The Effect of Sleep Quality on Mental Health Among Clinical and Non-Clinical Staffs

Hadis Najafimehr, Hamid Soori, Narges Naghavi, Reyhaneh Sadat Jafarian Bahri, Mohammad Taghi Yasami

SBMU Cohort Employees Health Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

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Abstract- Sleep quality plays an important role in people's mental health. Until now, the comparison of factors affecting mental health among clinical and non-clinical workers has received less attention. This study aimed to investigate the relationship between sleep quality and mental health and factors affecting mental health in a large working population. The present study was derived from the first phase of a cohort study of Shahid Beheshti University of Medical Sciences staff in 2019. Participants included 2921 employees. Demographic variables and job characteristics, the Pittsburgh Sleep Quality Index (PSQI) and General Health Questionnaire-28 (GHQ-28) were used for data collection. For finding factors affecting mental health, logistic regression was used. Clinical workers had lower mental health (P<0.001) and lower sleep quality (P=0.04) than others. The relationship between mental health and sleep quality was significant (P<0.001). The prevalence of poor sleep quality was 35.6% and for undesirable mental health was 27.8%. Marital status had a significant relationship with mental health (P=0.02). The chance of undesirable mental health decreased with age (OR: 0.98 (0.97, 0.99)). Women had twice undesirable mental health than men (OR: 1.99 (1.62, 2.50)). The odds of undesirable mental health in staff with poor sleep quality were about five times higher than others (OR: 4.80 (3.99, 5.76)). Sleep quality may be considered as a factor affecting mental health. Due to the importance of the issue, planning for the improvement of clinical workers' sleep quality seems to be necessary by health policymakers.
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Introduction

Mental health (MH) is a condition an individual is: i) aware of his or her abilities, ii) affords with daily stresses, iii) helpful and effective in his or her work, iv) able to have social interaction. Because of the importance of MH in human life and in order to improve MH and also to reduce the disabilities of people living with mental disorders, the World Health Organization (WHO) has presented a global action plan for the period 2013-2020 (1). Individuals regarding to their life conditions, may be introduced by some mental disorders. According to a meta-analysis study, the prevalence of mental disorders among Iranian students up to 2016 was estimated between 29 and 37 percent (2). MH affects people's social activities definitely, again by using preventive strategies, the development of mental disorder can be restricted.

One of the important factors that affect MH is sleep quality. Sleep is one of the central nervous system activities and can affect the functioning of the human brain psychologically. Sleep plays a significant role in the biological and circadian rhythm patterns. Desirable sleep may improves MH and thus improves people's quality of life (3). Studies have shown that sleep quality affects cognitive and emotional functioning as well as interpersonal relationships. Factors such as the hormones involved in the body's response to stress as well as neurotransmitters are helpful in regulating sleep (4).

Researches on the working population have revealed the fact that social stresses in the workplace, which are often uncontrollable and unpredictable, have the potential to cause sleep disturbances in employees, because people leaving work may still have mental issues related to their work. Occupational stress can have undesirable effects on

Corresponding Author: H. Soori
SBMU Cohort Employees Health Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
Tel: +98 2122431993, Fax: +98 2122431993, E-mail address: hsoori@yahoo.com

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sleep quality even long after work is completed (5). Conversely, employer social support is strongly associated with the better quality of employees' sleep condition because this support can reduce job stress (6). Otherwise, reducing the time pressure and decreasing the working time improves sleep quality (7). Sleep disturbance not only has a negative impact on people's general health but also has unpleasant consequences for employers. Studies in the United States have shown annual socioeconomic costs of sleep problems range from 63-91 billion dollars. Also, health care costs for shift workers in the USA are estimated to be between 30-40 billion dollars yearly (8).

Although many studies have investigated the relationship between sleep quality and MH, only there are a few pieces of research on comparison this relationship between clinical and non-clinical job groups. To reduce this gap, the present study aims to evaluate the factors affecting MH in a large working population in addition to examining MH and sleep quality components.

Materials and Methods

The present study was derived from the first phase of the Shahid Beheshti Medical University (SBMU) cohort study. The study population was the employees of hospitals, colleges, and health centers, and related SBMU's departments. Inclusion criteria were: subjects who have 18-65-year-old, employed at the beginning of the year 2017, and completed the written consent form. The sampling method was proportionally stratified according to 9 job categories. Samples were selected according to the job category, based on the university recruitment list. Employees were evaluated in both clinical (medical health care employees) and non-clinical groups in 2019. The clinical group includes physicians, nurses, nurse assistants, and employees of radiology, operating room, emergency, laboratory, physiotherapy, Central Sterilization Room (CSR), and pharmacy. Non-clinical employees include administrative, security, service and facility, laundry, and kitchen employees (9). The instruments used in this study were demographic questionnaires, General Health Questionnaire-28 (GHQ-28), and the Pittsburgh Sleep Quality Index (PSQI).

