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RESEARCH ARTICLE

PSYCHOLOGICAL STRESS AMONG UNDERGRADUATE MEDICAL STUDENTS OF SAUDI ARABIA: A CROSS SECTIONAL SURVEY

[*]Mudassar Ali Roomi[1], Alharbi Abdulrhman Obaid[2], Hamoud Mohammed Alshaya[3] and Khalid Alobeiwi[4].

1. MPhil Physiology, Assistant Professor in Physiology, School of Health Sciences, College of Medicine, Nursing and Health Sciences, Fiji National University, Fiji Islands.
2. MBBS, Medical Intern at King Fahad Specialist Hospital, Buraidah, Qassim.
3. MBBS, Intern Alzulfi General Hospital, Saudi Arabia.
4. MSc, RRT-NPS, ACCS, Alzulfi General Hospital, Saudi Arabia.

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Abstract

Background: Psychological stress can negatively affect learning and performance of medical students. Medical studies are considered intrinsically more stressful than many other disciplines. This study was conducted to investigate stress among undergraduate medical students of Saudi Arabia, and to compare stress between pre-clinical and clinical students, and to compare stress between male and female students.

Methods: This cross-sectional survey was conducted in December 2016 among medical students by using a self-administered questionnaire. The data were entered and analyzed using IBM-SPSS-20. The data were summarized and analyzed by frequencies, percentages, means, standard deviation and Chi-square test.

Results: A total of 119 participants (54.6% males, 45.4% females) with mean age of 21.8±2.1 years participated in this study. Severe and moderate stress was present among 78% and 20% of the participants, respectively. Prevalence of stress was high in all the medical students irrespective of whether they were in pre-clinical or clinical years of study; there was no statistically significant difference between them. Majority (77%) of the male students had severe stress as compared to 79.6% of the female students; there was no statistically significant difference between them.

Conclusions: Most of the medical students of Saudi Arabia perceive their studies and training as either moderately or severely stressful. The risk of stress was high among most of the participants irrespective of their gender, and pre-clinical or clinical years of study during MBBS. It is recommended that stress management courses should be included in the curriculum of undergraduate medical students.

Introduction:-

Stress can be defined as any challenge to homeostasis or to our body's ability to keep the internal environment constant(Bansal and Bhave, 2006). In psychology, stress can be defined as a feeling of strain and pressure. Stress is body's non-specific response to demands or to any disturbance in the environment. It is a process which enables us

Corresponding Author: -Dr. Mudassar Ali Roomi
Address: Assistant Professor Physiology, School of Health Sciences, CMNHS, FNU, Fiji Islands.

to perceive and cope with challenges or threats (Al-Dubai *et al.*, 2011).Stress can be good or bad. 'Good stress' is called as eustress. Eustress is a form of stress in which a person perceives a stressor as positive; it motivates and inspires the person to continue working. 'Bad stress' is called as distress and it is a negative form of stress which demotivates a person. Distress occurs when a person perceives that his capabilities or resources are less than the demands; stressors create tension and there is no fun in the challenge while a person is distressed(Le Fevre *et al.*, 2006).

Too much stress can affect physical and psychological health of individuals (Folkman, 1984). Perceived stress can create emotional instabilities leading to relationship problems, sleep disturbance, low self-esteem, anxiety, depression,drug addiction, and suicidal tendencies(Shapiro *et al.*, 2000; Moffat *et al.*, 2004; Stecker, 2004; Yousafzai *et al.*, 2009).Stress may also decrease the learning abilitiesand academic performance of students. Moreover, it canadversely affect the ability of doctors to provide high quality care (Firth-Cozens, 2003).

Tertiary medical education is regarded generally as being highly stressful. It has been observed that medical students and resident doctors experience more stress than students of other disciplines(Stewart*et al.*, 1999; Aktekin *et al.*, 2001; Dyrbye *et al*., 2006).Medical students are prone to stress development due to vastness of their curriculum, length and depth of their courses, inadequate leisure time,lack of holidays, financial burden and career choices(Stecker, 2004; Yousafzai *et al.*, 2009; Waghachavare *et al.*, 2013; Oboko *et al*., 2015). Some studies suggest that medial students are most prone to stress in their 1st year of study due to tremendous change in their lifestyle(Stewart*et al.*, 1999; Dyrbye *et al*., 2006). Another study suggests that medical students are at risk of stress during transition from pre-clinical years to clinical training(Oboko *et al*., 2015).

