The Relationship between Sleep Quality, Self-Efficacy, and Stages of Change among the Elderly: A Pilot Study

Mahin Nazari[1], PhD;
Mostafa Taheri[2], MSc;
Sareh Keshavarzi[3], PhD;
Ali Javadpour[4], MD

[1]Department of Health Education and Promotion, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran;
[2]Student Health Education and Promotion, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran;
[3]Department of Epidemiology, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran;
[4]Department of Psychiatry, Hafez Hospital. Shiraz University of Medical Sciences. Shiraz. Iran

Correspondence:
Mahin Nazari, PhD;
Department of Health Education and Promotion,
Shiraz University of Medical Sciences,
P.O. Box: 71645-111, Shiraz, Iran
Tel: +98 9177323669
Fax: +98 71 37260225
Email: manazari@sums.ac.ir

Abstract

Background: Although sleeping problems are common among all age groups, the elderly suffer a higher prevalence of sleep disorders. The present study aimed to investigate the relationship between sleep quality, self-efficacy, and stages of change among the elderly.

Methods: This descriptive-analytical study was conducted on 36 individuals aged 60-75 years selected through simple random sampling in 2013. The data were collected using Pittsburgh Sleep Quality Index (PSQI) and self-made structured questionnaires, including sleep self-efficacy scale and stages of sleep behavior change scale. SPSS statistical software, version 19 was used to analyze the data and descriptive and inferential statistics such as independent samples t-test were used.

Results: The results of the present study revealed that the mean of sleep quality was 7.91 (SD=4.99). In addition, most of the subjects (69%) had poor sleep quality. Considering the stages of change, the participants were in different stages of sleep behavior change. Moreover, a significant relationship was found between self-efficacy and PSQI total score (P<0.001). Also, significant relationships were observed between self-efficacy and the variables of stages of change (P<0.05), except for the average night sleep.

Conclusion: The results of this study showed that most of the elderly had poor sleep quality. Besides, they were in different stages of change in sleep problems. The results also indicated that self-efficacy affected the sleep quality in the elderly. Therefore, measures should be taken based on stages of change and increased self-efficacy to improve sleep quality among the elderly.

Introduction

Sleep, a complex biologic process controlled by the nervous system, is essential for proper cognitive, immune, and metabolic function.[1] Yet, the aging process leads to changes in sleep, and the prevalence of sleep disorders increases with age, having a negative impact on the quality of life in older adults.[2] Sleep disturbances are associated with diminished quality of life, increased risk for extension of psychological disorders, inappropriate use of sleep aids, decreased daytime functioning, and significant morbidity and mortality among older adults.[3]

Numerous epidemiological studies have consistently demonstrated that compared to younger people, older adults are disproportionately dissatisfied with their sleep quality.[4] Overall, 57% of the elderly have been reported to suffer from sleep

disturbances.[5] Likewise, in another study, more than 50% of the elderly had poor sleep quality.[6] A large number of epidemiological studies have also suggested that up to 50% of the elderly individuals complain about poor sleep.[7]

The stage construct represents a change in the temporal dimension implying a phenomenon which occurs over time.[8] The stage of change is one of the key constructs of the transtheoretical model. This model states that individuals pass through a series of stages called stages of change, including pre-contemplation, contemplation, preparation, action, and maintenance.[9] Individuals may move through these stages in a linear fashion or move back and forth.[10] Among these five stages, precontemplation is characterized by lack of intent to change, contemplation by ambivalence and intention to make changes sometime in the future, preparation by exploring and planning to take action in the immediate future, action by implementation, and maintenance by ongoing behavior change for more than 6 months.[11,12] Cain and colleagues used stages of change model to improve the individuals' sleep quality. In that study, the participants were categorized in different groups of sleep problems and many of them were in the precontemplation phase.[13] In another study, sleep quality improvement was reported after using the stages of change model among adolescents.[14]

Self-efficacy is defined as the situation-specific confidence that people can tackle with high-risk conditions without revert to their former behaviors.[15] This construct has been retrieved from Bandura's self-efficacy theory.[16] Weaver and colleague evaluated the self-efficacy for sleep apnea among patients. According to the results, the subjects with high self-efficacy had higher motivation to cope with sleep disorders.[17] Thus, the present study aims to investigate the relationship between sleep quality, self-efficacy, and stages of change among elderly.

