped having menstruation for at least one year. Lack of using contraception and /or hormone replacement therapy. And the criteria for exclusion from the study were: having sleep disturbances before menopause (based on individual's statement. Having a recognized sexual disease or being under treatment for diseases that affect sleep such as thyroid problem, low amount of sleep, insomnia and headaches. Loss of a first-degree relative in the past year or a recent accident. History of smoking and narcotic drug consumption and 5. A recognized case of depression and any mental disease before menopause. SPSS Version 16, descriptive analysis (frequency and standard deviation) and inferential analysis (Pearson's correlation coefficient) were used for data analysis.

Research tools: General and demographic information questionnaire: Kupperman index has been used for question no. 12 of general information questionnaire which is related to the severity of hot flashes. The method content validity has been used for determining the scientific validity of the demographic questionnaire. For this purpose, the questionnaire was explored by 3 university faculty members and 3 medical staff in the selected medical centers.

The Hamilton Depression Rating Scale (HAM-D): HAM-D is a standard tool for diagnosis of depression and is consisted of 17-21 observational measuring items that measure the presence and intensity of depression. In

front of each question that specifies disease symptom are four sentences that represent the mildest to the most intense feeling of the disease. The quantitative values of each aspect are from 4-0. The following scores have been considered for determining the overall level of depression in this study: 0-7 normal, 8-13 mild depression, 14-18 moderate depression, 19 and higher severe depression (Hamilton, 1967).

This questionnaire was created by Hamilton (1967) for assessment of the intensity of depression by the therapist. The scale has 21 items. After psychological interview with the patient, the interviewer scores each item on a 5 or 3-point scale. This scale was published in 1960 together with a report of its situation with factorial analysis and normalization obtained on 41 male patients. In terms of reliability, the correlation coefficient calculated between two assessors regarding 70 patients was equal to 0.90. The coefficient is reported being 0.94 in another study (Hamilton, 1967).

The Pittsburgh Sleep Quality Index (PSQI): This scale is consisted of 19 self-report questions and 5 questions that are reported by the roommate of a menopausal woman (only self-report questions are calculated in the scoring). 15 of the 19 questions are multiple-choice questions that deal with the repetition of sleep problem and subjective quality of sleep. And 4 items deal with the timing of going to bed, waking up, sleep latency and subjective sleep quality. The 5 other multiple-choice questions are asked from the roommate and partner of the patient. The questionnaire covers 7 domains. The score of each section is from 0 (without problem) to 3 (severe problem). The scores are added for a total score, the range of which is 0-21. An overall score of 5 or more indicates a significant sleep disturbance. In this questionnaire, question 9 is related to subjective sleep quality, questions 2 and 5a are related to the sleep latency, question 4 is related to sleep duration, questions 5j-5b are related to sleep disturbances, question 6 is related to the use of sleeping drugs and questions 7 and 6 are related to daytime dysfunction (Buysse *et al.*, 1989). Carpenter and Andrykowski (1989) have reported that the Cronbach's Alpha for this scale is 0.80. Also, in the study by Backhaus *et al.* (2002) the retest reliability of the scale was obtained being 0.87. The scale has been used for different populations in Iran and its psychometric characteristics have been reported to be acceptable. For example Mokarami and colleagues have reported 0.89 as the Cronbach's alpha for this scale.

RESULTS AND DISCUSSION

The findings of the study indicate that the mean age of the menopausal women explored in this study was 55.27±3.03 and the mean age of menopause in the women

Table 1: Relative frequency of being exposed to smoking, hot flashes, husband's education and relationship with husband in women visiting the selected medical and health centers

