Comparison of Sources and Severity of Perceived Stress between Paramedical and Medical Students

Farah Moayedi[1], Mohammad Mohajer Bastami[2], Fazilat Pour Ashouri[2], Hosein Hamadiyan[2] and Sepehr Rasekhi[2],*

[1]*Department of Psychiatry, Behavioral and Neurosciences Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran*
[2]*Student Research Committee, Hormozgan University of Medical Sciences, Bandar Abbas, Iran*
Corresponding Email: flosep538@gmail.com

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ABSTRACT

Medical and paramedical students need high qualities of mental health as a prerequisite of learning and also clinical performance. However, studying medicine and paramedicine, by themselves, seem to be stressful. The present research was conducted with the objective of determining and comparing the sources and severity of stress between medical and paramedical students. A cross-sectional, questionnaire-based survey was carried out among the 40 medical and 40 paramedical students of Hormozgan University of Medical Science (HUMS) in October, 2015. A three part self-administered questionnaire was used for data gathering. Part one was designed for demographic characteristics including age, gender, term and field of education while the second and third parts consisted of Perceived Stress Scale (PSS-14) and a 32-item list of potential stressors, respectively. Stress sources were determined using logistic regression analysis. The overall PSS mean score of the students was 20.04±11.57 (23.70±12.85 for medical and 16.38±8.88 for paramedical students). Among the 80 subjects, 22 cases (27.5%) had perceived stress (PSS-14 score more than 28), 6 cases were paramedical students while the others (16 cases) were medical students. Logistic regression analysis indicated phase of education, age, academic, psychosocial and health related factors as sources of stress in medical students while phase of education, age, gender and psychosocial factors were reported as the sources of stress in paramedical students. The prevalence of perceived stress was higher in medical students rather than paramedical ones mainly due to academic and health related factors.

Keywords: Stress, Mental health, Medical, Paramedical

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INTRODUCTION

Studying in university is one of the stressful stages of life and it is characterized by quite a bit of change in students lifestyles which is stress inducing [1]. In fact, the person experiences stressful events such as, changes in friendship relations, staying away from their home and family and education [2]. In addition, studying medicine and paramedicine, by themselves, seem to be stressful due to their communication with patients, intensive curriculum and academic demands, including forced night awakenings for shifts and even for exam preparation [3-5].

Although, these students need high qualities of mental health as a prerequisite of learning and also clinical performance, several recent observations have described a link between stress and mental health problems [6]. In the other words, medical and paramedical students need cognition and alertness abilities that are impeded by stress and stressful conditions [4].

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Two considered sources of stress (university as an unfamiliar place and intensive curriculum) can lead to lots of existing stress-causing factors or "stressors". The majority of these stressors can be categorized into three main areas including academic pressures, social issues and financial problems [1, 7]. On the other hand, each stressor requires it's specific coping strategy, thus it is important to identify the sources of stress in each population [8].

In this regards, Borjalilu et al. in 2015 described that 83% of the medical students perceived stress and also indicated that subjects in clinical phase perceived more stress than basic sciences ones. The authors documented frequency of examinations, performance in examinations, academic curriculum and lack of entertainment in the situation as the major stressors in medicine schools [1]. Another study conducted by Mortimer-Jones et al. in 2015 also showed the importance of stress and anxiety in paramedical students [9].

Based on the previous reports, medical and paramedical students revealed high values of stress in compare with the other students [10, 11]. Although this issue was relatively solved in noticeable part of developed societies in recent years, some studies in developing communities have illustrated stress and low mental health among medical and paramedical students and also the role of academics as a source of further stressors [12].

However, only few surveys were carried out in those countries to investigate the sources and severity of stress and their correlations, simultaneously. Also, there is a lack of comparison in these parameters between medical and paramedical students. Therefore, the present research was conducted with the objective of determining and comparing the sources and severity of stress between medical and paramedical students.

