ORIGINAL ARTICLE

The Impact of the Educational Intervention on Sleep Quality and Psychological Well-being Among the Elderly People

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ABSTRACT

Introduction: Sleep disorder is one of the most common problems in elderly people. The present study is focused on the effectiveness of educational intervention on sleep quality and psychological well-being in the elderly people. **Method:** This is a Randomized educational field-controlled trial which was conducted on 90 elderlies with the sleep disorder, who have been selected using systematic random sampling from the clients of comprehensive health centers in Borazjan, Iran, 2019. The educational intervention was presented for 5 weeks by lecture, group discussions and virtual learning methods. Data were collected by the Pittsburgh Sleep Quality Index and the Ryff's Psychological well-being scale before and 2 months after the intervention. The data were analyzed using SPSS-25 software using independent t-test, and Chi-square test. **Results:** The results showed significant statistical differences in sleep quality, subscales of sleep efficiency, sleeping time, and taking sleeping pills in experimental and control groups after the intervention ($p \leq 0.005$). Moreover, significant statistical difference was observed in terms of the mean scale of psychological well-being between experimental and control groups ($p=0.036$). **Conclusion:** Behavioral interventions can make various advantages for elderly people. Therefore, this study suggests providing such interventions in a wide range in comprehensive health centers, and boarding centers for the elderly.

Keywords: Behavioral Interventions, Sleep Quality, Psychological Well-Being, Elderly

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INTRODUCTION

Change in sleep patterns is a part of the aging process (1). Changes in circadian rhythm, decrease in total sleep time, increase in light sleep, decrease in Rapid Eye Movement (REM) period of sleep, increased frequency of naps during the day, interruption of the sleep cycle, and a general decrease in the quality and the effectiveness of the sleep are the main sleep changes during elderly (2). In many of diseases, patients complain of decreased sleep quality and inefficient sleeping(3).The sleep quality is a significant index of health status in the elderly. Feeling refreshed after waking up and lack of drowsiness during the day are the signs of a high-quality sleep. The main advantages of high-quality sleep can be mental and physical relaxation and rejuvenation and readiness to accept new tasks (4).

The most common sleep disorders in the elderly include insomnia, sleep rhythm disorders, excessive daily drowsiness, sleep apnea, and restless legs syndrome (5). The prevalence of sleep disorders in the elderly is about 70 percent. The most common sleep disorder among the elderly is insomnia. About 40% of people above 60 years old complain the difficulty in falling asleep or staying asleep (6).The most important causes of sleep disorders in elderly are diseases, drugs, depression, anxiety, and inactivity (7). Insomnia can affect different dimensions of life; for example, it can result in concentration disorders, increased risk of falling and the car accidents, unstable mood, irritability, fatigue, depression, dementia, exacerbation of ischemia, myocardial infarction, decreased quality of life, and increased risk of death (8, 9).

One of the impacts of insomnia can be on psychological well-being. Psychological well-being is an effort for the achievement of one's full psychological potential. It is a multi-dimensional dynamic concept, with 6 dimensions including personal growth, self-acceptance, purpose in life, positive relationships with others, environmental mastery, and autonomy (10).

There are various ways to overcome insomnia including pharmacological and non-pharmacological treatments. Non-pharmacological interventions include cognitive therapy, relaxation strategies, sleep hygiene, stimulus control and sleep restriction (11). Sleep hygiene can lead to an improvement in the sleep quality of elderly people (12).

Behavioral interventions are not only as effective as pharmacological treatments but also, they may leave

more long-term impacts. Health education is a part of the behavior therapy methods. The main objective of behavioral change techniques used in insomnia management is changing behaviors which cause sleep disorders. Sleep hygiene, sleep restriction and stimulus control are the most common behavioral change techniques in management of insomnia. Sleep hygiene refers to taking actions to support the normal rhythm of waking and sleeping, and restoring restful sleep (7). The goal of sleep restriction is to shorten the amount of time spent in bed, and Stimulus control therapy is designed to cut negative relations between the patient and the sleeping environment, which may be originated from the inadaptable behaviors of the patient (13). Some studies have showed the positive effects of education of behavior change techniques on the sleep quality in the elderly (7, 14-17).