Variables	Types	Frequency	
		Number	Percentage
Being exposed to smoking	Yes	632	38.6
	No	685	51.3
Hot flashes	No	837	65.3
	Mild	319	23.9
	Moderate	103	8
	Severe	22	1.7
Husband's education	Illiterate	387	38
	Elementary	325	25.3
	Middle school	178	13.9
	High School	115	9
Relationship with husband	University	176	13.7
	No	7	0.5
	Very satisfied	318	23.8
	Satisfied	638	50.6
	Mediocre	273	21.3
	Not Satisfied	35	2.7

was 50.8±1.71. Most (1108 individuals) of the individuals explored were married, 90.7% (1162 individuals) lived in city, 58% (752 individuals) were illiterate, 17.3% were employed, 82.7% were housewives and 52.5% had a monthly income of >\$285. Table 1 shows that 38.6% (632 individual) of the menopausal women explored in the study were exposed to smoking and 65.3% (837 individuals) had hot flashes. Also, 25.3% of the women's husbands had elementary education and 50.6% of women were satisfied with their relationship with their husbands.

Table 2 shows that age, being exposed to smoking, relationship with husband, monthly income and the level of education of the individuals explored have a significant relationship with their level of depression (p<0.05). This means that the more are the age, being exposed to smoking, good relationship with husband, income and education, the lower is the level of depression in these women. Also, the level of hot flashes in these individuals has a direct and significant relationship with their depression level.

According to Table 3, 88.3% of the individuals explored had moderate sleep problem and only 0.55 had severe sleep problem. About 72.7% of the menopausal women explored had very good sleep quality and only 3.3% had relatively bad sleep quality. The subjective sleep quality was relatively good in 61.8% of the respondents and only 2.7% had relatively bad subjective sleep quality. About 38.3 % of the individual's explored fall asleep between 16 and 30 min and 9.65 of the individuals needed >60 min to fall asleep. Also, 33.65 of the women explored had >7 h of sleep and 5% had <5 hours of sleep.

Table 4 indicates that there is an inverse and significant relationship between depression and sleep disturbance and its dimensions in the individuals

Table 2: Relationship of depression with age, hot flashes, being exposed to smoking, relationship with husband, monthly income and education level in the women explored

Variable	Age		Being exposed to smoking		Hot flashes		Relationship with husband		Monthly income		Education	
	p-value	r	p-value	r	p-value	r	p-value	r	p-value	r	p-value	r
Depression	0.008	-0.073	-0.001	-0.0130	0.018	0.66	0.001	-0.259	0.038	-0.053	0.023	-0.056

Table 3: Frequency of sleep disturbance, subjective quality, latency period and duration in the women explored

Variables	Types	Frequency	
		Number	Percentage
Sleep disturbance	Lack of sleep problem	31	2.30
	Moderate sleep problem	1132	88.3
	Serious sleep problem	111	8.70
	Very serious sleep	7	0.50
Sleep quality	Very good	931	72.7
	Relatively good	292	22.8
	Relatively bad	57	3.30
	Very bad	0	0.00
Subjective sleep quality	Very good	132	10.3
	Relatively good	792	61.8
	Relatively bad	322	25.1
	Very bad	35	2.70
Sleep latency	<15 min	263	20.6
	16-30 min	620	38.3
	31-60 min	273	21.3
	>60 min	123	9.60
Sleep duration	>7 h	331	33.6
	6-7 h	563	33.0
	5-6 h	222	17.3
	<5 h	63	5.00

Table 4: Relationship of depression with sleep disturbance and its dimensions in women visiting the selected medical and health centers

Variables	Sleep disturbance		Sleep efficiency		Subjective sleep quality		Sleep latency		Sleep duration	
	p-value	r	p-value	r	p-value	r	p-value	r	p-value	r
Depression	0.001	-0.338	0.001	-0.333	0.001	-0.219	0.00	-0.326	0.00	-0.337

explored. This means that the more the severity of the sleep disturbance, the worse the depression. The efficiency, subjective quality, latency and duration of sleep is reduced with the increase of depression.