MATERIALS AND METHODS

Setting and participants
The present cross-sectional survey was undertaken at Hormozgan University of Medical Science (HUMS) in October, 2015. This research was performed among medical and paramedical students. Since processing the entire dataset is expensive and also not necessary, the statistical methods were used to calculate the sample size and participants were selected from the student list using simple random sampling method. Based on the computation, the study population comprised 40 medical students of first to seventh years and 40 paramedical students of first to fourth years. Participants were matched for age and sex and the sampling strategy was performed by assigning a number to each subject and a table of random numbers to identify which cases were to be chosen. The randomization procedure was proportional to size regarding the level of students, basic sciences and clinical. All of the participants were explained about the targets of research and methods of this study and also how to fill the questionnaires. All procedures were performed only with the consent of participants and all information were purely used for this research and those not consenting to participate in the study were excluded. Indeed, all subjects took part in the study voluntarily and no incentives were used for the respondents. The time allocated for completion of the questionnaire was 15 min. After completing the questionnaires, all of them were collected from subjects and then incomplete ones were removed from the study (even if an item was unanswered or the answer was ambiguous).

Data collection instrument
A three part self-administered questionnaire was used for data gathering. Part one was designed for demographic characteristics including age, gender, term and field of education while the second and third parts consisted of Perceived Stress Scale (PSS-14) and a 32-item list of potential stressors, respectively [13].

Perceived Stress Scale-14 (PSS-14)
The Perceived Stress Scale (PSS) was developed to measure participants' experience of stress during one month prior to the research. The original version had 14 items, seven out of the fourteen items of PSS-14 are considered negative [1-3, 8, 11-12, 14] and the remaining seven as positive [4-7, 9-10, 13], representing perceived helplessness and self-efficacy, respectively. Responses were scored from 0 to 4 based on a five point Likert-type scale for items never, almost never, sometimes, fairly often and very often, respectively. Therefore, scores for the 14-item form range from 0 to 56. Thereafter, total scores are calculated after reversing positive items' scores and then summing up all scores. A higher score demonstrates greater levels of stress. The PSS has test-retest reliability during a short retest interval (several days) of 0.85 and Cronbach coefficient of 0.85. According to Amr M et al. and Shah et al. the stress score was classified into stratified quartiles: the upper two and lower two quartiles were labeled as stressed and not stressed, respectively (28 being the operational cut off value for the upper bound) [13-14].

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Self-administered scale for sources and severity of stress
In the third part of questionnaire, potential stressors were selected in accordance to two similar studies from Sreeramareddy et al. and Borjalilu et al [1, 15]. Thirty-two stressors were listed and categorized as academic, psychosocial and health related potential stressors. The frequency of occurrence was classified as never, rarely, sometimes, often and always and the severity of each stressor was rated using a Likert scale [1–10] ranging from not severe to very severe. The internal consistency (Cronbach coefficient) of this part was 0.81 [1].

Data analysis
Data handling and analyses were performed using SPSS software (version 19.0. Chicago: SPSS Inc.). The data are reported as means, standard deviation and percentages for demographic variables. Descriptive statistics and Logistic regression analyses were performed in order to the severity of stressors and assessing determinants of stressed cases, respectively and comparison between groups was conducted by Chi-square test.

RESULTS

Medicine group included 40 individuals (22 men and 18 women) with the age range of 19 - 31 years and mean age of 22.23±2.6 years and paramedicine group included 40 (22 men and 18 women) individuals with the age range of 18 - 28 years and mean age of 21.92±2.2 years. There was no significant difference between two groups in sex and age. The overall PSS mean score of the students was 20.04±11.57 (23.70±12.85 for medical and 16.38±8.88 for paramedical students). Among the 80 subjects, 22 cases (27.5%) had perceived stress (PSS-14 score more than 28), 6 cases were paramedical students while the others (16 cases) were medical students. Therefore, there was a significant difference in prevalence and scores of perceived stress between students groups (P <0.001). Table 1 demonstrates participants' and stressed cases' demographic characteristics.