There seems to be limited information in Saudi Arabia relating to this important global issue, especially on comparison of stress between male and female students, and between pre-clinical and clinical students. Therefore, this study was conducted to: a) assess the degree of stress among undergraduate medical students of Saudi Arabia, b) compare stress between medical students of pre-clinical years and clinical years, and c) compare stress between male and female medical students.

Methodology:-

This cross-sectional survey was conducted in December 2016 among medical students enrolled in various medical colleges of Saudi Arabia. The participants were male and female medical students aged ≥ 18 years studying in various years of MBBS from year 1 through year 6. A self-administered online questionnaire was created using Google Forms. The questionnaire had two sections; section 1 contained information on demographic characteristics of the participants while section 2 contained 25 standard questions to assess psychological stress. Section 2 of the questionnaire was taken from the website of International Stress Management Association-UK (ISMA, 2013).

Information on participants' age, gender and year of study were obtained. Medical students in years 1-3 and 4-6 of MBBS were considered doing their pre-clinical and clinical studies, respectively. Each participant was supposed to answer each of the 25 questions as "Yes' or 'No'. 'Yes' carried 1 score and 'No' carried 0 score. Scores of all the 25 questions answered by a participant were added up. A participant with total score of 0-4 was supposed to have *least risk* of stress. A total score of 5-13 meant that the participant was *more likely* (moderate risk) to suffer from stress and stress-related illness. Stress score ≥ 14 meant that the participant is *most prone* (severe risk) to stress and stress-related illness.

All the participants were informed about the nature and scope of the study before their voluntary participation. To ensure anonymity, no questions about the name of the institution or the name of student were included in the questionnaire. We assured confidentiality of all the data. Moreover, we ensured to fulfill the ethical considerations in line with Helsinki Declaration.

The data were double entered and analyzed by using IBM Statistical Package for Social Sciences (SPSS) version 20. The data were cross checked to ensure accuracy. The data were summarized and analyzed by frequencies, percentages, means, standard deviation and Chi-square test. A *p*-value of ≤ 0.05 was considered statistically significant.

Results:-

A total of 119 participants (54.6% males, 45.4% females) with age of 21.8±2.1 (18-28) years participated in this study. More than half (61.3%) of the participants were students of pre-clinical (1-3) years and the rest (38.7%) were students of clinical (4-6) years (Table 1).

Table 1:-Demographic characteristics of the participants (n = 119)

Demographic characteristics	**Frequency (%)**
Age: Mean ± SD (Range)	21.8±2.1 (18-28) years
Gender	
Male	65 (54.6)
Female	54 (45.4)
Year of study during MBBS	
1	23 (19.3)
2	24 (20.2)
3	26 (21.8)
4	12 (10.1)
5	9 (7.6)
6	25 (21.0)
Pre-clinical or clinical students	
Students of pre-clinical (1-3) years	73 (61.3)
Students of clinical (4-6) years	46 (38.7)

Cumulative responses of the participants to each question of the stress questionnaire are given in Table 2. Except questions 18, 20, 21 and 24, participants have predominantly reported a 'Yes' to all the questions of the stress questionnaire.

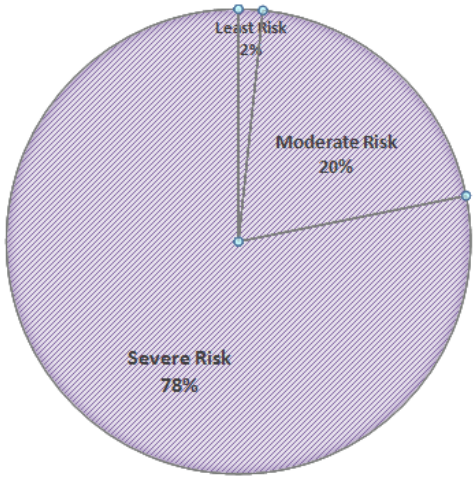
Table 2:-Participants' cumulative responses to each of the 25 questions of the stress questionnaire