Iranian population is rapidly aging, such that 9.3% of the total Iranian popu¬lation were more than 60 years old in 2016 and it is estimated to increase to 10% by 2026 (18). There is no exact information about the prevalence of sleep disorders in the elderly in Iran, but in some studies, it has varied from 39% in nursing homes(19) to 82% in retired elderly (20). According to the increasing population of elderly people and high prevalence of insomnia in this age group, the Ministry of Health in Iran has provided recommendations on sleep quality assessment and sleep health care as part of an integrated and comprehensive geriatric care program (21), but due to a lack of studies in the field of the effect of behavior change interventions on this disorder; the present study has been conducted with the purpose of evaluation of the combined effect of sleep hygiene, sleep restriction, and sleep stimulus control interventions on sleep quality and psychological well-being in elderly people of Borazjan, Bushehr, Iran.

MATERIALS AND METHODS

Participants

In this Randomized field-controlled trial (RFCT) which was conducted in Borazjan, South of Iran, 90 elderlies (60-70 years old) in both sexes recruited in the study through multistage random sampling. The sample size was determined based on a similar study(7), considering the alpha of 0.05, test power of 90%, standard deviation 15, and10% attrition rate. A sufficient size for each group in the study was established to be 45 people. First, two centers from 6 comprehensive health centers, were selected using simple random sampling 45 elder people were selected using systematic random sampling in each center. Each of the two centers allocated to intervention and control group randomly. The inclusion criteria were at least secondary school education level, being satisfied to participate in the study, having no physical disability or cognitive disorders, and gaining at least score 5 from sleep quality questionnaire. The participants who withdraw from the study, were absent in more than on educational session, did not respond to post test and begun to use hypnotics and sedatives during the study, were excluded (figure 1).

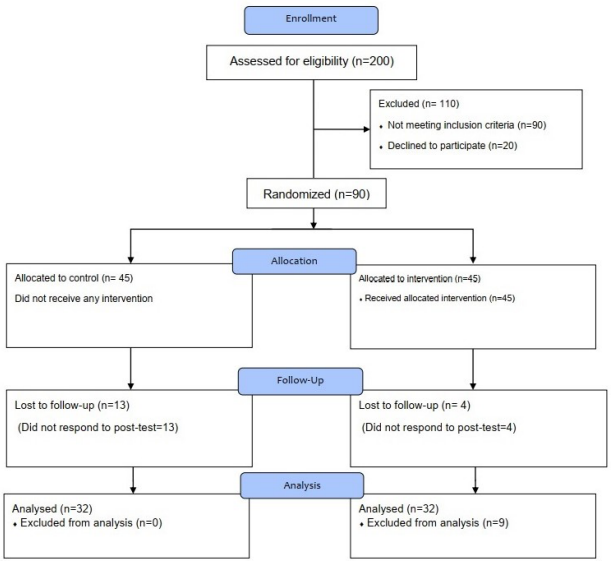

Figure 1: CONSORT flow diagram of participants through the study

Intervention

Behavioral change educational interventions included sleep hygiene, sleep restriction, and stimulus control. The intervention group were divided into five educational groups with 8-10 participants in each group. All participants in experimental group filled out the sleep scale before the intervention and the educational contents were designed based on the problems of elderly people which was extracted from the completed sleep scales and Bloom et al. (2009) recommendations for assessment and Management of Sleep Disorders in Older Persons (22). Five 45-60 minutes' education sessions were conducted for each education group during five weeks by one of the research team members (table I). Interactive lectures using PowerPoint presentations along with queries, and a booklet were used in educational sessions, and five short videos about sleep and its importance in health, insomnia and its causes, sleep hygiene, sleep restriction, and stimulus control were shared with participants in a WhatsApp group, and each week three text messages were sent to participants to encourage them to do recommendations provided in educational sessions. The control group received no education in this regard during the study period, but at the end of the study they received a copy of printed educational materials.