Table 1. Demographic characteristics of all participants and stressed cases

Variables	Medical Students		Paramedical Students	
	No. of Participants (%)	No. of Stressed Cases (%)	No. of Participants (%)	No. of Stressed Cases (%)
Gender				
Male	22(55%)	8(50%)	22(55%)	1(16.67%)
Female	18(45%)	8(50%)	18(45%)	5(83.33%)
Phase of education				
Basic science	13(32.5%)	2(12.5%)	22(55%)	0(0%)
Clinical science	27(67.5%)	14(87.5%)	18(45%)	6(100%)
Age				
18-22	18(45%)	2(12.5%)	18(45%)	0(0%)
22-26	20(50%)	12(75%)	21(52.5%)	5(83.33%)
>26	2(5%)	2(12.5%)	1(2.5%)	1(16.67%)

As shown in table 2, the most frequently (number of respondents) occurring sources of stress reported by medical students as often/always were quality of food in mess, sleeping difficulties, frequency of examinations, accommodation away from home, competition with peers, financial strain, performance in examinations and academic curriculum. However, the most frequently occurring stressors among paramedical students as often/always were quality of food in mess, adjustment with roommate/s, lack of entertainment in the institution, relations with the opposite sex and nutrition. On the other hand, frequency of examinations, academic curriculum, sleeping difficulties, performance in examinations, quality of food in mess, financial strain and nutrition were rated as most severe stressors in medical students, while class attendance, nutrition, quality of food in mess, difficulty in the journey back home and lack of entertainment in the institution were identified as most severe stressors in paramedical students.

Logistic regression analysis showed that stressed cases were associated with participant's age (OR 3.45, 95% CI 1.45-7.35 for medical students and OR 2.26, 95% CI 0.33-3.45 for paramedical students), phase of study (OR 2.25, 95% CI 2.74-8.76 for medical students and OR 3.60, 95% CI 1.96-7.93 for paramedical students) and often/always occurrence of psychosocial stressors (OR 4.25, 95% CI 2.74-8.76 for medical students and OR 3.24, 95% CI 1.13-6.78 for paramedical students) in both groups of students. In addition, being categorized as a stressed case was related with being a female (OR 2.34, 95% CI 0.85-3.57) only in paramedical participants. However, by logistic regression analysis, occurrence of academic and health-related stressors were predictors of stressed cases, only in medical students (OR 4.15, 95% CI 1.62-6.96, OR 2.85, 95% CI 0.75-4.21, respectively). The odds ratios and 95% confidence intervals of the analyses are presented in Table 4.

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Table 2. Frequency of occurrence of the stressors and perceived severity (rated in a likert scale of 1–10) as reported by the medical students

Stressors	Frequency of occurrence			Severity	
	Never/rarely	Sometimes	Often/always	Median	IQR*
Academic Stressors					
Frequency of examinations	5	13	22	8	4-10
Performance in examinations	7	15	18	7	4-9
Academic curriculum	9	9	18	8	4-10
Dissatisfaction with class lectures	23	13	4	3	1-7
Non-availability of adequate learning materials	16	18	6	3	2-7
Becoming a doctor	11	15	14	4	3-8
Lack of time for recreation	14	20	6	5	4-8
Competition with peers	11	10	19	6	3-9
Performance in practice	13	15	12	5	4-8
Lack of special guidance from faculty	11	19	10	4	2-7
Psychosocial Stressors					
High parental expectations	22	3	15	2	1-7
Loneliness	9	16	15	3	2-6
Family problems	14	19	7	5	3-8
Accommodation away from home	7	12	21	5	1-6
Political situation in the country	13	18	9	3	2-7
Relations with the opposite sex	14	10	16	6	3-8
Difficulty in reading text books	10	24	6	5	3-7
Lack of entertainment in the institution	9	18	13	5	2-9
Difficulty in the journey back home	16	10	14	3	1-6
Quality of food in mess	3	13	26	7	3-10
Financial strain	9	12	19	7	2-10
Inability to socialize with peers	20	15	5	3	1-6
Living conditions in the hostel	22	11	7	2	1-5
Member of fraternity or sorority	15	20	5	4	2-6
Lack of personal interest in medicine	11	17	12	6	3-9
Adjustment with roommate/s	9	19	12	6	2-8
Health Related Stressors					
Sleeping difficulties	7	8	25	8	2-10
Class attendance	15	14	11	6	4-9
Nutrition	13	10	17	7	3-9
Exercise	23	8	9	3	1-9
Physical disability	11	22	7	5	2-9
Alcohol/drug abuse/smoking	34	4	2	1	1-3

