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The Association Between Quality of Sleep and Health-related Quality of Life in Military and Non-military Women in Tehran, Iran

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ABSTRACT

Objectives: Quality of sleep (QoS) in individuals is affected by their occupation and is one of the factors affecting the quality of life (QoL). Few studies have evaluated the relationship between QoS and QoL in military women personnel. The aim of this study was to assess QoL and QoS, and compare their relationship among military and non-military women in Tehran. ***Methods***: This cross-sectional study was carried out on 90 women working in Tehran during 2014, 30 were military forces, 30 were military staff, and 30 were civilian organizations staff. The female subjects were selected from Amin Police University and Tehran Health Insurance Organization using simple random sampling. The 36-Item Short Form Health Survey (SF-36) and Pittsburgh Sleep Quality Index (PSQI) were used to measure QoL and QoS, respectively. The relationship between QoL and QoS was assessed using Pearson's correlation coefficient. ***Results:*** The mean scores of QoL in the military forces, military staff, and civilian organizations staff were 58.94±17.71, 67.18±13.52, and 69.10±12.51, respectively. Among the study participants, 62.9% of military forces, 20.0% of military staff, and 17.1% of the civilian organizations staff had poor QoS. Mental health as one of the dimensions of QoL was significantly different between military forces and civilian organizations staff. The association between QoL and QoS was statistically significant in military forces and military staff women. ***Conclusions:*** Low QoS and QoL in the army necessitates that the authorities offer programs and appropriate strategies to improve mental health of QoL and promotion of QoS.

Investigation of quality of life (QoL) dimensions of military personnel who have an important role in the country's security is vital. According to the published literature by Gill et al,[1] in 2014, the medical services of military personnel in the United States cost about four to six trillion dollars per year in order to improve mental health services, including services related to depression and stress. These mental disorders which are mostly caused by stressful conditions of military occupation affect the quality of their life.[2] According to da Silva et al, [3] in 2014, the officers who are involved in their work for a long time get obese and gain weight; this leads to their lower QoL. In every community and society, women constitute about half of the active population and the differences in social status and economic problems are of the most important factors in forcing women to have jobs. The gender ratio in Iran is 103 men to 100 women (103:100) or 1.03.[4] Therefore, it is necessary to make the women's participation possible and create a mechanism for improving their activities. In Iran, the number of working women has increased more than three times from the year 1986 to 2006.[5] On the other hand, women are experiencing depression almost twice as much as men due to biological characteristics.[6] Among women with social activities, female military personnel have more mental health disorder compared to non-military women because of the stress in their workplace.[7] According to the reports, millions of dollars are spent every year for biomedical researches on physical and mental health of military women.[8] Moreover, the studies have shown that military women who attend the

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military operations are faced with psychological disorders more than the male military personnel who have reserve roles in military operations.[8,9] In addition to mental disorders, one of the main factors that can influence health-related QoL is quality of sleep (QoS). The incidence of minor disorders such as irritability, anxiety, stress, etc., are some of the outcomes that are more common in people who have sleep disorders.[10,11] In various studies on the relationship between QoS and QoL of civilians, the results indicated that sleep disorders may lead to a reduction of QoL.[1] This is also very important for military personnel because of their activities and the importance of their job. This problem is more vital for women since in addition to their physical and psychological effects by their certain psychological conditions, it may also affect the family foundation and lead to risks to this holy foundation.[12] Various studies have been conducted on QoL and sleep disorders of different subgroups of the society. Previous research provides strong evidence that sleep disorders, such as poor quality and short duration of sleep, were negatively associated with health-related QoL.[13] Three studies showed that correlation between QoS and QoL was statistically significant in beta-thalassemia, chronic hemodialysis, and kidney transplanted patients.[14–16] However, little attention is paid to the military women.

In this study, the QoL and QoS of the female military forces in comparison with the female military staff and civilian organizations staff were investigated using two different questionnaires of QoL, the 36-Item Short Form Health Survey (SF-36) and the Pittsburgh Sleep Quality Index (PSQI).

