Comparative evaluation of the sleep quality in male verses female students of Nursing at school of nursing and midwifery of MBU

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Abstract: *Aims:* Traditionally science students exhibit poor sleep quality and impaired academic and professional performances due to high sleep deprivation and high incidences of daytime dysfunctions. The present study was aimed to evaluate the sleep quality in nursing students from the School of nursing and midwifery, Shahid Beheshti University of Medical Sciences (MBU) in Tehran. *Study design:* Sleep quality was evaluated by filling out the Pittsburgh Sleep Quality Index (PSQI). *Place and Duration of Study:* School of nursing and midwifery, Shahid Beheshti University of Medical Sciences (MBU) in Tehran, during 1 November, 2012 to 1 May, 2014. *Methodology:* 133 nursing students were divided into different groups (on the basis of age; group to 4); each group was further divided into two groups based on sex. Mean values of the score obtained for each PSQI category were analyzed by the Student t-test and 95% of Confidence of Intervals, to investigate the statistical differences among the male verses female groups and the correlation between the group and its respective score. *Results:* Findings showed that nursing students presented a fairly poor subjective sleep quality. Mean scores of sleep quality (PSQI category 1), sleep latency (PSQI category 2), sleep duration (PSQI category 3) and sleep efficiency (PSQI category 4) of female students were found significantly high in comparison to male students, while mean score of sleep disturbances (PSQI category 5), use of hypnotics/anti33 depressants (PSQI category 6) and daytime dysfunction (PSQI category 7) were non-significantly different among female and male students. *Conclusion:* The poor sleep quality in nursing students suggests that authorities should have specific guidance on sleep hygiene and should provide support for students presenting disturbances in day-time activities.

Keywords: Disorders of Excessive Somnolence, Education, Nursing Students Sleep, Sleep Disorders, Pittsburgh Sleep Quality Index (PSQI)

1. Introduction

National Institutes of Health (NIH) have been identified, adolescents 44 and young adults (ages 12 to 25 years) as a population at high risk for problem sleepiness based on "evidence that the prevalence of problem sleepiness is high and increasing with particularly serious consequences," [1]. Sleep is defined on the basis of behavioral and physiological criteria dividing it into two states: non rapid eye movement (NREM) sleep which is subdivided into three stages (N1, N2, N3); and rapid eye movement (REM) sleep characterized by rapid eye movements, muscle atonia and desynchronized EEG (electroencephalograph). Circadian rhythm of sleep-wakefulness is controlled by the master clock located in the suprachiasmatic nuclei of the hypothalamus. The neuroanatomical substrates of the NREM sleep are located principally in the ventrolateral preoptic nucleus of the hypothalamus and those of REM sleep are located in pons. A variety of significant physiological changes occur in all body system and organs during sleep as a result of functional alterations in the autonomic and somatic nervous systems [2]. Sleep is an active process which is functionally related to the wakefulness and the rhythmic alternation between these two states [3]. The metabolic cycle consisting of sleep, wakefulness, digestion, hormone production, thermal regulation and other daily processes or circadian rhythm or biological clock is regulated by processes in the brain. An optimal wakefulness state is reached when an adult sleeps 7 to 8 h within a period of 24 h, with nocturnal awakenings