DISCUSSION

The present investigation was carried out to compare the prevalence, sources and severity of perceived stress, between the medical and paramedical students. To our knowledge, such a detailed comparative study has not reported from Iranian studies. In this study, medical students illustrated a higher prevalence of perceived stress in compare with paramedical individuals. Two plausible reasons may be the longer academic curriculum of medicine schools and the medical students fundamental role in clinical practices, that are stress inducing [16, 17].

In this regard, Borjalilu S et al. and Shah et al. chose the perceived stress scale and described high prevalence and severity of stress among medical students. In the other words, the prevalence of stressed cases and mean PSS score in this study population was lower than those two similar studies. This difference may clearly reflects the importance of other related factors (including entertaining programs) that vary between universities. Based on the literature, entertainments can help the students to thwart their stressful conditions [1, 13]. Also, the prevalence and severity of stress experienced by students may vary according the settings of the schools, the curricula, examination system etc [13]. However, the results of present paper cannot be compared with the majority of similar studies, since the authors have used different instruments to measure stress. This limits the comparability among the reports. The advantage of PSS is that it can be applied to a wide range of settings, to different subject types, while the other reviewed stress scales for health professions students focuses only on academic stressors. Therefore, lack of inclusion of personal issues or reactions to stressful situations (psychosocial issues), and poor applicability to broader settings are the important limitations of other instruments [13, 18].

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Table 3. Frequency of occurrence of the stressors and perceived severity (rated in a likert scale of 1–10) as reported by the paramedical students

Stressors	Frequency of occurrence			Severity	
	Never/rarely	Sometimes	Often/always	Median	IQR*
Academic Stressors					
Frequency of examinations	18	10	12	3	1-8
Performance in examinations	17	14	9	3	1-7
Academic curriculum	13	14	13	4	2-6
Dissatisfaction with class lectures	9	24	7	3	1-5
Non-availability of adequate learning materials	15	17	8	5	2-9
Becoming a graduated	12	18	10	5	2-8
Lack of time for recreation	17	11	12	3	2-7
Competition with peers	13	18	9	5	1-9
Performance in practice	18	15	7	2	1-4
Lack of special guidance from faculty	14	18	8	3	2-5
Psychosocial Stressors					
High parental expectations	20	9	11	3	1-6
Loneliness	11	16	13	4	2-5
Family problems	16	17	7	3	1-6
Accommodation away from home	8	19	13	5	2-7
Political situation in the country	9	19	12	5	2-8
Relations with the opposite sex	12	11	17	6	3-8
Difficulty in reading text books	14	12	14	4	2-6
Lack of entertainment in the institution	8	13	19	7	2-9
Difficulty in the journey back home	14	12	14	7	2-10
Quality of food in mess	9	10	21	7	3-9
Financial strain	12	12	16	2	1-7
Inability to socialize with peers	21	15	4	6	3-8
Living conditions in the hostel	12	19	9	2	1-5
Member of fraternity or sorority	21	12	7	4	2-7
Lack of personal interest in paramedicine	15	15	10	6	2-8
Adjustment with roommate/s	10	11	19	4	1-9
Health Related Stressors					
Sleeping difficulties	24	8	8	3	2-6
Class attendance	16	19	5	7	3-9
Nutrition	9	14	17	7	3-9
Exercise	15	16	9	3	2-6
Physical disability	16	12	12	5	3-9
Alcohol/drug abuse/smoking	29	5	6	2	1-4

