

Correlation analysis of stress and substance abuse among medical students

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Abstract

Background: Substance abuse is increasing in young population of India at alarming rates. Younger generation abuse the substance to gain temporary pleasure, to relive stress and under peer pressure. Medical students are more prone to substance abuse because of longer working hours, high pressure working environment and stress.

Objectives: Present study aims towards finding a correlation between stress and addictive behaviors, so as to recognize the extent to which stress affects the medical students. Present study also focusses on establishing comprehensive measures to manage stress among medical students.

Methodology: Total 200 undergraduate medical students were recruited in present study. The stress level was analysed using perceived stress scale (PSS) and perceived academic stress scale (PASS). Substance abuse was analysed using drug abuse screening test (DAST-10) and alcohol use disorders identification test (AUDIT).

Results: A significantly high correlation was found in the stress level and substance abuse among undergraduate medical students. PSS exhibit correlation of 0.3589 with AUDIT and 0.3194 with DAST. PASS exhibit correlation of 0.4760 with AUDIT and 0.3775 with DAST.

Conclusion: Stress was found to be a significant problem among medical students and this leads to consumption of alcohol and other illicit mind-altering psychoactive substances in an attempt to cope with various academic and other life stressors. Awareness creation about the adverse effects of substance use and academic counseling in the first 2-3 years of course and putative stress reduction interventions are recommended and needed.

Keywords: Alcohol, Substance, PASS, PSS, DAST, AUDIT

Introduction

The body's reaction to changes that necessitate physical, mental, or physiological adjustment is known as stress. Medical training is known to be stressful and students have been reported to be under a great deal of stress during their training. For many students, the first year is marked by a shift in their environment as well as the understanding that they would never be able to master training entirely. This calls into question many students' prior perceptions of themselves as accomplished and capable of

"perfect mastery" ^[1]. As second-and third-years progress, these students are immersed in preclinical courses that cover a wide range of topics. Students learn how to approach and handle patients as they go from preclinical to clinical training. As a result, there is less stress ^[2]. Students frequently believe that they lack the necessary knowledge and skills to practise medicine. Students gradually gain increasing responsibility for patient care throughout the fifth and internship (sixth) years. Despite the fact that students are supposed to become more competent, they continue to feel incompetent and nervous. They learn to cope with their emotions by acting overconfident at times, striving to read "everything," and challenging everyone ^[3].

As a results, medical students all throughout the world experience a lot of stress. Medical students from throughout the world have been reported to be at risk for psychological stress, mental illnesses and a reduction in life satisfaction ^[4]. The majority of medical students from institutions in Mumbai, India ^[5] and Karachi, Pakistan ^[6], for example, have experienced stress at some point during their studies. Another research of medical students at King Saud University in Saudi Arabia found a greater frequency of stress (57%) ^[7]. Excessive stress in medical school predisposes students to be motivated to cheat on tests and to have difficulty resolving interpersonal disputes, as well as to have decreased attention, focus, objectivity, increased mistakes and inappropriate behaviour, such as neglect ^[8]. Furthermore, stress causes poor judgements, absenteeism, self-medication and addiction to drugs like tobacco chewing, cigarette smoking and alcohol use among students ^[9].

In this context, substance usage includes tobacco chewing, cigarette smoking, and alcohol use. Higher education students utilise substance to stay awake and work hard during study hours, with the belief that khat increases academic performance ^[10]. Present study aims towards finding a correlation between stress and addictive behaviors, so as to recognize the extent to which stress affects the medical students. Present study also focusses on establishing comprehensive measures to manage stress among medical students.

Methodology

Recruitment process: Total 200 undergraduate medical students were recruited in present study. Medical students from first to last years of M.B.B.S, age range 23-26 and belonged to families with middle to high socio-economic status were selected and taken as the sample. All the questionnaires were self-administered to the students.