General health questionnaire-28

The GHQ-28 is a self-administered, non-diagnostic, and also is screening tool for identifying individuals who are at risk of psychiatric disorders. This questionnaire is a well-known psychological tool for assessing non-psychotic psychiatric disorders in the general population. The 28-item GHQ was developed by Goldberg in 1978. The questionnaire consists of 4 subscales, and each subscale contains seven questions. The following subscales include physical symptoms, anxiety and sleep symptoms, social functioning, and subscales of severe depressive symptoms. The score of each subject in each subscale is minimum 0 and maximum 21, and the total score is minimum 0 and maximum 84. Low scores indicate health, and high scores indicate poor health. For the 28-item GHQ, a cut-off score of 23 is introduced, which means that subjects who had scores below 23 had favorable mental health and scores 23 and above had poor (10). The Iranian version of this questionnaire has been confirmed previously (11).

Sleep quality questionnaire

PSQI was developed by Buysse *et al*., in 1989. The PSQI is a 9-item self-administered questionnaire that examines the patient's opinion about the quality of her/his sleep over the past month. The questionnaire measures seven subscales, including mental quality of sleep, delayed sleep, useful sleep duration, sleep adequacy, sleep disturbances, hypnotic drug use, and impaired daily functioning. Scores in this questionnaire range from 0 to 21; a score of 0 to 4 indicates good sleep quality, and a score of 5 and above indicates poor sleep status (12). The validity and reliability of this questionnaire have been assessed in Iran (13).

Statistical analysis

Data analysis was done using SPSS 21 software, and 0.05 considered a significant level. For descriptive statistics of qualitative variables, number, and percent, and for describing quantitative variables, mean and standard deviation (SD) were used. For comparing scores between the groups *t*-test, and for evaluating the relation between qualitative variables, the *Chi*-square test was done. Factor associated with general health was assessed using the logistic regression method.

Results

A total of 2921 employees (38.4% from clinical and 61.6% from non-clinical parts) participated in the study. Among all participants, 1113 (38.1%) were male, and 1808 (61.9%) were female. The mean age of males and females was 42.36±9.07 and 41.49±8.62 years, respectively. The mean of working history for all employees was 14.08±8.74 years, and the mean of time working per day was 8.01±2.09 hours. The main characteristics of participants by job parts are presented

in (Table 1).

Table 1. Main characteristics of participants

		Clinical (n=1073)	Non- clinical (n=1730)
Variable		N (%)	N (%)
Sex	**Male**	256 (23.4)	819 (47.3)
	Female	826 (76.6)	911 (52.7)
Marriage status	**Married**	811 (77.8)	1375 (81.8)
	Single	196 (18.8)	216 (12.9)
	Dead wife	11 (1.1)	27 (1.6)
	Divorced	25 (2.4)	62 (3.7)
Education status	**Diploma and lower**	220 (21.1)	529 (31.5)
	Associate	119 (11.4)	175 (10.4)
	Bachelor	464 (44.5)	522 (31.1)
	Master and Doctorate	239 (22.9)	451 (26.9)

Comparing general mental health scores between two job groups revealed that the scores for clinical employees were higher than non-clinical employees, and two groups had a statistical difference in all subscales except in depression symptoms (P=0.16). The total score of mental health also was different between the two groups, and for clinical employees was higher than non-clinical employees (P<0.001). Details are presented in (Table 2).

Table 2. Mean scores of general mental health components by job groups

	Clinical	Non- clinical	
Subscales	**Mean (SD)**	**Mean (SD)**	***P***
Physical symptoms	5.63 (3.66)	4.93 (3.26)	<0.001
Anxiety and sleep disorders	5.31 (3.94)	4.81 (3.78)	0.001
Social function	6.84 (2.49)	6.62 (2.43)	0.02
Depression symptoms	2.00 (3.01)	1.84 (2.86)	0.16
Total score	19.79 (10.49)	18.21 (9.67)	<0.001

There were statistical differences between clinical and non-clinical groups for some scores of sleep quality subscales, and the total score in clinical employees was higher than non-clinical employees (P=0.04) (Table 3). Among all employees, the number of participants with poor quality of sleeping was 975 (35.6%), and the number of participants with distress condition for general health was 777 (27.8%).

