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ORIGINAL ARTICLE

Evaluation of Depression and Anxiety, and their Relationships with Insomnia, Nightmare and Demographic Variables in Medical Students

Alireza Haji Seyed Javadi[1*], Ali Akbar Shafikhani[2]

[1]MD. of Psychiatry, Associate Professor, Department of Psychiatry, Faculty of Medicine, Qazvin University of Medical Sciences, Qazvin, Iran
[2]Department of Occupational Health Engineering, Faculty of Health, Qazvin University of Medical Sciences, Qazvin, Iran

ABSTRACT
Researchers showed comorbidity of sleep disorders and mental disorders. The current study aimed to evaluate depression and anxiety and their relationship with insomnia, nightmare and demographic variables in the medical students of Qazvin University of Medical Sciences in 2015. The study population included 253 medical students with the age range of 18-35 years. Data were gathered using Beck depression inventory, Cattle anxiety, and insomnia and nightmare questionnaires and were analyzed by proper statistical methods (independent T-test, Chi-square test and Spearman correlation coefficient (P<0.05). Among the participants, 126 (49.6%) subjects had depression and 108 (42.5%) anxiety. The prevalence of depression and anxiety among the subjects with lower family income was significantly higher (X2=6.75, P=.03 for depression and X2=27.99, P<0.05 for anxiety). There was a close relationship between depression with sleep-onset difficulty, difficulty in awakening and daily sleep attacks, and also between anxiety with sleep-onset difficulty and daily tiredness (P <0.05). In addition, there was a close relationship between depression and anxiety with nightmare; 16.2% of the subjects with depression and 26.5% of the ones with anxiety experienced nightmares. Results showed a relationship between nightmare, insomnia and level of family income with increasing depression and anxiety in the medical students. These results can help to perform the preventive mental health program in the medical students.
Keywords: Depression; Anxiety; Insomnia; medical students

INTRODUCTION

In different studies, medical education was identified as a stressful activity and high level of stress in medical students was approved (Momayyezi, Fallahzadeh, & Momayyezi, 2016). Passing through pre-clinical educations to clinical educations is one of the critical stages of mental health in medical students, which provides conditions for depression and anxiety (Ighodaro, Stefanovics, Makanjuola, & Rosenheck, 2015). These mental disorders may cause further problems and affect their performance. Different studies evaluated the high level of anxiety and depression in the medical students using different tools (Iqbal, Gupta, & Venkatarao, 2015), Most likely, this anxiety and depression are related to the scientific, financial and social requirements of the university atmosphere (Jadoon, Yaqoob, Raza, Shehzad, & Zeshan, 2010; Tyssen, Vaglum, Grønvold, & Ekeberg, 2001). Hence, determining the prevalence of anxiety and depression and their relationship with sociodemographic

***Correspondence:** ahsjavadi@qums.ac.ir
Alireza Haji Seyed Javadi, 22 Bahman Hospital of Qazvin University of Medical Sciences, Qazvin, Iran
Phone: +98.2833565712 Fax: +98.2833565825

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variables are of great importance (Haji SeyedJavadi & Shafikhani, 2017).

On the other hand, epidemiological studies performed in Western Europe, USA, Japan have reported a prevalence of insomnia-related symptoms ranging from 10% to 48% (Palatty, Fernandes, Suresh, & Baliga, 2011). Medical students are one subgroup of the general population who appear to be especially vulnerable to poor sleep, perhaps due to the long duration and high intensity of study, clinical duties that include overnight on-call duties, work that can be emotionally challenging, and lifestyle choices (Azad et al., 2015; Palatty et al., 2011).

Insomnia and nightmare are interacting with various factors, one of the most important of which is depression and anxiety (Cutler, 2016; Nadorff, Nazem, & Fiske, 2011; Sundbom, Malinovschi, Lindberg, Alving, & Janson, 2016). Studies showed that continuous nightmares may lead to different disorders and affect the performance and occupational status of the person and intensify depression and anxiety in him/her. If such a hypothesis proved, nightmares can act as an initial indication of the onset of depression and anxiety (Kelly, 2016; Krakow, Haynes, Warner, & Melendrez, 2007; Levin & Fireman, 2002; Nakajima et al., 2014).