Methods

This descriptive-analytical study was conducted on 36 elderly men selected through simple random sampling in 2013. First, the places where the elderly usually get together in the city were identified by randomization. Then, the individuals who met the inclusion criteria were selected and the questionnaires were completed with their permission and consent. The sample size was estimated as 40; however, 4 individuals had incomplete questionnaires and were excluded from the study. The inclusion criteria of the study were 60-75 years of age, elderly men, and ability to understand the study questions. On the other hand, the exclusion criteria were suffering from mental and cognitive dysfunction and returning incomplete questionnaires. The following questionnaires were employed in this study.

Demographic Characteristics

The participants' demographic characteristics were collected using six items about age, living with children, marital status, occupation, suffering from chronic diseases, and use of sleep medications.

Sleep Quality

The Pittsburgh Sleep Quality Index (PSQI) is a 19-item questionnaire appraising sleep quality and disorders over a one-month period.[18] The first 4 items are open questions, while items 5 to 19 are based on a 4-point Likert scale. The subscales of PSQI contained 7 components, including daytime dysfunction, sleep duration, sleep latency, sleep efficiency, sleep disturbances, use of sleeping medication, and subjective sleep quality. The total score of the questionnaire was obtained by adding the 7 components' scores and could range from 0 to 21. A global score greater than 5 suggested poorer sleep quality.[19] The reliability and validity of the questionnaire were confirmed by Ahmadi et al.[20]

Sleep Self-Efficacy Scale

Sleep self-efficacy was evaluated by 8 questions (e.g. I can get up at the same time every morning even if I have problems). The participants responded based on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree).

The scientific validity of the questionnaire was approved by sending the questionnaire to 10 related professors and applying their corrective comments on the questionnaire. In addition, the reliability of the questionnaire was confirmed by Cronbach's alpha of 0.74.

Stages of Sleep Behavior Change Scale

Stages of Sleep Behavior Change (SSBC) were evaluated by 5 questions (e.g. my bedtime is not the same in different nights, and I'm not going to regulate it in the next 6 months). The participants chose the items on a 5-point scale based on the five stages of precontemplation, contemplation, preparation, action, and maintenance.

The scientific validity of the questionnaire was confirmed by sending the questionnaire to 10 related professors and applying their corrective comments on the questionnaire. Additionally, its reliability was approved by Cronbach's alpha of 0.85. With respect to the ethical considerations, the study participants were explained about the study objectives and were ascertained about the secrecy of their information. After all, SPSS statistical software (version 19) was used to analyze the data using Pearson correlation, independent Samples t-test, or alternative

non-parametric tests, such as Mann-Whitney and Spearman correlation coefficient.

Results

According to the study findings, the mean age of the participants was 67.78±5.66 years (range: 60–75 years). As table 1 displays, 78% of the population had diploma or lower degrees. In addition, only 6% of the population were single and 58% reported one or more chronic diseases.

Besides, almost half of the population (47%) reported the use of medications and only 11% used sleep medications. Moreover, the majority of the population (72.2%) were retired and 86% owned houses. It should be noted that the elderly who lived with their children had higher PSQI total scores (8.22) compared to those who lived alone or with their wives (7.42).

Also, the results presented in table 1 show that the participants with chronic illnesses had higher PSQI total scores (8.71±5.31) in comparison to the healthy individuals (6.80±4.44). Furthermore, the PSQI total score was 8.64±5.84 in medication users and 7.26±4.14 in non-medication users. Moreover, the participants who worked had better sleep quality (6.10±2.42) compared to the retired ones (8.61±5.56).

In this study, the minimum and maximum scores of PSQI were respectively zero and 19 out of 21. In addition, the mean of PSQI total score was 7.91±4.99 out of 21. Among the 36 participants, 69% had poor sleep quality, while 31% had desirable sleep quality. Among the subscales, the highest score (1.66±1.09) was related to sleep duration while the lowest score (0.30±0.88) was related to the use of sleep medications. Considering subjective sleep quality, most of the participants (44.4%) reported very good sleep quality and only about 8% reported fairly bad sleep quality (table 2).