METHODS

This study was designed as a comparative cross-sectional study, and data was collected using two questionnaires, which were filled by 90 women practicing in Tehran, between April and October 2014.

Given the lack of similar published studies, this study was carried out as a pilot study. Thirty Amin Police University personnel who performed military activities (military forces), 30 Amin Police University personnel who worked in the administrative sectors (military staff), and 30 civilians working as staff in Tehran Health Insurance Organization were selected using simple random sampling.

The inclusion criteria for this study were willingness to participate in this study, female gender, having no military background for civilian jobs, working in a military environment for military groups, and having at least one year of full-time work experience. Exclusion criteria were the use of psychiatric and anti-depression drugs and history of mental or sleep disorders. The women who were not willing to cooperate were excluded from the study. The main aims of the present research were explained to all the participants. All of them participated after signing the informed consent forms. All information related to the participants was confidential.

The SF-36 questionnaire is an instrument used to assess health related QoL. The SF-36 has two subcategories of physical and mental health. Physical component summary (PCS) has 21 items and measures four domains: physical functioning (10 items), role limitations due to physical health (4 items), bodily pain (2 items), and general health perception (5 items). Mental component summary (MCS) contains 14 items and measures four domains: social functioning (2 items), role limitations due to emotional problems (3 items), vitality (4 items), and emotional well-being (5 items). The potential score on each dimension ranges from 0 to 100. The higher scores indicate better health conditions. The psychometric features of the Persian language version of SF-36 was approved in Iran.[17]

The PSQI is a self-report questionnaire that assesses QoS over a one month time interval. The PSQI is composed of 19 items with seven dimensions: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Subscale scores were totaled to produce a global score. The global score ranges from 0 to 21. The higher scores indicate a worse QoS. PSQI global scores greater than six indicates a poor QoS.[18] The validity and reliability of the Persian version of PSQI have already been studied in Iran.[19,20]

Statistical analysis was conducted using SPSS Statistics (IBM Corp., Armonk, NY) version 23. Descriptive analyses were used to explore frequencies, means, and standard deviations (SD) to summarize the data. The normality condition of the quantitative variables was investigated using the Shapiro-Wilks test. One-way analysis of variance (ANOVA) followed by Tukey's test were used to compare the means of SF-36 and PSQI scores in groups. Chi-

Table 1: Characteristics of the participants' scores in the 36-Item Short Form Health Survey questionnaire.

Characteristics		Groups	Mean (SD)	F-statistic (*p*-value)
PCS	Physical functioning	Military forces	73.17 (27.08)	0.359 (0.699)
		Military staff	78.00 (19.81)	
		Civilian organization staff	76.17 (19.15)	
		Total[a]	**75.78 (22.14)**	
	Role limitations due to physical health	Military forces	65.21 (26.45)	2.999 (0.055)
		Military staff	76.67 (17.90)	
		Civilian organization staff	76.67 (17.13)	
		Total	**72.85 (21.39)**	
	Bodily pain	Military forces	59.67 (25.47)	2.489 (0.089)
		Military staff	69.48 (24.63)	
		Civilian organization staff	72.58 (19.70)	
		Total	**67.22 (23.78)**	
	General health perception	Military forces	65.00 (21.93)	0.409 (0.665)
		Military staff	60.17 (23.17)	
		Civilian organization staff	64.33 (22.16)	
		Total	**63.17 (22.28)**	
MCS	Role limitations due to emotional problems	Military forces	51.11 (28.09)	13.930 (< 0.001*) A vs B: (< 0.001*) A vs C: (< 0.001*) B vs C: (0.739)
		Military staff	74.44 (18.94)	
		Civilian organization staff	78.61 (16.48)	
		Total	**68.06 (24.71)**	
	Vitality	Military forces	49.83 (11.10)	1.463 (0.237)
		Military staff	53.97 (10.89)	
		Civilian organization staff	54.17 (11.15)	
		Total	**52.64 (11.11)**	
	Emotional well-being	Military forces	49.20 (12.30)	5.049 (0.008*) A vs B: (0.043*) A vs C: (0.011*) B vs C: (0.870)
		Military staff	56.28 (10.90)	
		Civilian organization staff	57.73 (10.00)	
		Total	**54.38 (11.61)**	
	Social functioning	Military forces	58.33 (28.30)	2.795 (0.067)
		Military staff	68.97 (21.81)	
		Civilian organization staff	72.50 (21.63)	
		Total	**66.57 (24.63)**	
PCS		Military forces	65.76 (19.86)	1.250 (0.292)
		Military staff	70.96 (16.25)	
		Civilian organization staff	72.44 (15.08)	
		Total	**69.72 (17.23)**	
MCS		Military forces	52.12 (17.25)	8.019 (0.001*) A vs B: (0.007*) A vs C: (0.001*) B vs C: (0.825)
		Military staff	63.59 (12.64)	
		Civilian organization staff	65.75 (12.04)	
		Total	**60.49 (15.25)**	
Total scores of QoL		Military forces	58.94 (17.71)	4.011 (0.022*) A vs B: (0.084) A vs C: (0.025*) B vs C: (0.870)
		Military staff	67.18 (13.52)	
		Civilian organization staff	69.10 (12.51)	
		Total	**65.07 (15.25)**	

