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Research Paper

Subjective sleep quality in perimenopausal women and its related factors

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Abstract

Objective: To evaluate the sleep quality and its related factors among perimenopausal women. **Methods**: A self-designed questionnaire was administered to 506 perimenopausal women. The questionnaire included the influencing factors on the sleep quality, the Pittsburgh Sleep Quality Index (PSQI), the Zung Self-Rating Depression Scales (SDS), the Zung Self-Rating Anxiety (SAS) and the Modified Kupperman Index (KI). Data were analyzed by SPSS11.5. **Results**: The mean PSQI was 5.97±4.30. Twenty-four percent of perimenopausal women reported poor sleep. Age and perimenopausal symptoms were significantly correlated with sleep quality. The sleep quality of the 45~49 age group was the poorest and the 40~44 age group was the best. The women who had higher Kupperman index were more likely to be poor sleepers. There was no significant correlation between occupation and sleep quality. Night sweat, depression, anxiety, hot flash, stressful life event, and regular exercise were significantly and independently related with sleep quality. Among them, regular exercise was a protective factor of sleep quality. **Conclusion**: High incidence of poor sleep quality exists among perimenopausal women. Some effective interventions should be taken to improve the sleep quality of perimenopausal women.

Keywords: perimenopausal women; sleep quality; influencing factor

INTRODUCTION

Perimenopausal period is an essential transitional stage in every woman's life. During this period, two-thirds of perimenopausal women will be or are bothered by a series of physical and psychological symptoms caused by the degeneration of ovarian function associated with the reduction of estrogen [1,2]. The epidemiological data show that approximately 33~51% of perimenopausal women are bothered by sleeping disturbance [3,4]. However, the reports about the sleep quality and related factors in perimenopausal women in China are still very few; only two articles concerned with sleep quality in perimenopausal women have been found in CNKI (China National Knowledge Infrastructure) database from 1994 to 2005. Therefore, we investigated the sleep quality of 506 perimenopausal women and the related influencing factors in order to provide a scientific basis and appropriate measures to improve their sleep quality.

MATERIALS AND METHODS

Subjects

A total of 540 perimenopausal women who went to the perimenopausal hygiene out-patient clinic of the first Affiliated Hospital of Xi'an Jiaotong University from March, 2003 to November, 2004 were enrolled in this study (mean age 47.46±5.14, range from 40 to 65). 506 perimenopausal women returned complete questionnaires.

Procedure

A self-designed questionnaire was filled out by all subjects. The questionnaire included the demographic data and influencing factors on the sleep quality, the Pittsburgh Sleep Quality Index (PSQI), the Zung

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Self-Rating Depression Scales(SDS), the Zung Self-Rating Anxiety (SAS) and the Modified Kupperman Index.

The demographic data included age, marital status, education, occupation, exercise, stressful life event, menopausal status, etc.

The 19-item Pittsburgh Sleep Quality Index was developed by Buysse *et al* [5]. It contains seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the last month. Each component scored from 0-3 scales and a global score ranged between 0 and 21. The PSQI was revised by Xianchen Liu *et al* [6,7], and the Chinese version defined a global PSQI score greater than 7 as poor sleep.

The Zung Self-Rating Depression Scales (SDS) and the Zung Self-Rating Anxiety (SAS) contain 20 items respectively. The standard score≥50 was diagnosed as depression or anxiety[8].

The perimenopausal symptoms were evaluated with the 13-item Modified Kupperman Index (KI). Each item score of the modified KI ranges from 0 to 3 (0=no symptoms, 1=slight, 2=moderate, 3=severe). The KI total symptoms scores were categorized into three menopause symptom severity groups: mild(≤20), moderate(21 to 35), and severe(≥36)[9].

Statistical analysis

Data were presented as mean±SD. SPSS for windows 11.5 software was used for data analysis. Categorical variables were compared with χ^2 test and rectify χ^2 test. Continuous variables were assessed using two-sample t-test for independent samples and Cochran & Cox test as appropriate. The related factors on the sleep quality were analyzed using univariate Logistic regression and multivariate stepwise Logistic regression analysis. Values of $P < 0.05$ were considered significant.

RESULTS

The sleep quality of the perimenopausal women

The mean PSQI score was 5.97±4.30 with a range from 0 to 20. Of 506 participants, 24.51% (n=124) were confirmed as poor sleepers, and 75.49% (n=382) as good sleepers. The group of poor sleepers had PSQI score ranging from 8 to 20, with a mean score of 12.28±3.66, which was significantly higher than that of good sleepers (***Tab 1***).

Tab 1 **Comparison of components of PSQI for good sleepers and poor sleepers** ($\bar{x} \pm s$)

	All (n = 506)	Good sleeper (n = 382)	Poor sleeper (n = 124)	F	P
Subjective Sleep quality	1.15 ± 0.76	0.85 ± 0.48	2.08 ± 0.69	21.84	< 0.01
Sleep latency	0.91 ± 0.88	0.60 ± 0.61	0.86 ± 0.91	51.24	< 0.01
Sleep duration	0.69 ± 0.89	0.31 ± 0.52	1.87 ± 0.75	10.48	< 0.01
Sleep efficiency	0.62 ± 0.86	0.28 ± 0.47	1.66 ± 0.96	158.5	< 0.01
Sleep disturbances	1.13 ± 0.68	0.87 ± 0.43	1.94 ± 0.65	20.92	< 0.01
Use of sleeping medication	0.20 ± 0.60	0.02 ± 0.12	0.77 ± 1.00	985.1	< 0.01
Daytime dysfunction	1.26 ± 0.75	0.99 ± 0.58	2.10 ± 0.56	0.726	< 0.01
Global PSQI score	5.97 ± 4.30	3.93 ± 1.74	12.28 ± 3.66	127.6	< 0.01

Significance levels were for comparisons between good sleeper and poor sleeper.