According to table 3, high self-efficacy was related to the question □I can get up and sleep at about the same time every day even if my family members get

Table 2: The means of PSQI total score and the seven components' scores

Variables	N	Mean±SD
Global score	36	7.91±4.99
Subjective sleep quality	36	0.86±0.99
Sleep latency	36	1.61±1.20
Sleep duration	36	1.66±1.09
Sleep efficiency	36	1.58±1.02
Sleep disturbances	36	1.19±0.52
Use of sleep medications	36	0.30±0.88
Day time dysfunction	36	0.69±1.06

up and sleep at different times". On the other hand, the lowest self-efficacy was related to the question "I can drink less caffeinated drinks in the afternoon and evening".

With respect to the stages of change, most of the participants (86.1%) reported that they got up at about the same time every day (maintenance phase) and 88.9% stated that they had gone to bed at the same time every night for more than 6 months (maintenance phase).

The majority of the population (55.6%) reported that they did not intend to decrease the use of caffeinated beverages in the next 6 months (precontemplation phase). In addition, 86.1% of the population reported that they had woken up and got up on holidays like other weekdays for more than 6 months (precontemplation phase). Considering the average night sleep, 58.3% of subjects were in the precontemplation phase (table 4).

The results of the present study revealed a significant relationship between regular wake-up and PSQI total score (P<0.001). Also, a significant relationship was observed between regular sleep and PSQI total score (P<0.001). The correlation between PSQI total score and average night sleep was also statistically significant (P<0.01). However, no significant relationship was found between PSQI total score and use of caffeinated drinks and waking up in the morning on holidays (P<0.05) (table 5).

Table 1: Demographic variables and PSQI total score

Variables		%	PSQI total score Mean±SD
Education level	≤Diploma	80.55	8.55±5.16
	>Diploma	19.45	5.28±3.30
Marital status	Single/divorced	5.6	10.00±11.31
	Married	94.4	7.79±4.72
Use of medications	Yes	47.2	8.64±5.84
	No	52.8	7.26±4.14
Use of sleep medications	Yes	11.0	14.50±3.99
	No	89.0	7.09±4.53
Occupation status	Full/part-time	27.8	6.10±2.42
	Retired	72.2	8.61±5.56
Living status	Live alone/ with wife	58.3	7.42±5.21
	Live with children	41.7	8.224.94
Chronic illness	Yes	58.3	8.71±5.31
	No	41.7	6.80±4.44

Table 3: Comparison of the relative frequency distribution of self-efficacy questions

Frequency (%) Questions	Strongly agree	Agree	Disagree	Strongly disagree	Total
I can get up at about the same time every day even if I have problems.	20 (55.6)	10 (27.8)	3 (8.3)	3 (8.3)	36 (100)
I can sleep at about the same time every day even if I have problems.	18 (50)	12 (33.3)	3 (8.3)	3 (8.3)	36 (100)
I can avoid sleeping past my normal days wake-up time on holydays.	31 (86.3)	1 (2.8)	1 (2.8)	3 (8.3)	36 (100)
I can adjust average night's sleep over a whole week to between 6 and 9 hours.	22 (61.1)	5 (13.9)	7 (19.4)	2 (5.6)	36 (100)
I can get up and sleep at about the same time every day even if my family members get up and sleep at different times.	80.6))29	-	-	7 (19.4)	36 (100)
I can drink less caffeinated drinks in the afternoon and evening.	15 (41.7)	11 (30.6)	6 (16.7)	4 (11.1)	36 (100)
I can exercise regularly at least three times a week.	26 (72.2)	4 (11.1)	1 (2.8)	5 (13.9)	36 (100)
I can drink less caffeinated drinks even if my family members habit it.	14 (38.9)	13 (36.1)	6 (16.7)	3 (8.3)	36 (100)

Table 4: Stages of sleep behavior change

Stages	PC	C	P	A	M	Total
Regular wake-up	3 (8.3%)	1 (2.8%)	1 (2.8%)	0	31 (86.1%)	36 (100%)
Regular sleep	3 (8.3%)	0	1 (2.85%)	0	32 (88.9%)	36 (100%)
Use of caffeinated drinks	20 (55.6%)	0	0	1 (2.8%)	15 (41.7%)	36 (100%)
Weekend/holidays sleep	4 (11.1%)	0	0	1 (2.8%)	31 (86.1%)	36 (100%)
Average night sleep	21 (58.3%)	0	0	1 (2.8%)	14 (38.9%)	36 (100%)