**significant at 5%. PCS: physical component summary; MSC: mental component summary; QoL: quality of life; SD: standard deviation. A: military forces (n = 30); B: military staff (n = 30); C: civilian organization staff (n = 30); a (n = 90).*

square test was used to evaluate the relationship between QoS and occupation of the participants. Pearson correlation coefficient was employed to evaluate the relationship between QoS and QoL.

The multiple linear regression model using the inter-method was applied for modeling the relationship between QoL and Qos by adjusting the other variables such as age, work experience, marital status, education, job, and employment status. A *p*-value < 0.050 was considered significant.

RESULTS

The mean age of the subjects was 29.8±8.0 years with a range of 19 and 50 years. The total number of years of work experience among women was 7.9±6.5 years. In total, 64.4% (58) of the women were married. Diploma, associate degree, bachelor degrees, master of sciences, and PhD level of education were observed in 22.2%, 18.9%, 45.6%, 11.1%, and 2.2% of the participants, respectively. In this study, 64.6% (53 cases), 8.5% (7 cases), and 26.8% (22 cases) were in permanent, fixed term, and contractual employment status, respectively.

The SF-36 global score, MCS, and PCS scores were 65.07±15.25, 69.72±17.02, and 60.49±15.25, respectively. Table 1 shows detailed information about the mean scores in the domains of SF-36 questionnaire.

About 38.9% (n = 35) of the participants in this

Table 2: The participants' scores in the PSQI questionnaire.