Instruments

Three questionnaires including a demographic scale, Pittsburgh Sleep Quality Index (PSQI), and Ryff Psychological well-being scale (RSPWB) were used for data collection. Pittsburgh Sleep Quality Index (PSQI) contains 19 self-rated questions, which are combined to assess the sleep quality within past month in seven components: subjective sleep quality, sleep latency,

Table I: The designed and implemented education program

Session	Subjects	Aims
First	Briefing	Familiarity of participants with the goals of the educational program Learning participants how to fill out a sleep booklet Motivating participants for continuous attendance at program
Second	Sleep and its importance in health	The importance of sleep quality on health The definition of insomnia and its causes Insomnia reduction strategies
Third	Sleep hygiene	Factors that can have an effect on sleep including: • Sleep habits: daytime napping, Spending too much time in bed, etc. • Behavioral factors: Excess caffeine, Smoking in the evening, Late, heavy dinner, etc. • Environmental factors: the room being too warm, too noisy, or too bright; active or noisy bed partners.
Fourth	Sleep restriction	limiting time in bed to consolidate actual time sleeping decreasing time in bed gradually to match total sleep time (sleep compression)
Fifth	Stimulus control	Developing a sleep ritual, such as a 30-minute relaxation or taking a hot bath before bedtime. Going to bed only when feeling sleepy. Avoiding heavy exercise within 2 hours of bedtime. Avoiding caffeine, nicotine, and alcohol. Using the bedroom only for sleep and sex. Etc.

sleep duration, sleep efficiency, sleep disturbances, use of sleeping medications, and day time dysfunction. Each component has a range of 0-3 points. In all cases, a score of "0" indicates no difficulty, while a scale of "3" indicates severe difficulty. The total score range is 0-21 point, "0" indicate no difficulty and "21" indicate sever difficulties in all areas. The score of less than 5 shows good sleep quality; 5-11 shows relatively good quality, 11-16 shows the relatively bad quality and 17-21 shows bad sleep quality(7).The validity and reliability of Persian version of this scale are confirmed in other studies (Chronbach's α= 0.76-0.83 for its different components) (23). Ryff's Psychological well-being scale (RSPWB) contains 18 self-reported items with 6-point Likert scale (strongly disagree- strongly agree) and 6 subscales: self-acceptance, positive relationships with others, purpose in life, personal growth, and autonomy. Each of the subscales contain 3 items. The score range for each subscale is 3-18 and the total score range is 18-108. A higher score indicates higher psychological well-being(24).The validity and reliability of the Persian version of this scale was confirmed by Moatamedy et al. 2018 (Chronbach's α > 0.65 for its different subscales) (25). The questionnaires were completed in health centers by participants in intervention and control groups through face to face interviews, before and two months after the intervention, so total study duration was 14 weeks.

Data analysis

Data were analyzed by SPSS 25 at a 5% significance level. Initially, data normality was confirmed by Kolmogorov-Smirnov test and then independent t-test, and paired t-test, were used to compare differences between and within groups. Nonparametric tests were used in case the data distribution was not normal.

Ethical issues

This study was confirmed in the ethics committee of Shiraz University of Medical Sciences (ethic code: IR.SUMS.REC.1398.1187). All participants signed an inform consent form prior to filling out the questionnaire. Nonetheless, their participation in the study was voluntarily and they could withdraw from the study in case they were unwilling to continue participation.

RESULTS

Of the 90 elders participated in the study, 53 (58.9%) were male. The mean age of participants in intervention and control groups were 62.73±3.11 and 63.60±3.23 years respectively (p= 0.17). The table II shows that demographic variables were not significantly different between intervention and control groups.