But the challenging issue is which of the symptoms of sleep is more associated with depression and anxiety. There are some disagreements in this regard which need more investigations. According to some studies, these problems are sleep-onset difficulty and difficulty maintaining sleep (David Nutt & Paterson, 2008; Hayley et al., 2014). Other studies believed that obstructive sleep apnea, with larger effect size, is the main cause of sleep disorder in association with depression (Harris, Glozier, Ratnavadivel, & Grunstein, 2009; Rezaeitalab, Moharrari, Saberi, Asadpour, & Rezaeetalab, 2014). Identifying each of the factors can affect the diagnosis and treatment of depression and anxiety. If nightmares are associated with depression and anxiety, mood disorders can be investigated in the students. Identifying such relationships with mental disorders is of great importance; such clues can significantly help to perform the preventive mental health program in the medical students. The purpose of this study was to evaluate anxiety and depression and its relation to insomnia, nightmares and demographic variables in medical students of Qazvin University of Medical Sciences in 1394.

METHODS

The current cross-sectional study was conducted in Qazvin University of Medical Sciences in June, 2015. The research protocol was approved by the Ethics Review Committee on Human Research of the University of Qazvin. Before distributing the questionnaires, the oral informed consent was obtained from all participants and they were assured regarding the confidentiality of the information. The inclusion criterion were at least six months presence in the university and residence in the dormitories of Qazvin University of Medical Sciences. The exclusion criterion was severe physical illness at the time of intervention. In addition, those who had a serious accident in the past months were also excluded. The samples were selected using stratified random sampling. So, first, the total number of students each of the buildings belonging to this collection was determined, then, according to the number of students, from each building a number of samples were randomly selected. The sampling team moved to each floor of the building in clockwise direction and they chose each room one in between. In the event that the residents were not present or were not willing to cooperate, the adjoining room was selected. A total of 253 people were included in the study. After explaining the study goals to the participants and obtaining the oral consent, the data were collected through the questionnaires. First of all, sociodemographic data (age, gender, marital status, place of residence, level of education and income), medical records and other data were collected and recorded through specific forms. Depression symptoms were evaluated using Beck depression inventory and the anxiety symptoms were assessed by Cattle anxiety questionnaire. The Beck questionnaire involved 21 four-option multiple choice questions, each item score ranging 0-3 shows the severity of depression (Özcan, Dursun, & Cicek, 2015), with the maximum score of 63, which 0-15 indicated the normal status, 16-30 slight depression, 31-46 moderate

depression and 47-63 severe depression (Özcan et al., 2015; Rosner, 2015). Validity and reliability Beck Depression Inventory In previous studies have been approved with Cronbach α of 0.83 to 0.85(Hojat, Shapurian, & Mehryar, 1986a, 1986b). The Cattle anxiety test is a 40-item questionnaire with an interval scale which indicates the general anxiety, quantitatively (Hajseyed Javadi, Ziaee, Yazdi, Ebrahimabadi, & Shafikhani, 2017). The validity of its Persian version has been determined and reliability has been reported from 0.65 to 0.85 (Dadsetan & Mansour 1989). Based on Kaplan and Sadock textbook of psychiatry and considering the questionnaires used in the previous epidemiologic studies, the sleep questionnaire was designed and developed based on the study purpose (R. Li, Wing, Ho, & Fong, 2002; S. X. Li, Zhang, Li, & Wing, 2010; Sadock & Sadock, 2011). The validity and reliability of this researcher-designed questionnaire was approved with the Cronbach's alpha of 0.836. This questionnaire includes 14 items evaluating a wide spectrum of sleep clinical features such as sleep-onset difficulty, difficulty maintaining sleep, early morning awakening, snoring, restless sleep, dry mouth, nightmare, morning headache and daily tiredness. This questionnaire investigates all sleep signs during the recent 12 months. The subjects were asked to score the frequency of sleep disorders within the last year based on a five-point scale (0= none, 1= less than ` once in a month, 2= once or twice in a month, 3= once or twice in a week, 4= three times or more in a week). Regarding the nightmare item in the current study, the term "nightmare" had no specific definition in Iran. This item involved four answers as: no nightmare in the previous month, less than once a week, once or twice a week, three times or a week or more. The collected data were analyzed using SPSS ver. 22. Data were presented for the categorical variables; mean and standard deviation for the continuous variables in frequency and percentage. To compare the continuous variables, the independent T-test, and to compare the categorical variables the Chi-square test were used. The relationship between sleep signs, depression and anxiety were assessed using Spearman correlation coefficient (P<0.05).