up to 5% of the total sleep time. Therefore, the adult sleep pattern should include 30% of dreams, 20% of deep sleep and 50% of light sleep [4-5] In the absence of environmental perception, the joint action of several nervous structures regulates this sleep state, which is also affected by environmental and endogenous factors. Among them, the social factors seem to be most important, such as work schedules and recreation. Besides this environmental synchronization, the sleep-wakefulness cycle is endogenously generated and regulated by the supraquiasmatic nucleus in the hypothalamus, which is considered the biological clock in mammalian [5]. Sleep quality can be estimated by some quantitative or subjective components from the Pittsburgh Sleep Quality Index (PSQI), such as sleep duration, sleep latency, sleep disturbances and daytime dysfunctions [6]. PSQI is commonly applied to evaluate the sleep quality in various studies [7]. The reduced sleep duration in students triggers an irregular pattern of the sleep-wakefulness cycle, which is characterized by large sleep latency on weekends and by short sleep duration on weekdays. This irregular cycle usually increases the incidence of sleep disturbances and daytime dysfunctions, such as excessive daytime sleepiness [7]. Both sleep disturbances and daytime dysfunctions evoke negative impacts on the activities carried out during the day by the students and contribute to impair their academic performance [8]. Sleep disturbances have significant implications for the individual, the family and the society. The quality of sleep directly affects the quality of waking life, including mental sharpness, productivity, emotional balance, creativity, physical vitality, and even body weight. No other activity delivers so many benefits with so little effort. Poor life quality may induce autonomic dysfunction, poor academic or professional performance of the students and may increase the incidence of psychiatric disorders and decrease the wakefulness, with further damages in the personal security and subsequent increase in accidents. Moreover, sleep disturbances may become risk factors for clinical and psychiatric disorders [9].

In students, some sleep disturbances, such as insomnia and arousal, have been associated with clinical depression and minor psychiatric disorders [10], attention deficit and poor learning development [11]. Excessive daytime sleepiness has been described as the main daytime dysfunction in the students. Daytime sleepiness was prevalent among 18.9% of the medical students from the University of Brasilia (Brazil) [12], 22.4% of the students from the King Saud University (Saudi Arabia) [13], 51.5% of the students from the Federal University of Goiás (Brazil) [7,14], and 35.5% of the students from the International Medical University (Malaysia) [15]. Moreover, excessive daytime sleepiness in students has been correlated with short sleep duration [13], poor academic performance [12], minor psychiatric disorders [10], sleep disorders [16], depressive symptoms [17] and poor sleep quality [7]. Considering the poor sleep quality in students [7-12], the harmful effects on the student mental functions [17] and

learning ability [11], can deteriorate the academic performance [18]. There is paucity of data on sleep quality of students in Pakistan presently. Therefore the present study was designed to evaluate the sleep quality in nursing students from Shahid Beheshti University of Medical Sciences and compare it with female verses male students. Further the evaluation which 97 could provide the guideline for the implementation of the programs to aid the students, in order to promote sleep hygiene.

2. Materials and Methods

A prior approval was obtained from Research Ethics Committee of MBU in Tehran to conduct the present study.

2.1. Subjects

A total number (n) of 133 students of both male and female, aged 16-20 years, were included in this study. Students were enrolled in the semester 4 in the Shahid Beheshti University, Tehran, Iran. Participants were divided into two different groups *i.e.* male (nm = 56) and female (nf = 77). Both male (M) and female (F) groups were further divided into four groups each according to their ages and the random sampling. Group M1 (nm1=13) and F1 (nf1=20) (age: 16-17 years), M2 (nm2=14) and F2 (nf2=20) (age: >17-18 years), M3 (nm3=14) and F3 (nf3=19) (age: >18-19 years), M4 (nm4=15) and F4 (nf4=18) (age: >19-20 years). All the students included in the study were signed an Informed Consent [5].

2.2. Evaluation of Sleep Quality

Sleep quality was evaluated by filling out a questionnaire PSQI (Appendix A), comprising of nineteen (19) self-rated questions; grouped into seven categories *i.e.* (1) sleep quality, (2) sleep latency, (3) sleep duration, (4) habitual sleep efficiency, (5) sleep disturbances, (6) use of hypnotics and/or anti119 depressants, and (7) daytime dysfunction. Each category score ranged from 0-3 points; score 0 (aggregated score 0) meaning "very good", the score 1 (aggregated score $0 \geq 7$) meaning "fairly good", the score 2 (aggregated score $7 \geq 14$) meaning "fairly bad" and the score 3 (aggregated score $14 \geq 21$) meaning "very bad". Sum of the scores from the seven categories yielded an aggregated score that ranges from 0- 21 points. Higher the aggregated score, the worse the sleep quality [5]. The PSQI has been widely used to evaluate the sleep quality, since it is internationally reliable and appropriately standardized for retrospective use [19].