Table 3. Mean scores of sleep quality subscales by job groups

	Clinical	Non- clinical	
Subscales	**Mean (SD)**	**Mean (SD)**	***P***
Mental sleep quality	1.03 (0.67)	0.99 (0.65)	0.10
Delayed sleep	0.87 (0.88)	0.74 (0.81)	<0.001
Sleep duration	1.18 (0.96)	1.29 (0.96)	0.003
Sleep adequacy	0.32 (0.75)	0.23 (0.65)	0.001
Sleep disturbances	1.09 (0.50)	1.06 (0.50)	0.14
Use of hypnotic medications	0.19 (0.62)	0.18 (0.60)	0.84
Daytime dysfunction	0.65 (0.77)	0.59 (0.78)	0.06
Total score	4.25 (2.88)	4.03 (2.67)	0.04

Among clinical employees, 203 and among non-clinical employees, 269 participants had both poor sleep quality and unfavorable general health. The association between sleep quality and general health was statistically significant (P<0.001). The number and percent of participants in two determined levels for sleep quality and general health according to job groups are shown in (Table 4).

Table 4. Association between sleep quality and general mental health by job groups

			Sleep quality N (%)			
			<5	**>=5**	**Total**	***P***
General mental health N (%)	**Clinical**	<23	539 (74.8)	182 (25.2)	721 (100)	<0.001
		>=23	116 (36.4)	203 (63.6)	319 (100)	
	Non- clinical	<23	927 (74.7)	314 (25.3)	1241 (100)	<0.001
		>=23	163 (37.7)	269 (62.3)	432 (100)	

Factor associated with general health status was checked using categorized scores of general health in two levels (>=23, <23). According to the univariate model, age, sex, marriage, education, job group, and finally sleep quality were significant variables. Multivariate model by controlling covariate variables revealed that age (*P*=0.01), sex (*P*<0.001), marriage (*P*=0.02), and sleep quality (*P*<0.001) were significant factors. The chance of unfavorable general health was decreased by age increasing (OR: 0.98; 95% CI (0.97, 0.99)). For males, the chance of unfavorable general health was two folds (OR: 1.99; 95% CI (1.62, 2.50)). Divorced persons had a higher chance than married persons (OR: 1.76; (95% CI (1.08, 2.87)). Persons with poor sleep quality also had a higher chance of unfavorable general health compare with others (OR: 4.80; 95% CI (3.99, 5.76)). Details are presented in (Table 5).

Table 5. Factor associated with general mental health using logistic regression

	Univariate model		**Multivariate model**	
	OR (95% CI)	***P***	**OR (95% CI)**	***P***
Age	0.98 (0.97, 0.99)	0.01	0.98 (0.97, 0.99)	0.01
Sex, male	2.06 (1.71, 2.47)	<0.001	1.99 (1.62, 2.50)	<0.001
Marriage status		0.01		0.02
Married	1		1	
Single	1.05 (0.83, 1.33)		0.77 (0.59, 1.01)	
Dead wife	1.25 (0.62, 2.48)		0.82 (0.37, 1.79)	
Divorced	2.09 (1.35, 3.22)		1.76 (1.08, 2.87)	
Education status		0.02		0.64
Diploma and lower	1		1	
Associate	1.31 (0.98, 1.76)		0.99 (0.71, 1.38)	
Bachelor	1.25 (1.01, 1.55)		0.96 (0.74, 1.23)	
Master and Doctorate	0.95 (0.75, 1.21)		0.84 (0.64, 1.12)	
Working time	0.96 (0.92, 1.00)	0.10	-	-
Job group		0.007		0.40
Clinical	1.26 (1.06, 1.49)		1.08 (0.89, 1.32)	
Non- clinical	1		1	
The total score of sleep Quality		<0.001		<0.001
>=5	4.97 (4.16, 5.95)		4.80 (3.99, 5.76)	
<5	1		1	