PC=Pre-contemplation; C=Contemplation; P=Preparation; A=Action; M=Maintenance

Table 5: The relationship between PSQI total score and sleep self-efficacy and stages of sleep behavior change

Stages of sleep behavior change		PSQI total score	Sleep self-efficacy
Regular wake-up	Pearson Correlation	0.581**	0.544**
Regular sleep	Pearson Correlation	0.574**	0.617**
Use of caffeinated drinks	Pearson Correlation	0.117	0.397*
Weekend/holidays sleep	Pearson Correlation	0.056	0.415*
Average night sleep	Pearson Correlation	0.444**	0.328
Sleep self-efficacy	Pearson Correlation	0.526**	-

0.001**, P<0.05*

The findings demonstrated a significant relationship between self-efficacy and PSQI total score (P<0.001) (table 5).

Discussion

The present study showed that 69% of the population had poor sleep quality. In the same line, the study by Zahedi and colleagues revealed that most of the elderly (70.3%) had poor sleep quality.[21] Likewise, Catherine and colleagues reported the prevalence rate of sleep problems to be 77.7% in the elderly.[22]

In our study, the mean of PSQI total score was 7.91±4.99 out of 21. This measure was obtained as 6.7 in the research by Rahmaninia and colleagues.[23]

In addition, the elderly who reported one or more chronic diseases (58%) had poorer sleep quality compared to others. This implies that diseases are effective in poor sleep quality. These results were also confirmed by Torabi and colleagues.[21]

Regular wake-up and sleep times and being in maintenance phase indicate the established sleep-wake time behavior in the elderly. Moreover, the results of the present study showed that the majority of the population was in the precontemplation phase and did not intend to decrease the use of caffeinated drinks in the afternoon and at night until 6 months. In addition, most of the participants reported that they had woken up and got up on holidays like other weekdays for more than 6 months (precontemplation phase). Considering the fact that most of the elderly were retired and all the days of the week were the same for them, this result was predictable. The average night sleep was less than 6 hours in most of the participants (58.3%) and they did not intend to increase it (precontemplation phase). Moseley and colleagues reported that the majority of the population (40.5%) were keen to increase the average night sleep time (preparation phase), but many of them (34.2%) were not keen to regularize weekend wake-up times (precontemplation phase). In addition, 26.3% of the population were committed to improving exercise (preparation phase).[14] In another study, 34.6% of the participants stated that they tried to go to bed earlier

on weeknights to improve their average night sleep.[13]

With regards to the correlation between PSQI total score and stages of change, the individuals who were in higher stages of regular wake-up and sleep and average night sleep had better sleep quality. According to the results presented in table 3, the positive correlation between self-efficacy and sleep quality showed that the individuals with higher self-efficacy had better sleep quality. The present study findings demonstrated significant relationships between self-efficacy and the variables of stages of change ($P<0.05$), except for average night sleep. The study by Mazloomy and colleagues also showed that self-efficacy levels increased with individuals' development through the five stages of behavior change.[24]

There were several limitations in this study, including the relatively small sample size and that it was conducted only on the elderly men. Moreover, this research only focused on the main concepts of self-efficacy and stages of change which affected the sleep quality. Thus, investigation of other effective factors in the elderly subjects' sleep quality could be useful for future planning.

Conclusion

The present study assessed the relationship between sleep quality and self-efficacy based on the stages of change among the elderly men in Shiraz. The study results demonstrated that most of the elderly had poor sleep quality. Nonetheless, the individuals with higher self-efficacy had better sleep quality. Also, the participants were in different stages of sleep behavior change. Therefore, educational interventions based on the five stages of behavior change are recommended to be designed and implemented to promote sleep self-efficacy.

Acknowledgments

Conflict of Interest: None declared.

References

1   Barsam T, Monazzam MR, Haghdoost AA, Ghotbi MR, Dehghan SF. Effect of extremely low frequency electromagnetic field exposure on sleep quality in high voltage substations. Iranian Journal of Environmental Health Science & Engineering. 2012; 9(1): 1-7.

2   de Castro Toledo Guimaraes LH, de Carvalho LBC, Yanaguibashi G, do Prado GF. Physically active elderly women sleep more and better than sedentary women. Sleep Medicine 2008; 9(5): 488-93.

3   Harrington JJ, Avidan AY. Treatment of sleep disorders in elderly patients. Current treatment options in neurology 2005; 7(5): 339-52.