2.3. Statistical Analysis

Data were presented as the mean ± standard error of mean (S.E.M.) of the aggregated score obtained for each PSQI category in both male and female groups of the students. SPSS 19 (Statistical Package for the Social Sciences) was used to analyze the data. This analysis was carried out by the application of Student t-test, that was

considered as statistical significance *P*<0.05. A 95% confidence interval of proportions was determined as follows:

$$p \pm (\sqrt{pq/n}) \times Zd/2 \quad (20)$$

where:

p = Mean aggregated score different groups from the PSQI
q = 1 – p
Z = Standard normal variate (1.96)
d = Degree of freedom [20]

3. Results

Total score of all seven categories from PSQI of both male and female nursing students was found 14.6125 ± 1.38 out of 21 (Score point = 2.09). A significant difference (*P*<0.005) was observed by comparing total mean score (sum of all categories of PSQI) of all female (16.3675 ± 1.15, nf = 77) participants against total mean score (sum of all categories of PSQI) of all male (12.8575 ± 1.02, nm=56) participants (P=0.0305, CI 95%= -6.685494 to -0.334506, Figure 1). Sum of mean score of all seven categories of PSQI (aggregated score) of different female groups were compared with similar age male groups. A significant difference (*P*<0.005) was observed by the comparison of aggregated score of F1 verses M1 (p=0.0337, 95% CI=-6.9227 to -0.2973), F2 verses M2 (p=0.0237, CI=-7.8387 to -0.6013) group. Comparison of aggregated score of F3 with M3 (p=0.1071, 95% 151 CI=-7.3778 to 0.7578) and F4 with M4 (p=0.1302, 95% CI=-8.1147 to 1.0947) did not show any significant difference (Figure 2). Figure 3 presents the score point of different categories of PSQI of nursing students.
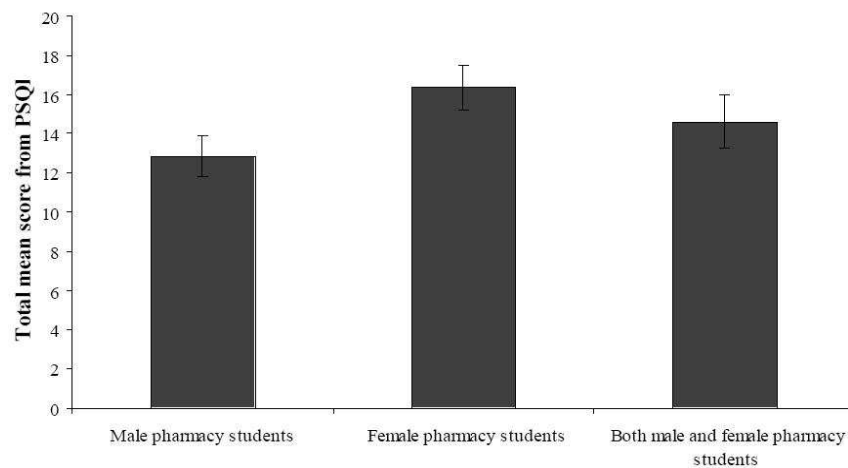

Fig. 1. Comparison of sum of score from all categories of PSQI of all male verses female nursing students.

PSQI: Pittsburgh Sleep Quality Index. Male nursing students presented a fairly bad sleep quality by achieving score point 2 (total mean score 162 7≥14) while female nursing students showed a very bad sleep quality by achieving score point 3 (total mean score 14≥21). Therefore female nursing students showed a poorer level of sleep quality versus male nursing students. Overall score point of both male and female is near to 2 indicated a fairly bad level of sleep quality of nursing students.
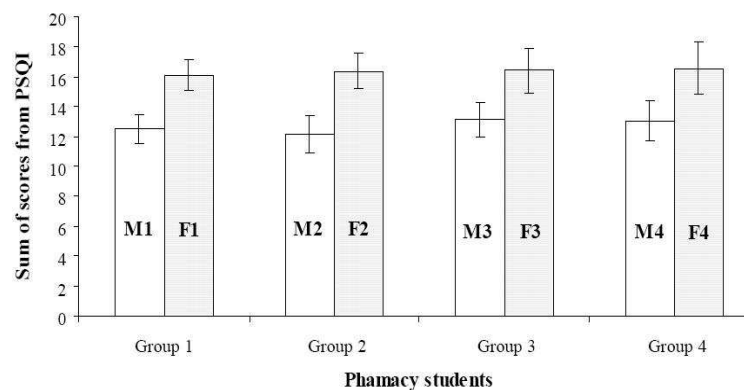