Q.No.	**Questions**	**Participants' Response**		**Total responses from the participants**
		Yes n (%)	**No n (%)**	
1.	I frequently bring work home at night	93 (78.8)	25 (21.2)	118
2.	Not enough hours in the day to do all the things that I must do	89 (75.4)	29 (24.6)	118
3.	I deny or ignore problems in the hope that they will go away	65 (54.6)	54 (45.4)	119
4.	I do the jobs myself to ensure they are done properly	110 (92.4)	9 (7.6)	119
5.	I underestimate how long it takes to do things	80 (67.2)	39 (32.8)	119
6.	I feel that there are too many deadlines in my work / life that are difficult to meet	93 (80.9)	22 (19.1)	115
7.	My self-confidence / self-esteem is lower than I would like it to be	82 (69.5)	36 (30.5)	118
8.	I frequently have guilty feelings if I relax and do nothing	100 (84.7)	18 (15.3)	118
9.	I find myself thinking about problems even when I am supposed to be relaxing	103 (88)	14 (12)	117
10.	I feel fatigued or tired even when I wake after an adequate sleep	89 (76.7)	27 (23.3)	116
11.	I often nod or finish other people's sentences for them when they speak slowly	78 (67.2)	38 (32.8)	116
12.	I have a tendency to eat, talk, walk and drive quickly	81 (69.8)	35 (30.2)	116
13.	My appetite has changed, have either a desire to binge or have a loss of appetite / may skip meals	85 (73.3)	31 (26.7)	116
14.	I feel irritated or angry if the car or traffic in front seems to be going too slowly/I become very frustrated at having to wait in a queue	75 (64.7)	41 (35.3)	116
15.	If something or someone really annoys me I will bottle up my feelings	71 (61.2)	45 (38.8)	116
16.	When I play sport or games, I really try to win whoever I play	86 (74.1)	30 (25.9)	116

17.	I experience mood swings, difficulty making decisions, concentration and memory is impaired	90 (77.6)	26 (22.4)	116
18.	I find fault and criticize others rather than praising, even if it is deserved	49 (43)	65 (57)	114
19.	I seem to be listening even though I am preoccupied with my own thoughts	86 (74.1)	30 (25.9)	116
20.	My sex drive is lower, can experience changes to menstrual cycle	38 (34.9)	71 (65.1)	109
21.	I find myself grinding my teeth	45 (39.5)	69 (60.5)	114
22.	Increase in muscular aches and pains especially in the neck, head, lower back, shoulders	91 (78.4)	25 (21.6)	116
23.	I am unable to perform tasks as well as I used to, my judgment is clouded or not as good as it was	68 (59.1)	47 (40.9)	115
24.	I find I have a greater dependency on alcohol, caffeine, nicotine or drugs	52 (44.8)	64 (55.2)	116
25.	I find that I don't have time for many interests / hobbies outside of work	93 (80.2)	23 (19.8)	116

This study has shown that 78% of the total participants were most prone (severe risk) to stress and stress-related illness. A total of 20% of the participants were more likely (moderate risk) to develop stress, and just 2% of the participants had least risk (score 1-4) of stress (Figure).

Figure:-Three categories (with percentages) of risk of stress development among medical students



Majority (82.2%) of the pre-clinical (years 1-3) students were most prone (severe risk) to stress and stress-related illness as compared to 71.7% students of clinical years (years 4-6). Moreover, 16.4% ofpre-clinical students and 26.1% of clinical students were more likely (moderate risk) to experience stress. Prevalence of stress was high in all the medical students irrespective of whether they were in pre-clinical years or clinical years of study, and there was no statistically significant difference (p=0.405) of risk of stress between pre-clinical and clinical students (Table 3).

Table 3:-Comparison of the risk of stress development between medical students of pre-clinical years and clinical years

Year of study during MBBS	**Frequency and percentage of the medical students showing risk of stress development. n (%)**			**Total Frequency (%)**	***p*-value**
	Least risk (Score 1-4)	**Moderate risk** (Score 5-13)	**Severe risk** (Score ≥14)		
Pre-clinical years (1-3)	1 (1.4%)	12 (16.4%)	60 (82.2%)	73 (100%)	0.405
Clinical years (4-6)	1 (2.2%)	12 (26.1%)	33 (71.7%)	46 (100%)	

Majority (77%) of the male students were most prone (severe risk) to develop stress and stress-related illness as compared to 79.6% of the female students. Furthermore, 20% of the male students and 20.4% of the female students were more likely (moderate risk) to experience stress. Prevalence of stress was high in all the participants irrespective of their gender, and there was no statistically significant difference (p=0.429) of risk of stress development between male and female medical students (Table 4).