Characteristics	Groups	Mean (SD)	F-statistic (*p*-value)
Subjective sleep quality	Military forces	1.57 (0.82)	9.995 (< 0.001*) A vs B: (0.002*) A vs C: (< 0.001*) B vs C: (0.840)
	Military staff	0.89 (0.75)	
	Civilian organization staff	0.78 (0.58)	
	Total[a]	**1.10 (0.80)**	
Sleep latency	Military forces	1.57 (0.90)	8.106 (0.001*) A vs B: (0.009*) A vs C: (0.001*) B vs C: (0.741)
	Military staff	0.90 (0.86)	
	Civilian organization staff	0.73 (0.78)	
	Total	**1.07 (0.91)**	
Sleep duration	Military forces	0.81 (0.68)	4.272 (0.018*) A vs B: (0.163) A vs C: (0.015*) B vs C: (0.646)
	Military staff	0.50 (0.60)	
	Civilian organization staff	0.35 (0.49)	
	Total	**0.56 (0.62)**	
Habitual sleep efficiency	Military forces	0.83 (1.15)	4.223 (0.019*) A vs B: (0.141) A vs C: (0.016*) B vs C: (0.666)
	Military staff	0.36 (0.73)	
	Civilian organization staff	0.16 (0.37)	
	Total	**0.44 (0.85)**	
Sleep disturbances	Military forces	1.63 (0.61)	3.706 (0.029*) A vs B: (0.030*) A vs C: (0.118) B vs C: (0.816)
	Military staff	1.24 (0.58)	
	Civilian organization staff	1.33 (0.55)	
	Total	**1.40 (0.60)**	
Use of sleep medication	Military forces	0.37 (0.76)	0.376 (0.686)
	Military staff	0.45 (0.83)	
	Civilian organization staff	0.55 (0.87)	
	Total	**0.45 (0.82)**	
Daytime dysfunction	Military forces	1.07 (0.38)	1.899 (0.157)
	Military staff	0.82 (0.50)	
	Civilian organization staff	1.00 (0.51)	
	Total	**0.97 (0.47)**	
Total scores of PSQI	Military forces	7.47 (3.19)	10.207 (< 0.001*) A vs B: (0.001*) A vs C: (< 0.001*) B vs C: (0.975)
	Military staff	4.69 (2.98)	
	Civilian organization staff	4.53 (2.21)	
	Total	**5.57 (3.10)**	

**significant at 5%. PSQI: Pittsburgh Sleep Quality Index; SD: standard deviation. A: military forces (n=30); B: military staff (n=30); C: civilian organization staff (n=30); a (n=90).*

Table 3: The Pearson's correlation coefficient between QoL and QoS.

Groups	PCS	MCS	SF-36 global score
Military forces	-0.630**	-0.545**	-0.618**
Military staff	-0.518**	-0.408*	-0.500**
Civilian organization staff	-0.261	-0.061	-0.186
Total	**0.523****	**-0.495****	**-0.542****

***significant at 1%. *significant at 5%. PCS: physical component summary; MSC: mental component summary; SF-36: 36-item short form health survey; QoL: quality of life; QoS: quality of sleep.*

study had poor QoS; 62.9% (n = 22) of the military forces, 20.0% (n = 7) of the military staff, and 17.1% (n = 6) of the civilian organizations staff had poor QoS. Table 2 provides more detailed information about the mean scores in the domains of PSQI questionnaire.

The relationship between SF-36 global score, MCS, and PCS scores with QoS in military forces and military staff was significant. The Pearson's correlation coefficient showed that in PCS (z = 0.620, $p = 0.535$), in MCS (z = 0.650, $p = 0.516$), and in total QoL (z = 0.630, $p = 0.529$) the differences were not statistically significant in military forces and military staff. Table 3 shows detailed information about the correlation coefficient of the three study groups.

Multiple linear regression analysis revealed that the relationship among QoS, job, and employment status with QoL was statistically significant [Table 4].

DISCUSSION

In this cross-sectional study, we assessed the relationship between QoL and QoS in the military forces, military staff, and civilian organizations staff. The results indicated that the military forces who participated in military operations compared with those working in the civilian organizations had lower QoL, because of their MCS of QoL.

In the present study, the prevalence of sleep disorders and poor sleep quality was 38.8%. A study by Plumb et al,[21] reported the percentage of sleep disorders and poor sleep quality among service members and veterans of Operations Enduring Freedom and Iraqi Freedom was 89%.

According to the study by Manxiu et al,[22] 57.1% of military retirees in Beijing city reported sleep disturbances. Sleep disorders are considered as a common problem in many jobs. These disorders could negatively affect the job performance and decreases the QoL.