Fig. 2. Comparison of sum of mean score from all categories of PSQI of different groups of male verses female nursing students.

PSQI: Pittsburgh Sleep Quality Index, Group 1: M1 (male) and F1 (female): age, 16-17 years; Group 2: M2 (male) and F2 (female): age, >17-18 years; Group 3: M3 (male) and F3 (female): age, >18-19 years; Group 4: M4 (male) and F4 (female): age, >19-20 years. Different age male nursing students groups (M1, M2, M3 and M4) presented a fairly bad sleep quality by achieving score point 2 (total mean score 7≥14). Different age female nursing students groups (F1, F2, F3 and F4) showed a very bad level of sleep quality by achieving score point 3 (total mean score 14≥21). Female nursing students showed a poorer level of sleep quality versus male nursing students.
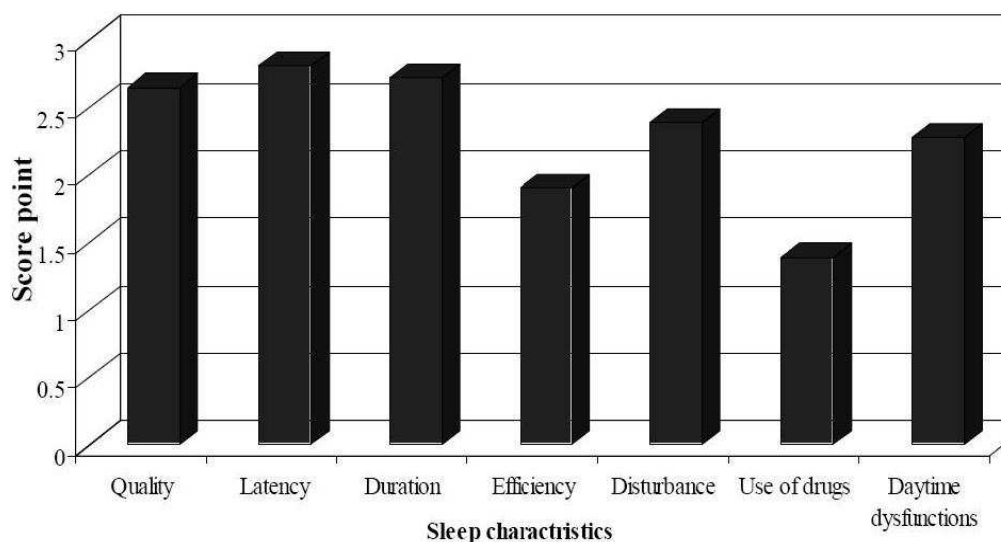
Fig. 3. *Score point of all categories of PSQI of nursing students.*

PSQI: Pittsburgh Sleep Quality Index, Use of drugs: use of hypnotics and/or anti-depressants. nursing students presented very bad sleep quality, sleep latency, sleep duration, sleep disturbances and daytime dysfunctions (score point more than 2) while sleep efficiency and use of hypnotics and/or anti-depressants were judged fairly bad (score point near to 2) among students.

3.1. Sleep Quality (PSQI Category 1)

Mean score of sleep quality (PSQI category 1) of different female groups (F1-F4) were found significantly different (*P*<0.005) when compared with similar age male groups (M1-M4) respectively (Table 1). However male groups (M1-M4) of nursing students were insignificantly different from each other or from the values of M1 group. Mean score values from this PSQI category 1, obtained from F1, F2, F3, and F4, groups did not differ from each other or compared with the values of group F1 (Table 1).