Table II: Distribution of participants by demographic characteristics

Variable	Group		p
	Control N(%)	Intervention N(%)	
Sex			0.903
Male	26 (57.77)	27(60.00)	
Female	19(42.23)	18(40.00)	
Age (years)			0.092
60-64	28(62.22)	29(64.44)	
≥ 65	17(37.77)	16(35.55)	
Marriage			0.221
Married	40(88.8)	45(100.00)	
Single	5(11.12)	0(0.00)	
Education level			0.060
Secondary education	23(51.11)	13(28.88)	
Diploma	10 (22.23)	16 (35.56)	
Higher education	12 (26.66)	16 (35.56)	
Job status			0.105
Employed	5(11.11)	0(0.00)	
Unemployed	14 (31.11)	15 (33.33)	
Retired	26(57.78)	30 (66.67)	
Using sleeping medications			0.115
Yes	5 (11.11)	10 (22.22)	
No	40(88.89)	35 (77.78)	

In between group comparisons, there were no statistically significant differences between intervention and control groups in mean score of total sleep quality and its seven components before the intervention. But after the intervention, mean scores of total sleep quality (p<0.001) and sleep duration (p=0.024) and sleep efficiency (p< 0.001) components in intervention group were significantly lower than control group which means better sleep quality in intervention group, however, use of sleeping medications (p=0.043) were significantly higher than control group. In other components there were no significant differences between two study groups after the intervention (table III). The results, as seen in table III, indicate that in within group comparisons, the mean score of total sleep quality (p<0.001) and sleep duration (p<0.001) and sleep efficiency (p<0.001) components in intervention group decreased significantly which

Table III: Comparing the mean score of sleep quality and its subscales in intervention and control groups before and after the intervention

Variable	Time Inter-vention	Group		P-val.**
		Mean (SD)	Control Mean (SD)	
PSQI*	Before	18.57 (1.06)	18.62(1.24)	0.847
	After	16.00(2.34)	18.15(1.61)	<0.001
P-val,***		<0.001	0.325	
Subjective sleep quality	Before	2.00(0.00)	1.96(0.28)	0.340
	After	2.63(0.58)	2.78(0.42)	0.208
P-val.***		<0.001	<0.001	
Sleep latency	Before	1.17(0.56)	1.20(0.61)	0.803
	After	2.35(0.57)	2.53(0.57)	0.175
P-val.***		<0.001	<0.001	
Sleep duration	Before	3.00(0.00)	2.96(0.28)	0.340
	After	1.58(1.05)	2.13(0.94)	0.024
P-val.***		<0.001	<0.001	
Sleep efficiency	Before	2.89(0.43)	2.80(0.69)	0.448
	After	1.04(1.21)	2.66(0.48)	<0.001
P-val.***		<0.001	0.354	
Sleep disturbance	Before	3.00(0.00)	2.90(0.28)	0.335
	After	3.00(0.00)	3.00(0.00)	-
P-val.***		-	0.325	
Use of sleep medication	Before	2.00(0.00)	1.96(0.28)	0.340
	After	2.58(0.85)	2.13(1.07)	0.044
P-val.***		<0.001	0.351	
Day time dysfunction	Before	2.00(0.00)	1.96(0.28)	0.340
	After	2.81(0.39)	2.94(0.25)	.0123
P-val.***		<0.001	<0.001	

* Pittsburgh Sleep Quality Index ** Independent sample t-test
***Paired sample T-test

Table IV: Comparing the mean value of psychological well-being and its subscales in intervention and control groups before and after the intervention

Variable	Time Inter-vention	Group		P-val.*
		Mean (SD)	Control Mean (SD)	
Psychological well-being (Total)	Before	69.98(15.22)	70.94(9.47)	0.621
	After	65.44(20.23)	63.41(22.60	0.683
P-val,**		0.362	0.041	
Self-acceptance	Before	12.13(2.88)	11.86(2.76)	0.643
	After	12.23(5.49)	11.59(4.39)	0.590
P-val.**		0.949	0.747	
Positive relationships with others	Before	9.64(2.25)	10.35(2.04)	0.102
	After	11.02(4.45)	10.68(4.54)	0.750
P-val.**		0.099	0.835	
Purpose in life	Before	11.55(3.53)	11.25(3.38)	0.970
	After	9.09(3.04)	8.68(3.42)	0.590
P-val.**		<0.001	<0.001	
Personal growth	Before	11.51(3.83)	11.43(3.45)	0.914
	After	11.32(4.41)	11.43(4.87)	0.918
P-val.**		0.953	0.461	
Autonomy	Before	11.95(3.91)	12.25(2.96)	0.670
	After	5.26(2.88)	9.75(4.01)	0.537
P-val.**		<0.001	<0.001	
Environmental mastery	Before	12.89(3.21)	13.78(2.39)	0.121
	After	12.51(3.89)	11.25(4.16)	0.182
P-val.**		0.773	0.005	