The mean SF-36 scores for physical and mental health status of 28 000 women aged 18 to 44 American veterans health administration were lower than our study's prevalence (PCS: 40.7 vs 69.72; MCS: 42.8 vs 60.49).[23]

In another research, Bray et al,[2] stated that about one-third of the female military had excessive stress, which leads to disruption of physiological, psychological, and social factors aspects of stress. According to studies, female military are more likely to be afflicted with mental disorders. Therefore, the improvement of mental health in female military leads to an increase in their QoL.[24,25]

There was no statistically significant difference between military forces and military staff's QoL score, these two groups differ only in MCS; this difference was due to the emotional well-being and role limitations through emotional problems subscales. This difference explained that military

Table 4: Factors affecting the QoL obtained by linear regression analysis.

Variables	Unstandardized coefficients (SE)	Standardized coefficients	F-statistic (*p*-value)
QoS	-2.020 (0.521)	-0.436	-3.878 (< 0.001*)
Age	-0.397 (0.588)	-0.220	-0.674 (0.502)
Work experience	0.824 (0.728)	0.372	1.132 (0.262)
Marital status	1.359 (5.314)	0.044	0.256 (0.799)
Education	1.098 (1.676)	0.076	0.655 (0.515)
Job	5.809 (2.780)	0.355	2.010 (0.031*)
Employment status	6.575 (2.810)	0.387	2.340 (0.022*)

**significant at 5%. QoL: quality of life; QoS: quality of sleep.*

female forces who were sent to military zones and participated in military operations experience more stressful conditions, which are more difficult than military staff who work in an office environment. Studies have shown a relationship between mental health and deployment experience among female military. Women who were sent to military zones and participated in military operations have more mental health disorder, anxiety, and depression than females who did not participate in military operations. Seelig et al,[8] conducted a longitudinal analysis (2001–2008) among women in the US military and concluded that women in the US military deployed to Iraq and Afghanistan have more anxiety and stress after the operations than female military that were not deployed. The differences in the SF-36 global score, MCS, and PCS scores were not statistically significant between military forces and military staff. The results of a study carried out on the personnel of two universities affiliated to the army showed that these two groups had the same level of QoL.[26]

The results of this study showed that QoS level in military forces was lower than military staff and civilian organization staff; this is due to the difference in subjective feelings of sleep quality, sleep latency, sleep duration, habitual sleep efficiency, and sleep disturbances domains. Female military with regard to mission requirements have different sleep-wake schedule, this causes sleep disturbance mainly through stress and depression after missions.[1,27,28]

According to the results, the relationship between SF-36 global score, and MCS and PCS scores with QoS in military forces and staff military was significant, but in the civilian organizations staff it was not significant. The severity of the relationship between military forces and military staff was not statistically significant.

Poor QoS can have negative effects on QoL dimensions and decreases the level of QoL. Sleep disorder is a normal response to stressful and tense situations. According to studies in communities with stressful situations, sleep disorder is more common. In previous studies, there was a significant relationship between depression and sleep disorders; depression is actually a subscale of mental health in QoL.[29–31] Besides affecting the mental dimension of QoL, sleep disorders are also associated with PCS by the tiredness from poor sleep.

The results of the current study were indicative of a significant relationship between the QoL and QoS with adjusting age, work experience, marital status, education, job, and employment status. To the best of our knowledge, this is the first study that evaluated the relationship between QoL and QoS in military women.

There were several limitations in our study. This study was conducted on a relatively small sample size and further larger studies are required to confirm these results. However, the sampling method in this study was designed to reduce the effect of this limitation. In the cross-sectional design, it is not possible to assess a cause and effect relationship between QoL and QoS. Also, the data were provided from self-reports questionnaires which can be prone to self-generated information bias. Despite the limitations, this study provided information on the effect of demographic, occupational, and QoS on QoL of military women. However, further studies on this topic are needed.

CONCLUSION

The results of this study indicated that the MCS in military forces is low. Female military, in addition to other types of stress in women, are exposed with job stress that can affect their mental health. The results of this research indicated that the level of QoS in female military was low, which certainly affects their QoL level. We suggest that military women should regularly evaluate their sleep status. Less attention has been paid to this group of people in the healthcare sector. We recommend that the health authorities provide programs and appropriate strategies to improve the level of MCS in female military.

Disclosure

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