Table 1. *Comparison of sleep quality, aggregated score from the PSQI category 1 among male verses female nursing students*

Groups	Sex	Aggregated score	p-value	CI 95%
M1 (13)	Male	2.02 ± 0.267		
F1 (20)	Female	3.12 ± 0.341*	0.0276	-2.07053 to -0.12947
M2 (14)	Male	2.07 ± 0.238		
F2 (20)	Female	3.10 ± 0.322*	0.0239	-1.91467 to -0.14533
M3 (14)	Male	2.09 ± 0.224		
F3 (19)	Female	3.02 ± 0.323*	0.0357	-1.79370 to -0.06630
M4 (15)	Male	2.01 ± 0.225		
F4 (18)	Female	3.14 ± 0.356*	0.0156	-2.03020 to -0.22980

Pittsburgh Sleep Quality Index, Values are mean ± M.S.E.
M2 (age >17-18 years), M3 (age >18-19 years) and M4 (age >19-20 years) groups were compared with M1 (age 16-17 years) group. F2 (age >17-18 years), F3 (age >18-19 years), and F4 (age >19-20 years), groups were compared with F1 (age 16-17 years), group. Female (F) groups were compared with respective (similar age) male (M) groups.

3.2. Sleep Latency (PSQI Category 2)

Table 2 summarized the mean score values of sleep latency of participant of this study. The comparison of female groups to respective similar age male groups showed significantly different (*P*<0.005) score (Table 2). Score values obtained from M2, M3 and M4 found insignificantly different in comparison to the values of M1. Similarly sleep latency score values of female F2, F3 and F4 groups remained insignificantly different from F1 group.

Table 2. *Comparison of sleep latency, aggregated score from the PSQI category 2 among male verses female nursing students*

Groups	Sex	Aggregated score	p-value	CI 95%
M1 (13)	Male	2.02 ± 0.270		
F1 (20)	Female	2.82 ± 0.232*	0.0341	-1.53621 to -0.06379
M2 (14)	Male	2.07 ± 0.144		
F2 (20)	Female	2.84 ± 0.185*	0.0046	-1.28399 to -0.25601
M3 (14)	Male	2.08 ± 0.174		
F3 (19)	Female	2.85 ± 0.161*	0.0031	-1.25918 to -0.28082
M4 (15)	Male	2.12 ± 0.175		
F4 (18)	Female	2.86 ± 0.279*	0.0401	-1.44435 to -0.03565

PSQI: Pittsburgh Sleep Quality Index, Values are mean ± M.S.E. M2 (age >17-18 years), M3 (age >18-19 years) and M4 (age >19-20 years) groups were compared with M1 (age 16-17 years) group. F2 (age >17-18 years), F3 (age >18-19 years), and F4 (age >19-20 years), groups were compared with F1 (age 16-17 years), group. Female (F) groups were compared with respective (similar age) male (M) groups.

3.3. Sleep Duration (PSQI Category 3)

Female groups (F1-F4) of nursing students showed significantly different (*P*<0.005) mean score of sleep duration (PSQI category 3) in comparison to similar respective age male (M1-M4) groups. While both male and female groups remained insignificantly different from each other in the same sex (Table 3).

Table 3. *Comparison of sleep duration, aggregated score from the PSQI category 3 among male verses female nursing students*

Groups	Sex	Aggregated score	p-value	CI 95%
M1 (13)	Male	2.08 ± 0.212		
F1 (20)	Female	2.64 ± 0.160*	0.0404	-1.09393 to -0.02607
M2 (14)	Male	2.13 ± 0.120		
F2 (20)	Female	2.62 ± 0.212*	0.0340	-0.94064 to -0.03936
M3 (14)	Male	2.21 ± 0.165		
F3 (19)	Female	2.74 ± 0.157*	0.0290	-1.00203 to -0.05797
M4 (15)	Male	2.09 ± 0.289		
F4 (18)	Female	2.62 ± 0.239*	0.0280	-0.99902 to -0.06098

PSQI: Pittsburgh Sleep Quality Index, Values are mean ± M.S.E. M2 (age >17-18 years), M3 (age >18-19 years) and M4 (age >19-20 years) groups were compared with M1 (age 16-17 years) group. F2 (age >17-18 years), F3 (age >18-19 years), and F4 (age >19-20 years), groups were compared with F1 (age 16-17 years), group. Female (F) groups were compared with respective (similar age) male (M) groups.