Pearson's correlation coefficients between the global PSQI score and the seven component scores were calculated. The three components that contributed most to the global PSQI were subjective sleep quality (r=0.865, $P < 0.001$), habitual sleep efficiency (r=0.827, $P < 0.001$), and sleep disturbances (r=0.819 $P < 0.001$). The component that contributed the least to the global PSQI was use of sleeping medications (r=0.701, $P < 0.001$).

Relationships among sleep quality, age, occupation, and perimenopausal symptoms

The results showed that age and perimenopausal symptoms were significantly correlated with sleep quality(***Tab 2*** and ***4***). However, there was no significant correlation between occupation and sleep qual-

Tab 2 **Relationship between PSQI and age**

Age(years)	PSQI		Total
	< 8	≥ 8	
40~	130	23	153
45~	116	59	175
50~	103	32	135
55~	24	8	32
60~65	9	2	11

χ^2 = 15.732, P = 0.003.

ity (*Tab 3*). The sleep quality of the 45~49 age group was the poorest and the 40~44 age group was the best. The women who had higher Kupperman index were more likely to be poor sleepers.

Tab 3 **Relationship between PSQI and occupation**

Occupation	PSQI		Total
	< 8	⩾ 8	
Laborer	47	17	64
Farmer	138	50	188
Professional technician	27	17	44
Teacher	32	10	42
Medical staff	25	5	30
Housewife and retired	51	9	60
Civil servant	52	14	66
Others	10	2	12

$\chi^2 = 10.063$, $P = 0.185$.

The related factors on the sleep quality

Univariate logistic regression showed that family income status, attendance of social activities, regular exercise, sleeping circumstance, menopausal status, night sweat, hot flash, depression, anxiety, physical illness, and stressful life event were significantly correlated with sleep quality, which were good univariate predictors of sleep quality. Of the 11 predictor variables, 5 variables entered the final multivariate logistic regression model(*Tab 5*). This result indicated that the five final variables—night sweat, depression, anxiety, hot flash, stressful life event and regular exercise—were significantly and independently related with sleep quality.

Tab 4 **Relationship between PSQI and perimenopausal symptoms**

Perimenopausal symptoms	PSQI		Total
	< 8	⩾ 8	
Without	204	35	239
Slight	118	16	134
Moderate	56	54	110
Severe	4	19	23

$\chi^2 = 101.91$, $P = 0.0001$.

DISCUSSION

In this study, 24.51% of perimenopausal women were poor sleepers, lower than that reported in different populations[1,2]. Kravitz[10] investigated the sleep quality of 12,603 perimenopausal women including Caucasian, African American, Chinese, Japanese and Hispanic women. The result showed that the incidence of difficult sleeping in Japanese women was the lowest (28%), while the incidence in Caucasian women was the highest (40%). Therefore, ethnicity may contribute to the different incidences of sleep disorder, but this needs further study to confirm [11].

Tab 5 **Related factors of sleep quality in perimenopausal women**

Variables	B	SE	Wald	OR	95%CI	*P*
Night sweat	1.351	0.497	7.384	3.860	1.457~10.224	0.007
Depression	1.295	0.424	9.315	3.652	1.590~8.392	0.002
Anxiety	0.707	0.151	21.83	2.028	1.507~2.728	< 0.001
Hot flash	1.075	0.593	3.288	2.929	0.917~9.355	0.070
Stressful life event	1.567	0.427	13.477	4.790	2.075~11.055	< 0.001
Regular exercise	−1.207	0.448	7.274	0.299	0.124~0.719	0.007

The result that low sleep quality was associated with an increased modified Kupperman index demonstrated that the degree of perimenopausal syndromes was related to the objective sleep quality [12]. The sleep quality of the 45~49 age group was the poorest and the 40~44 age group was the best which was in accordance with that the perimenopausal syndrome was more common during 45~49 age than 40~44 age. This result also supported the conclusion that the perimenopausal syndrome was associated with deterioration in sleep quality.

Based on the results of this study, depression and anxiety were significantly and independently related with sleep quality [13]. As a very common affective disturbance in perimenopausal period, depression and anxiety could be caused by the degeneration of ovarian function associated with the reduction of estrogen. And another important reason was that women during perimenopausal period often face with negative emotional problems and stressful life events, and all of these may worsen depression and anxiety symptoms and lead to poor sleep quality. On the other hand, sleep disorders can aggravate the symptoms of depression and anxiety. Thus the women fall into a vicious cycle and are bothered by them. Therefore, health hygiene, especially psychological health, should be strengthened to improve their psychological condition and sleep quality.

Another finding of this study was that night sweat and hot flash were correlated with sleep quality [14].

This may be explained by that the decrease of estrogen during perimenopausal period can change several biological factors such as body temperature regulation, circadian rhythms, and stress reactivity which directly influence sleep quality[15]. In addition, vasomotor symptoms such as hot flash, night sweet and palpitation could cause nocturnal waking, thus impair subject sleep quality[16].

According to the results of this study, regular exercises was helpful for perimenopausal women in improving their sleep quality, which was consistent with previous studies [17,18]. Regular exercises can increase sleep efficiency and sleep hours, and decreas awaking time after sleep onset. Exercise is also a healthy, safe, inexpensive, and simple means of improving sleep. Yet perimenopausal women should select a suitable and appropriate exercise to avoid damage.

In summary, some efficient interventions should be taken to improve the sleep quality as well as life quality of perimenopausal women. Hormone replacement treatment (HRT) can be given to improving sleep quality of perimenopausal women caused by severe perimenopausal syndrome it without HRT contraindication[19, 20].

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