4   Vitiello MV. Effective treatment of sleep disturbances in older adults. Clinical cornerstone 2000; 2(5): 16-24.

5   Foley DJ, Monjan AA, Brown SL, Simonsick EM. Sleep complaints among elderly persons: an epidemiologic study of three communities. Sleep: Journal of Sleep Research & Sleep Medicine. 1995.

6   Bazargan M. Self-reported sleep disturbance among African-American elderly: the effects of depression, health status, exercise, and social support. The International Journal of Aging and Human Development 1996; 42(2): 143-60.

7   Vitiello MV, Larsen LH, Moe KE. Age-related sleep change: gender and estrogen effects on the subjective–objective sleep quality relationships of healthy, noncomplaining older men and women. Journal of psychosomatic research 2004; 56(5): 503-10.

8   Prochaska JO, WF. V. The Transtheoretical Model of Health Behavior Change. American Journal of Health Promotion 1997; 12(1): 38-48.

9   Moradi M, Heydarnia A, Babaei G, R, Jahangiri M. Stage-based interventions for drug abuse prevention among petrochemical workers in assaluyeh. Medical Science Journal of Islamic Azad Univesity Tehran Medical Branch 2010; 19(4): 246-55.

10   Lach HW, Everard KM, Highstein G, CA. B. Application of the transtheoretical model to health education for older adults. Health Promotion Practice 2004; 5(1): 88-93.

11   Ko PC, Duda B, Hussey E, Mason E, Molitor RJ, Woodman GF, et al. Understanding age-related reductions in visual working memory capacity: Examining the stages of change detection. Atten Percept Psychophys 2014: 1-16.

12   Hoke MM, Timmerman GM. Transtheoretical model: potential usefulness with overweight rural Mexican American women. Hispanic Health Care International 2011; 9(1): 41-9.

13   Cain N, Gradisar M, Moseley L. A motivational school-based intervention for adolescent sleep problems. Sleep medicine 2011; 12(3): 246-51.

14   Moseley L, Gradisar M. Evaluation of a school-based intervention for adolescent sleep problems. Sleep 2009; 32(3): 334.

15   Bandura A. Social cognitive theory: An agentic perspective. Annual review of psychology 2001; 52(1): 1-26.

16   Glanz K, Rimer BK, Viswanath K. Health behavior

and health education: theory, research, and practice: John Wiley & Sons; 2008.

17 Weaver TE, Maislin G, Dinges DF, Younger J, Cantor C, McCloskey S, et al. Self-efficacy in sleep apnea: instrument development and patient perceptions of obstructive sleep apnea risk, treatment benefit, and volition to use continuous positive airway pressure. Sleep-New York Then Westchester 2003; 26(6): 727-34.

18 Nazifi M, Mokarami H, Akbaritabar A, Kalte HO, Rahi A. Psychometric Properties of the Persian Translation of Pittsburgh Sleep Quality Index. 2014.

19 Tavallaie S, Assari S, Najafi M, Habibi M, Ghanei M. Study of sleep quality in chemical-warfare-agents exposed veterans. MilMed Journal 2005; 6(4): 241-8.

20 Ahmadi S, Mohammadi F, Fallahi M, Reza Soltani P. The effect of sleep restriction treatment on quality of sleep in the elders. Iranian Journal of Ageing 2010; 5(2): 0-0.

21 Torabi S, Shahriari L, Zahedi R, Rahmanian S, Rahmanian K. A survey the prevalence of sleep disorders and their management in the elderly in Jahrom City, 2008. Journal of Jahrom University of Medical Sciences 2013; 10(4): 31.

22 Lo C, Lee PH. Prevalence and impacts of poor sleep on quality of life and associated factors of good sleepers in a sample of older Chinese adults. Health Qual Life Outcomes 2012; 10: 72.

23 Rahmaninia F, Mohebi H, Saberian Boroujeni MGH. The Effect of Walking on Quality, Quantity and Some Physiological Parameters Related to Sleep in Old Men. Sport Biosciences (HARAKAT) 2010; 3(111): 12.

24 Mahmoudabad SSM, Mohammadi M, Sharifabad MAM. Exercise and Its Relation to Self Efficacy Based on Stages of Change Model in Employees of Yazd in 2008. Journal of Kerman university of medical sciences 2010; 17(4): 346-54.