3.4. Sleep Efficiency (PSQI Category 4)

Table 4 showed the mean score values of sleep efficiency of nursing students. Comparison of female groups to respective similar age male groups showed significantly different ($P<0.005$) score. Score values obtained from M2, M3 and M4 found insignificantly different in comparison to the values of M1. Similarly sleep efficiency score values of female F2, F3 and F4 groups remained insignificantly different from values of F1 group (Table 4).

Table 4. *Comparison of sleep efficiency, aggregated score from the PSQI category 4 among male verses female nursing students*

Groups	Sex	Aggregated score	p-value	CI 95%
M1 (13)	Male	1.35 ± 0.158		
F1 (20)	Female	1.84 ± 0.124*	0.0199	-0.89722 to -0.08278
M2 (14)	Male	1.43 ± 0.167		
F2 (20)	Female	1.88 ± 0.116*	0.0289	-0.85053 to -0.04947
M3 (14)	Male	1.51 ± 0.115		
F3 (19)	Female	1.90 ± 0.118*	0.0282	-0.73545 to -0.04455
M4 (15)	Male	1.42 ± 0.129		
F4 (18)	Female	1.92 ± 0.140*	0.0147	-0.89455 to -0.10545

PSQI: Pittsburgh Sleep Quality Index, Values are mean ± M.S.E. M2 (age >17-18 years), M3 (age >18-19 years) and M4 (age >19-20 years) groups were compared with M1 (age 16-17 years) group. F2 (age >17-18 years), F3 (age >18-19 years), and F4 (age >19-20 years), groups were compared with F1 (age 16-17 years), group. Female (F) groups were compared with respective (similar age) male (M) groups.

3.5. Sleep Disturbances (PSQI Category 5)

Female groups (F1-F4) of nursing students showed insignificantly different ($P>0.005$) mean score of sleep disturbances (PSQI category 5) in comparison to respective similar age male (M1-M4) groups. Further same sex groups did not differ from each other (Table 5).

Table 5. *Comparison of sleep disturbance, aggregated score from the PSQI category 5 among male verses female nursing students*

Groups	Sex	Aggregated score	p-value	CI 95%
M1 (13)	Male	1.98 ± 0.270		
F1 (20)	Female	2.12 ± 0.232	0.7008	-0.87621 to 0.59621
M2 (14)	Male	2.03 ± 0.241		
F2 (20)	Female	2.12 ± 0.185	0.7654	-0.69926 to 0.51926
M3 (14)	Male	2.10 ± 0.264		
F3 (19)	Female	2.15 ± 0.272	0.8988	-0.84521 to 0.74521
M4 (15)	Male	2.04 ± 0.227		
F4 (18)	Female	2.18 ± 0.247	0.6842	-0.83544 to 0.55544

PSQI: Pittsburgh Sleep Quality Index, Values are mean ± M.S.E. M2 (age >17-18 years), M3 (age >18-19 years) and M4 (age >19-20 years) groups were compared with M1 (age 16-17 years) group. F2 (age >17-18 years), F3 (age >18-19 years), and F4 (age >19-20 years), groups were compared with F1 (age 16-17 years), group. Female (F) groups were compared with respective (similar age) male (M) groups.

3.6. Use of Hypnotics/Anti-Depressants (PSQI Category 6)

The use of hypnotics/anti-depressants mean score from the PSQI category 6 in nursing students did not differ from female groups verses respective similar age male groups. Groups of same sex did not differ from each other as well for the PSQI category 6 (Table 6).