Table 4. Determinants of stressed cases by logistic regression

Variables	Adjusted OR* (95% CI)	
	Medical Students	Paramedical Students
Gender		
Male	1	1
Female	0.73 (0.45-2.7)	**2.34(1.85-3.57)**
Phase of education		
Basic science	1	1
Clinical science	**4.25(2.74-5.76)**	**3.60(2.96-5.93)**
Age		
18-22	1	1
22-26	**3.45(2.45-5.35)**	**2.26(1.33-3.45)**
>26	1.90(0.61-4.51)	1.65(0.48-3.66)
Occurrence of Academic Stressors		
Less than often	1	1
Often/Always	**4.15(3.62-5.96)**	1.58(0.73-4.82)
Occurrence of Psychosocial Stressors		
Less than often	1	1
Often/Always	**4.36(3.11-7.46)**	**3.24(1.13-4.78)**
Occurrence of Health-related Stressors		
Less than often	1	1
Often/Always	**2.85(1.75-4.21)**	1.47(0.59-4.08)

Depending on the previous studies, academic curriculum and clinical practices in medicine and paramedicine schools are stressful. In addition to examinations, these students also experience longer hours of study and an

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associated lack of free time. On the other hand, working with dying patients, conflicts with other staff, insecurity about clinical competence, interpersonal problems with patients and work overload are the main causes of stress in mentioned individuals [19-21]. In this issue, academic, psychosocial and health related factors were also reported as stressors by the medical students. Frequency of examinations, Competition with peers, Performance in examinations and Academic curriculum were the most prevalent educational factors of perceived stress. In medical students, among psychosocial factors, quality of food in mess, accommodation away from home and financial strain were the main sources of perceived stress. These associations are in compliance with the findings of other observations [22]. Majority of these factors are due to the severity and longevity of medical academic curriculum in Iran that causes exhaustion of examinations, staying away from home and inability to work and earn money in those years [23]. However, sleeping difficulties and nutrition were also the main stressors of perceived stress as health related factors in medical students in our study. This is agree with the sleep–wake cycle of medical students is characterized by insufficient sleep duration, delayed sleep onset, and occurrence of napping episodes during the day [24, 25]. This cycle can also damage to their nutrition quality by changing their daily meals and food consumption patterns [26].

On the other hand, paramedical students reported psychosocial factors as their main stressors, including Quality of food in mess, Lack of entertainment in the institution and Adjustment with roommate/s. Indeed, although they had no problem with the frequency of their exams and academic curriculum, they mostly complained about lack of entertainment and adjusting with their roommates. Limitations in their communication with patients and various hospital wards and also higher numbers of members in each room in compare with medical students can be the major reasons for these complains, respectively [27, 28]. Unfortunately, in accordance with previous researches, quality of food in mess was common in both groups. Thus, the relevant authorities should pay more attention to this issue as a main problem of students [15]. Further data analysis in this study demonstrated relatively same factors for severity of each stressor.

In addition to revealed parameters, some demographic factors were also examined in this project such as gender, phase of education and age of participants. Logistic regression determined the association between basic and clinical science students in both groups. This correlation was predictable since clinical science involves interactions with patients and also diagnostic clinical materials [29]. In addition, they usually experience forced night awakenings for shifts, which can lead to further stress inducing side effects including sleep difficulties [30, 31]. In consistent with conversion process from basic to clinical phase, the age of subjects were also showed a significant association with the stressed cases. In the other words, the association of age mainly attributed to their conversion process from basic to clinical phase. An appropriate justification for both of these relationships is that higher grade students (such as interns) had heroic images of themselves at the end of their educating period and while the internship year progresses, the ability to assess these aims may be threatened. Thus, they usually experience psychological distress in the clinical course [32-34].

In compliance with the previous experiments, our results showed that gender is an important factor in perceived stress in students and the female students' perceived stress more than male cases [35]. However, this was only observed in paramedical students in present research. Gender is a critical determinant of mental health in most of the related surveys and female medical students indicated more susceptibility to experience mental problems during their training period mainly due to their instinctive characteristics and social situation [36, 37]. Finally, we can conclude that, the prevalence of perceived stress was higher in medical students rather than paramedical ones mainly due to academic and health related factors. Thus, a change in medical education and academic curriculum or also empowering students to effectively cope with the stressors are required.

Declaration of interest
The authors report no conflicts of interest. The authors alone are responsible for the content and writings of this article.

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