* Independent sample t-test
**Paired sample T-test

indicated that sleep quality in this group has improved, while mean score of subjective sleep quality (p<0.001), sleep latency (p<0.001), and use of sleep medication (p<0.001) have increased significantly. In control group, mean score of subjective sleep quality (p<0.001), sleep latency (p<0.001), and day time dysfunction (p<0.001) increased significantly and sleep duration mean score decreased significantly (p<0.001) after the intervention, while total mean score of sleep quality had no significant change comparing before the intervention.

Between group comparisons revealed that mean score of psychological wellbeing and its subscales in both intervention and control groups had no significant differences before and after the intervention (Table IV). But in within group comparisons, after the intervention, mean scores of purposes in life (p<0.001) and autonomy (p<0.001) subscales decreased significantly in the intervention group, and mean scores of psychological well-being (p=0.041) and its purpose in life (p<0.001) and autonomy (p<0.001) subscales decreased significantly in control group.

DISCUSSION

Behavioral educational interventions such as sleep hygiene education have been introduced as one of the effective methods for treatment of insomnia in the elderly(7).This study was conducted to investigate the effect of behavioral educational intervention on sleep quality and psychological well-being in a sample of Iranian elderly in Borazjan in southern Iran.

The preliminary analysis showed that demographic variables were not significantly different between intervention and control groups which indicates the appropriateness of random allocation of study participants.

The results of this study showed that behavioral education interventions improved PSQI which was consistent with the findings of some other studies (7, 9, 15, 23, 26, 27). In this study only two components of sleep duration and sleep efficiency improved after the intervention in intervention group which was in line with Eshghizadeh et al. (2020)(27) , Hedayat and Arefi (2015) (23)and Elmoneem and Fouad (2017)(15).In contrast to some earlier studies (21, 9, 22), in the present study the other components of sleep quality did not change significantly in intervention group. These findings can be attributed to the synchronization of the post-intervention and post-test period with the Covid-19 pandemic which radically changed daily lives and life styles and caused anxiety, stress, and mood alterations. Innocenti et al. 2020 in

Italy, and Idrissi et al. 2020 in Morocco confirmed that the disturbed sleep during Covid-19, may cause chronic insomnia or other sleep disorders (28, 29).

Despite the evidence that suggests positive correlation between sleep quality and psychological wellbeing(30, 31), the finding of this study revealed that mean score of psychological well-being and some of its subscales decreased in both groups and no significant differences were seen between the groups before and after the intervention. The prevalence of the covid-19 epidemic immediately after the end of the educational intervention, the relatively short period between the end of the intervention and the post-test, and the economic problems created during this period in the community can be mentioned as some of the reasons for this result. Implementing the study on both genders and simultaneous use of face to face and virtual education were some of the strengths of the present study. But it has some limitations, such as implementing the study only on 60-70-year-old participants. Since the prevalence of sleep disorders in different subgroups of elders and effectiveness of educational intervention in these groups may be different, the results of this study cannot be generalized to all elders.

CONCLUSION

Behavioral educational interventions can lead to various advantages for the elderly people and implementing such interventions at home is cost-effective and easy. Increasing the capacity of the elderly health care system, including empowering health care providers and establishing an appropriate process based on effective face-to-face and virtual education methods, can help control the behavioral conditions predisposing to sleep disorders in the elderly. At the same time, it is recommended to pay attention to the underlying conditions (such as socio-economic status) and situational factors (such as the epidemic of infectious diseases) and take appropriate measures.

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