Table 6. *Comparison of use of hypnotics/anti-depressants, aggregated score from the PSQI category 6 among male verses female nursing students*

Groups	Sex	Aggregated score	p-value	CI 95%
M1 (13)	Male	1.07 ± 0.125		
F1 (20)	Female	1.32 ± 0.144	0.2330	-0.66918 to 0.16918
M2 (14)	Male	1.10 ± 0.132		
F2 (20)	Female	1.30 ± 0.128	0.2975	-0.58464 to 0.18464
M3 (14)	Male	1.05 ± 0.122		
F3 (19)	Female	1.32 ± 0.156	0.2083	-0.69853 to 0.15853
M4 (15)	Male	1.21 ± 0.145		
F4 (18)	Female	1.34 ± 0.160	0.5584	-0.57820 to 0.31820

PSQI: Pittsburgh Sleep Quality Index, Values are mean ± M.S.E. M2 (age >17-18 years), M3 (age >18-19 years) and M4 (age >19-20 years) groups were compared with M1 (age 16-17 years) group. F2 (age >17-18 years), F3 (age >18-19 years), and F4 (age >19-20 years), groups were compared with F1 (age 16-17 years), group. Female (F) groups were compared with respective (similar age) male (M) groups.

3.7. Daytime Dysfunction (PSQI Category 7)

All male (M1-M4) and female (F1-F4) groups of nursing students showed mean score of daytime dysfunction insignificantly different ($P>0.005$) from each other (Table 7).

Table 7. Comparison of daytime dysfunctions, aggregated score from the PSQI category 7 among male verses female nursing students

Groups	Sex	Aggregated score	p-value	CI 95%
M1 (13)	Male	1.80 ± 0.141		
F1 (20)	Female	2.05 ± 0.148	0.2565	-0.69111 to 0.19111
M2 (14)	Male	1.73 ± 0.313		
F2 (20)	Female	2.12 ± 0.327	0.4138	-1.34941 to 0.56941
M3 (14)	Male	1.92 ± 0.247		
F3 (19)	Female	2.14 ± 0.314	0.6071	-1.08380 to 0.64380
M4 (15)	Male	1.96 ± 0.283		
F4 (18)	Female	2.22 ± 0.296	0.5353	-1.10588 to 0.58588

PSQI: Pittsburgh Sleep Quality Index, Values are mean ± M.S.E.
M2 (age >17-18 years), M3 (age >18-19 years) and M4 (age >19-20 years) groups were compared with M1 (age 16-17 years) group. F2 (age >17-18 years), F3 (age >18-19 years), and F4 (age >19-20 years), groups were compared with F1 (age 16-17 years), group. Female (F) groups were compared with respective (similar age) male (M) groups.

4. Discussion

In the present study, nursing students enrolled in the School of nursing and midwifery of MBU in Tehran, Iran, reported a score point approximately 2.09 which means a fairly poor subjective sleep quality (overall total score=14.6125 ± 1.38). The statistical analysis of the score obtained in each category from the PSQI also shows that nursing students present a fairly bad subjective sleep quality. Statistical analysis shows a significantly higher (P=0.0305, CI 95%= -6.685494 to -0.334506) total mean score of female student (16.3675 ± 1.15, nf = 77) versus male students (12.8575 ± 1.02, nm=56, Fig. 1 and 2). Male students present score point 1.85 and female students 2.34. Higher score among female students indicate a poorer level of sleep quality. Students generally exhibit poor sleep quality [21], which has been associated to insomnia and other sleep disturbances, to the high course load [7] and to demographic and hygiene behaviors [21]. In the present study, PSQI category 1 presents a score, 2.65 points (approximately, Fig. 3). Female groups' comparison to the similar age male groups shows the significantly higher mean scores (Table 1), suggesting poorer quality of sleep in female than male students. This finding is in consistent with earlier reports [22-23]. Where, the reduced sleep duration in students (i.e., a total sleep duration of 5 to 6 hours on average) was found to be related to the class schedules [24] and the high course load [7]. Another study [25] revealed a gender differences in circadian typology and in biological rhythms. Data also indicates a gender difference in the subjective sleep duration, PSQI category 2 which presents a score, nearly 2.81 points (Fig. 3, Table 2). Moreover, sleep deprivation in students impairs the academic and professional performances [26]. In this study, nursing students from the School of nursing and midwifery of MBU in Tehran, Iran, sleep 5 to 6 hours on average, which yields a score near from 2.72 points in the PSQI