RESULTS

A study population, consisted of 81 (31.9%) males and 172 (67.7%) females with the mean age of 22.32±2.85 years (ranged 18-35), were assigned to the study; 126 (49.6%) and 108 (42.5%) subjects had depression and anxiety,

Table 1. The Relationship of Sociodemographic Features with Anxiety and Depression in the Students

Variable	Depression		P-value	Anxiety		P-value
	Yes	No		Yes	No	
Gender						
Male	41(16.2%)	40(15.8%)	0.859	34(13.4%)	47(18.6%)	0.875
Female	85(33.6%)	87 (34.4%)		74(13.4%)	98(38.7%)	
Age						
Mean (SD)	22.36(2.87)	22.29(2.83)	0.837	22.45(2.94)	22.23(2.78)	0.546
Marital status						
Single	114(45.1%)	113(44.7%)	0.694	93(36.8%)	134(53%)	0.102
Married	12(4.7%)	14(5.5%)		15(5.9%)	11(4.3%)	
Education level						
Sciences	41(16.2%)	42(16.6%)	0.23	40(15.8%)	43(17%)	0.08
Physiopathology	24(9.5%)	16(6.3%)		8(3.2%)	32(12.6%)	
Training	23(9.1%)	35(13.8%)		23(9.1%)	35(13.8%)	
Internship	38(15%)	34(13.4%)		37(14.7%)	35(13.8%)	
Place of residence						
Dormitory	101(39.9%)	89(35.2%)	0.154	86(34%)	104(41.1%)	0.352
In family	14(5.5%)	24(9.5%)		13(5.1%)	25(9.9%)	
Private home	11(4.3%)	14(5.5%)		9(3.6%)	16(6.3%)	
Family income						
Less than 430 US$	74(31.5%)	46(19.6%)	0.034	74(31.5%)	46(19.6%)	<0.05
430-570US$	35(14.9%)	39(16.6%)		17(7.2%)	57(24.3%)	
>570US$	17(7.2%)	24(10.2%)		17(7.2%)	24(10.2%)	

Table 2. The Relationship between Sleep Disorder Symptoms with Depression and Anxiety in the

Variables	Depression		Anxiety	
	r	P-value	r	P-value
Insomnia symptoms				
Sleep-onset difficulty	0.492	0	0.568	0
Difficulty maintaining sleep	0.063	0.315	0.116	0.066
Early morning awakening	0.073	0.248	0.82	0.161
Restless sleep	0.041	0.512	0.071	0.261
Obstructive sleep apnea				
Dry mouth	-0.011	0.856	0.038	0.546
Nightly sweating	0.036	0.574	0.071	0.262
Mouth breathing	0.082	0.194	0.112	0.075
Snoring	0.053	0.398	0.103	0.103
Problems associated with daily consequences				
Daily tiredness	0.022	0.726	0.4	0
Morning headaches	0.041	0.512	0.071	0.261
Early morning awakening	0.317	0	0.118	0.062
Daily sleep attacks	0.368	0	0.05	0.429

Spearman correlation coefficient

Table 3. The Relationship Between Nightmare With Depression and Anxiety in the Students

Variable	Nightmare				P-value
	Never	Less Than Once in a Week	One to Three Times in a Week	Three Times or More in a Week	
Depression					
Yes	85(33.6%)	21(8.3%)	17(6.7%)	3(1.2%)	0.001
No	99(39.1%)	26(10.3%)	1(.4%)	1(.4%)	
Anxiety					
Yes	41(16.2%)	47(18.6%)	17(6.7%)	3(1.2%)	0.05
No	143(56.3%)	0(0%)	1(.4%)	1(.4%)	

respectively. Table 1 shows the frequency of mental disorders (anxiety and depression) considering sociodemographic features (age, gender, marital status, education level, place of residence and family income) in the subjects.

Among the sociodemographic variables, the prevalence of depression and anxiety were significantly higher in the subjects with family income less than 430 US$ (X^2=6.75, P=0.03 for the depression and X^2=27.99, P<0.05 for the anxiety) (Table 1). There was no significant relationship between the other variables.

The prevalence of insomnia among the medical students was 12(44.3%). Results of the Chi-square test showed that the number of subjects with depression and insomnia was significantly higher than the ones with depression without insomnia [73 (28.9%) subjects with depression and insomnia vs. 53 (20.9%) subjects with depression without insomnia] (P<0.05); there was a insignificant relationship between anxiety and insomnia [52 (20.6%) subjects with anxiety and insomnia vs. 56 (22.1%) subjects with anxiety without insomnia] (P<0.284). Table 2 shows the relationship between insomnia with depression and anxiety in the students. There was a significant relationship between sleep-onset difficulty, difficulty in awakening and daily sleep attacks with depression symptoms (P-value<0.05). There was also a significant relationship between sleep-onset difficulty, difficulty in awakening and daily tiredness with anxiety. The largest effect size among the sleep symptoms belonged to sleep-onset disorder.