Table 4:-Comparison of the risk of stress development between male and female medical students

Gender	**Frequency and percentage of the medical students showing risk of stress development. n (%)**			**Total Frequency (%)**	***p*-value**
	Least risk (Score 1-4)	**Moderate risk** (Score 5-13)	**Severe risk** (Score ≥14)		
Male students	2 (3%)	13 (20%)	50 (77%)	65 (100%)	
Female students	0 (0%)	11 (20.4%)	43 (79.6%)	54 (100%)	0.429

Discussion:-

Findings from this study suggest that most of the Saudi medical students are stressed out during their studies. We also found that most of the study participants have high stress irrespective of whether they are in their pre-clinical or clinical years of study. Furthermore, we observed that the risk of stress is high in all the medical students irrespective of their gender.

High (78%)prevalenceof severe stress in our study participants is similar to the findings of some other studies which have reported 75% to 90% risk of stress(Saipanish, 2003; Ofili et al., 2009; Yousafzai *et al.*, 2009; Koochaki *et al.*, 2011). A study conducted by Oboko *et al*(2015)to investigate the prevalence of stress, stressors and coping strategies among male medical students of Nigeria found that 70.3% and 22.1% of medical students perceived their studies and training as very stressful and moderately stressful respectively which is very similar to the findings of our study. However, some studies have reported a lower risk of stress among medical students than our findings. For example, Bhatti*et al* (2016)have observed 13.3% risk of severe stress development among medical students of a Pakistani university; although they have used same ISMA stress questionnaire to assess the risk of stress development, the difference in the risk of stress development in their study may be due to differences in the educational curriculum and system, and social and cultural differences. Some other studies(Sherina*et al.*, 2004; El-Gilany *et al*., 2008) have also reported a lower (41.9% and 43.7%, respectively) risk of severe stress than our findings (78%). These differences may be due to different tools used for assessment of stress in their studies.

We have observed a high (82.2%) prevalence of severe stress among our pre-clinical (years 1-3) students as compared to 71.7% prevalence among students of clinical years (years 4-6). The prevalence of severe stress was high among all participants irrespective of whether they were in pre-clinical years or clinical years of MBBS. Contrary to our findings, Oboko *et al*(2015)observed a significantly higher (97.3%) prevalence among pre-clinical students than 88.5% prevalence among clinical students of a Nigerian medical college. This difference may be attributed to the use of different tools for assessing the risk of stress. Furthermore, it seems as if Nigerian study has combined the very stressful and moderately stressful categories, it is likely they might have over-reportedprevalence of stress than our study.

We found that more than three-fourths of both male and female medical students were stressed during their studies and training, and there was no statistically significant difference between them. These findings are a bit lower than the findings of a Nigerian study (Oboko *et al.*, 2015)which has also described a high prevalence (above 90%) of stress in medical students irrespective of their gender. This difference may be attributed to the use of differenttools for the assessment of stress; the Nigerian study has used DASS-21 guidelines to classify stress.

Very high prevalence of stress in our participants may be a serious concern as too much stress can affect physical and psychological health of individuals (Folkman, 1984). Perceived stress can create emotional instabilities leading to relationship problems, sleep disturbance, low self-esteem, anxiety, depression, drug addiction, and suicidal tendencies (Shapiro *et al.*, 2000; Moffat *et al.*, 2004; Stecker, 2004; Yousafzai *et al.*, 2009).Stress may also decrease learning ability and academic performance of students. Moreover, it can adversely affect the ability of doctors to provide high quality care(Firth-Cozens, 2003).

One of the strengths of this study is that we have studied three categories of stress among medical students by using a standardized questionnaire of International Stress Management Association, UK. Additionally, we have compared stress between male and female students, and also between pre-clinical and clinical students. A relatively small sample size as compared to other similar studies may be one of the limitations. Cross-sectional nature of this study may also limit the generalizability of the results of this study. Reporting bias cannot be entirely eliminated as we have used self-administered questionnaire; respondents' understanding of the questions or their wish to report their emotions in a certain way may have caused some degree of bias. Some possible confounding factors e.g. psychiatric problems and current emotional states of the participants, teaching styles and faculty characteristics were not considered for this study.

Conclusions:-

This study has shown that most of the undergraduate medical students of Saudi Arabia perceive their studies and training as either moderately or severely stressful. The risk of stress development is high in most of the participants irrespective of their gender or year of study during MBBS. Since medical studies are intrinsically stressful and there are some stressors which are unavoidable, it is recommended that stress management courses should be included in the undergraduate medical curriculum. It is also important that we cooperatively discuss these results with students and offer them support in the form of counseling. Further studies are recommended to investigate stressors, consequences of stress, coping strategies, prevention and treatment of stress.

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