scale (Fig. 3). Considering that the maximum score (3 points) of the PSQI scale means the worst sleep quality (6), and that students show a higher sleep deprivation [7-24]. While a significant difference among female versus male nursing students indicates greater sleep deprivation in female than male participants (Table 3 and 4). Daytime dysfunctions, mainly excessive daytime sleepiness, have been described in the students [7-27]. Moreover, excessive daytime sleepiness in the students has been correlated with short sleep duration [13], poor academic performance [12], minor psychiatric disorders [10], sleep disorders [16], depressive symptoms [17] and poor sleep quality [7]. According to our findings, daytime dysfunctions also affect the nursing students from School of nursing and midwifery of MBU in Tehran (Fig.3). Although there is no significant difference observe on gender basis (Table 5-7). However, PSQI categories 5, 6 and 7 score point (2.39, 1.39 and 2.28 respectively) indicates a bad quality of sleep. As daytime dysfunctions impair the student daytime activities and academic performance [8-29], applying an educative approach that attenuates the occurrence of these disorders, may improve the student learning abilities.

5. Conclusion

In brief, the present study shows that nursing students from School of nursing and midwifery of MBU in Tehran, presents a fairly poor subjective sleep quality and a slight sleep deprivation and reports a fairly high incidence of daytime dysfunctions. When compare to female versus male a more poor sleep quality correlates with poor health level of female students than the male students, findings allow to suggest that improvement in sleep quality in nursing institutes may contribute to avoid further damages in students health and thus, their academic performance. Sleep is a homeostatic process with clear effects on wellbeing, cognition, attention and behavior. The implementation of a program to aid the students, in order to promote sleep hygiene is suggested. While this is the personal opinion of the present author rather than a direct conclusion of the study, such a measure could result in better academic results and better professional performance.

Appendix A: Pittsburgh Sleep Quality Index (PSQI)

Instructions

The following questions related to your usual sleep habits during the past month *only*. Yours answers should indicate the most accurate reply for the *majority* of days and nights in the past month. Please answer all questions.
1. During the past month, when have you usually gone to bed at night?
USUAL BED TIME

_____

2. During the past month, how long (in minutes) has it

usually take you to fall asleep each night?
NUMBER OF MINUTES
_____

3. During the past month, when have you usually gotten up in the morning?
USUAL GETTING UP TIME
_____

4. During the past month, how many hours of *actual sleep* did you get at night? (This may be different than the number of hours you spend in bed).
HOURS OF SLEEP PER NIGHT
_____

For each of the remaining questions, check the one best response. Please answer *all* questions.

5. During the past month, how often have you had trouble sleeping because you…

(a) Cannot get to sleep within 30 minutes
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(b) Wake up in the middle of the night or early morning
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(c) Have to get up to use the bathroom
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(d) Cannot breathe comfortably
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(e) Cough or snore loudly
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(f) Feel too cold
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(g) Feel too hot
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(h) Had bad dreams
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(i) Have pain Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(j) Other reason(s), please describe

6. During the past month, how would you rate your sleep quality overall?
Very good _____Fairly good _____Fairly bad _____Very bad _____

7. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

8. During the past month, how often you had trouble staying awake while driving, eating meals, or engaging in social activity?
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?
Not problem at all _____Only a very slight problem _____Somewhat of a problem _____A very big problem _____

10. Do you have a bed partner or roommate?
No bed partner or roommate _____Partner/roommate in other room _____Partner in same room, but not same bed _____Partner in same bed _____

If you have a roommate or bed partner, ask him/her how often in the past month you have had… (a) Loud snoring
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(b) Long pauses between breaths while asleep
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(c) Legs twitching or jerking while you sleep
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(d)Episodes of disorientation or confusion during sleep
Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

(e) Other restlessness while you sleep, please describe Not during the past month _____Less than once a week _____Once or twice a week _____Three or more times a week _____

Acknowledgments

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Biography

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