Discussion

The first purpose of the current study was to investigate the relationship between sleep quality and general mental health in employees of Shahid Beheshti Medical University (SBMU). Analysis of the data showed that the relationship between general mental health and sleep quality in the entire study population, including both clinical and non-clinical workers, was significant, and the employees with poor sleep quality were four times more likely to have undesirable mental health than other workers. Several studies have been done in line with the results of the present study. Recent articles suggest that sleep quality is associated with depression, anxiety (14), and stress (15,16). There is also a great deal of psychological and physiological evidence suggesting a strong relationship between sleep and mental health and interacting with one another (17). Previous studies support the finding that sleep problems may also be the result of mental health disorders and also contribute to

producing multiple mental health disorders (18,19). In Iran, in Sahebi *et al.*, study (20), which was conducted on Shiraz hospital employees, a significant relationship was found between the abnormal sleep pattern and poor mental health. Rahmani *et al.*, research (21) in Tabriz Educational Hospitals also show that 37.3% of nurses suffer from mental disorders. These disorders may be due to the facts such as Long working hours, the quality of relationships between hospital staff, excessive workloads (22).

In our study, a comparison of sleep quality in both clinical and non-clinical groups showed that health care workers had lower sleep quality. Previous researches have shown that sleep problems are common among health care workers, which may be justified by their occupational conditions, stress, and their shifting hours (23). People who do not have regular work time and are working in the shift, on average, sleep 2.7 minutes per day less than people who work regularly (24). Previous studies that examined the quality of sleep in nurses have shown that nurses have poor sleep quality (25).

The second purpose of the present study is to investigate the factors affecting general mental health in the employees of SBMU. A comparison of general mental health between clinical and non-clinical groups showed that employees working in the health care sectors had less general mental health than the non-clinical employees. This difference was maintained across all subscales of general mental health except for depressive symptoms. No significant difference was found in depressive symptoms between the two groups. Depression is a common disease affecting millions of people worldwide and is a major public health problem (26). Equality in the depression symptoms between the two mentioned groups may be due to the fact that in the general mental health questionnaire, the symptoms of severe depression are evaluated. According to previous researches, hospital employees and nurses have a greater potential for mental illness than others (27). Factors such as daily exposure to dead and sick people as well as work shifts can increase the level of stress and insomnia among hospital employees (28). In the Poissonnet *et al*., study (29), nurses and shift workers had the highest GHQ score. In the study by Ebrahimi *et al*., (30), In line with our study, the lack of mental health in clinical employees was higher than in non-clinical employees. The findings of the present study for job variables indicate that the job singly is effective in mental health, and the chance of undesirable mental health for clinical employees is 26% more than non-clinical employees. But controlling for variables such as age, gender, marital status, and education level, the job did not significant association with general mental health, indicating the severity of other variables on mental health was more than the job.

In the next step, we examined the effect of age on mental health, the results indicated when the other variables are controlled, by increasing the age, and undesirable mental health will be decreased. Research by Thomas *et al*., (31) supports the paradox that mental health improves with age despite physical and cognitive impairment. Another study also showed a clear improvement in stress, anxiety, and anger with age increasing (32). Also, by controlling other variables, the chance of undesirable mental health in women was twice that of men. Many studies support this finding. Lopez *et al*., (33), in a study on a group of nurses at a hospital in Madrid, found that in general, the nurses are poorer in mental health than the general population. Moreover, female nurses performed worse than male nurses in the field of mental health.

The relationship between marital status and general mental health showed that by controlling other variables, those who divorced their spouse were more likely to have poorer mental health than married people. In the Navidian *et al.*, study (34) on medical emergency employees, mental health in married subjects was better than singles. Numerous articles have used longitudinal data to estimate marriage benefits on mental health. Horwitz *et al*., (35) found that marriage was associated with a decrease in depression in women and a decrease in alcohol abuse in men.

The advantages of our study were the large sample size and also the investigation and comparison of two groups of the working population (including medical and hospital employees and non-medical and administrative groups). Occupation has also been considered as a factor affecting mental health in a large population that has been less attended in Iran. But the limitation of the current study was that our study did not involve the time-work data of the understudy population, including shift-working, so investigating our goals in shift-working suggested being regarded in future studies.

The results of this study indicated that the employees of the health care departments have lower sleep quality and mental health than the non-clinical ones. There was also a significant relationship between sleep quality and mental health in each of the clinical and non-clinical groups. The risk of poorer mental health is higher among female employees, younger workers, divorced workers, and workers having a lower quality of sleep. Given the interrelationship between sleep quality and mental health with each other and the importance of the role of mental

health on employees' performance, planning and monitoring of employees' health and interventions to improve the sleep quality of these individuals seems to be necessary.

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