The results indicated that 88.3% of the individuals explored had moderate sleep problem and 2.7% had very bad subjective sleep quality. In the study by Taavoni *et al.* (2011) the sleep disturbance was seen in 70% of the individuals. Taibi *et al.* (2009) pointed out that sleep disturbance in menopausal women is highly prevalent. In a study, title A Multinational Study of Sleep Disorders during Female Mid-Life conducted on 11 countries in Latin America, Blümel showed that 56.6% of the women had inappropriate sleep quality (insomnia, weak sleep quality or both). The study also shows that 38.3% of the individuals explored showed problem in falling asleep and insomnia and sleep quality had a strong relationship in middle aged women. The researchers suggested that the cause of depression was increase of age and menopausal symptoms. The findings of this study are compatible with those of the present study (Blumel *et al.*, 2012). The study by Sun *et al.* (2014)

conducted in China showed that vasomotor symptoms was directly related to sleep disturbance and women who had more severe menopausal symptoms had more sleep disturbances.

It was shown in the present study that there is a significant relationship between sleep disorder and depression in menopausal women in a way that there is a significant inverse relationship between sleep disorders and its dimensions (sleep quality, sleep efficiency, subjective sleep quality and sleep latency duration and sleep duration). This means that the more the severity of sleep disturbance, the worse the depression. Sleep efficiency, subjective quality, latency period and duration are decreased with the increase of depression. Antonijevic *et al.* (2000) conducted a study titled Sleep-Endocrine Alterations in Women with Depression are Markedly Enhanced after Menopause and showed that problem in falling asleep is created in menopausal women due to hormonal changes and these sleep disturbances themselves are a factor for depression in menopausal women. In the study by Freeman *et al.* (2004), it was seen that depressed women had

more hot flashes and had problem in sleep continuation and these results are in line with those of the present study.

The frequency of depression in menopausal women in the present study is 59.8% (sum of frequency of mild, moderate and severe depressions). The prevalence of depression in menopausal women is different in the reports of different studies. Stadberg *et al.* (2000) reported the prevalence of depression being 33% and most of the prevalence of depression was seen in individuals who had more menopausal symptoms. In the study by Yassary the prevalence of depression was 33.7% and 3.2% of the individuals had severe depression. Also, the results of the study by Bondad on pregnant women in Tehran indicated that 57.8% of women had depression (Ohayon, 2002).

It was shown in the present study that age, being exposed to smoking, relationship with husband, monthly income and the level of education of the individuals explored had a significant relationship with their level of depression. This means that the more were the age, being exposed to smoking, good relationship with husband, income and education, the lower was the level of depression in these women. Also, the level of hot flashes in these individuals had a direct and significant relationship with their depression level. Women become menopausal in ages and the samples selected in the present study were in their menopause and of different ages and no age limitation was considered however, other studies have considered age limitation and this can be the reason for the inconsistency between the present study and the aforementioned study. Also, studies indicate that natural menopause age is impacted by environmental conditions, social and demographic characteristics and genetics.

The results of the present study indicated that there is a significant relationship between depression and relationship with husband which means that, in menopausal women, the better the relationship with husband, the less the depression in menopausal women. The results of the study by Yasary indicated that the type of the relationship with husband impacts the depression severity. The spouses that have problems with each other are more depressed, have more aggressive behavior and more anxiety. Ohayon (2002) too showed that women have problems with their spouses are more depressed during menopause. In their study in Spain, Cuadros *et al.* (2012) indicated that the better is the relationship of menopausal women with her husband, the less is the stress experienced and thus, the less is the depression in these women. The findings of the present study are consistent with the findings of these studies.

CONCLUSION

The findings of the present study indicated that the relationship of sleep disturbance with depression is significant in menopausal women who means that the more is the sleep disturbance in these women, the worse is the depression. Also, based on the results the more depressed are the women, the lower are their sleep quality, subjective sleep quality and sleep duration. Therefore, health professionals are recommended to provide appropriate guidance for prevention or improvement of sleep disturbance and depression in menopausal women by considering the characteristics that makes individuals eligible for high risk and the related planners are recommended to provide educational programs in the form of different educational classes during menopause for prevention and improvement of menopausal symptoms. Also, identification of women's problems during menopause for providing necessary education for appropriate decision-makings for improvement of the condition of these women is recommended. Finally, researchers are recommended to conduct more studies on menopause and discovery of the factors that can be effective in reduction of negative effects of menopause.

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