The prevalence of nightmare among the subjects was 27.3%. Table 3 compares the frequency of nightmare among the groups classified based on anxiety and insomnia. There was a significant difference between the scores of anxiety and insomnia among the four groups.

DISCUSSION

The current study showed that 49.6% of medical students presented depression symptoms and 42.5% had anxiety. These findings were in line with those of the studies conducted in the USA (49%) (Dyrbye et al., 2007), Beirut (27.63% and 69%) (Mehanna & Richa, 2006) and Iran (Najafi Kalyani, Pourjam, Jamshidi, Karimi, & Najafi Kalyani, 2013). However, these rates were significantly higher than the ones reported in other studies; for example, in the study by Zakeri et al., the prevalence of depression and anxiety was 29.7% and 11.5%, respectively (Zakeri, Sedaghat, Motlagh, Ashtiani, & Ardalan, 2012). Perhaps one of the reasons for these differences is the use of different screening tools in different studies.

The prevalence of insomnia was 44.3% in the current study, which was similar to that of the study by Veldi et al (Veldi, Aluoja, & Vasar, 2005). The prevalence of nightmare, with the frequency of at least once or more in a week, was 8.7%. This rate was rather similar to those of other studies that used similar tools (1%-7%) (S. X. Li et al., 2010; Schredl, 2010).

The results of this study showed that not only the symptoms of insomnia, but also nightmares were associated with an increase in depression and anxiety scores. Researchers showed that people with depression and anxiety had extreme concern and preoccupation about their problems; hence, their emotions were aroused and affected by insomnia and nightmare (Basta, Chrousos, Vela-Bueno, & Vgontzas, 2007; Nakajima et al., 2014). These findings can lead to the conclusion that each of insomnia and nightmare symptoms can act as depression and anxiety risk factors and intensifies it; nightmare can also induce depression and anxiety due to its association with insomnia.

In the current study, there was a significant relationship between nightmare with depression and anxiety; 16.2% of students with depression and 26.5% of students with anxiety had experienced nightmares. Studies indicated that 28.4% of the subjects with depression have experienced nightmare; while, nightmare is experienced in only 3.9% of healthy subjects (Eller, Aluoja, Vasar, & Veldi, 2006).

Studies showed a significant relationship between high stress and socio-economic status; these findings encouraged authors of the current study to investigate this issue. In the current study, there was a significant relationship between the level of income with depression and anxiety.

Other studies also showed that people with lower income were more affected by depression and anxiety (Jadoon et al., 2010).

There was a significant relationship between early symptoms of depression and initial insomnia (sleep-onset difficulty) with daily sleepiness in the current study. In contrast to the mentioned relationship, no significant relationship was observed between terminal insomnia (early morning awakening) and middle insomnia (difficulty maintaining sleep) with depression and anxiety. In a study conducted by Eller et al., they obtained similar results (Eller et al., 2006).

Most of the insomnia questionnaires are focused on the frequency of such symptoms instead of evaluating their power. The current study tried to show the correlation rate of each of the symptoms in the mentioned relationship to draw Quantitative attention toward it. Results showed that difficulty in Sleep-onset had the largest correlation rate, among other symptoms associated with depression and anxiety. Of course, such results were almost predictable due to the age range of the students. Studies have shown that in contrast to the adults who have middle and terminal insomnia, the early insomnia is the main symptom among youth (Liu, Uchiyama, Kim, et al., 2000; Liu, Uchiyama, Okawa, & Kurita, 2000).

There were some limitations in the current study; first, it was a cross-sectional study; hence, a causal link cannot be educed between depression and anxiety with insomnia and nightmare. Second, the current study only evaluated the frequency of nightmare symptoms; therefore, further investigations should be conducted to measure the inconvenience caused by nightmare in a standard format, in addition to measuring the frequency of nightmare.

CONCLUSIONS

Results showed a significant relationship between nightmare, insomnia symptoms and level of income with increased depression and anxiety in the medical students. On closer examination the symptoms of insomnia, there was a close relationship between depression with sleep-onset difficulty, difficulty in awakening and daily sleep attacks, and also between anxiety with sleep-onset difficulty and daily tiredness; hence, it is essential to consider these factors in therapy and prevention methods to prevent the aggravation of symptoms of depression and anxiety. Given the limitations mentioned, further studies are needed (preferably longitudinally) to investigate the causal relationships between mental health problems with symptoms of insomnia and nightmares.

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