Perceived Stress Scale (PSS): This scale is one of the most widely psychometric tools to measure the perception of stress. All the 10 items have been designed to tap how unpredictable, uncontrollable and overloaded, respondents find their lives. The questions in the scale asked the respondents about their feelings and thoughts during the past month and they had to indicate the frequency of a particular feeling or thought ranging from 0-4, 0 being never and 4 being very often. The items were easy to understand and rate. High scores were associated with greater vulnerability to stressful life-event -elicited depressive symptoms ^[11].

Perceived Academic Stress Scale (PASS): This scale aims to identify perceived sources of academic stress among university students and was developed by Bedewy and Gabriel. It has 18 items and takes five minutes to complete. The scale is a five-point rating scale and needs the respondent to rate his answers from least relatedness to the highest. High scores indicate increased levels of academic stress and classroom performance related stress ^[12].

Drug Abuse Screening Test (DAST-10): DAST was designed by H.A Skinner to provide a brief, self-report instrument for population screening, clinical case finding and treatment evaluation research. Each question requires an assenting or dissenting response from the responders. Each positive score is given a numeral of 1. Scores range from 0-8 pointing towards the degree of problems related to drug abuse from no problem to substantial level of problems ^[13].

The Alcohol Use Disorders Identification Test (AUDIT): It is a ten question self-report scale developed by WHO to screen patients for possible alcohol use. It is a much used valid and reliable tool which provides a valid indication of severity of alcohol use and dependence. Each question was scored by the respondents on a 4-point scale, for a total of 40 points, with higher ratings related to higher risk for alcohol related problems. Scores ranging between 8 and 15 were targeted for brief intervention. The range of possible scores is from 0-40, where 0 indicates an individual who has never had any problems from alcohol. A score of 1 to 7 suggests low-risk consumption according to World Health Organization (WHO) guidelines. Scores from 8 to 14 suggest hazardous or harmful alcohol consumption and a score of 15 or more indicates the likelihood of alcohol dependence (moderate-severe alcohol use disorder) ^[14].

Statistical Analysis: The data was analysed using the Graph Pad Prism. The data was represented as number and fraction of total was represented as percentage. The mean was calculated to measure the central tendency and standard deviation was use as measure of variability. Interquartile range was also calculated as a measure of central tendency. Pearson's correlation was used to correlate the variables. A p value less than 0.05 was considered significant. Graphs and tables were used to represent the data.

Results

There were 84 (42%) males and 116 (58%) females in the present study. The mean PSS score was 20.10 ± 5.430 , mean PASS score was 39.81 ± 11.551 , mean AUDIT score was 8.73 ± 5.579 and mean DAST score was 2.06 ± 1.603 (Table 1).

Table 1: Mean PSS, PASS, AUDIT and DAST score

Scale	Mean	SD	Minimum	Maximum
PSS Score	20.10	5.430	7	44
PASS Score	39.81	11.551	10	69
AUDIT Score	8.73	5.579	0	21
DAST Score	2.06	1.603	0	7

A significantly high correlation was found in the stress level and substance abuse among undergraduate medical students. PSS exhibit correlation of 0.3589 with AUDIT and 0.3194 with DAST. PASS exhibit correlation of 0.4760 with AUDIT and 0.3775 with DAST (Table 2).

Table 2: Correlation of PSS and PASS with the AUDIT and DAST score

	PSS		PASS	
	Pearson correlation (r)	P value	Pearson correlation (r)	P value
AUDIT	0.3589	0.0001***	0.4760	0.0001***
DAST	0.3194	0.0001***	0.3775	0.0001***

Discussion

A high rate of stress among medical students required attention since it might decrease learning abilities, which could damage the quality of patient care they deliver after graduation. Total 22.5% students reported mild levels of perceived academic stress, 74% moderate and 3.5% reported severe academic stress levels. Non-academic or other general life stressors were calculated as 12.5% of students reported mild levels, 65% moderate and 22.5% reported severe stress levels. Results of present study was similar to that earlier report by Abdulghani in Saudi Arabia where 57% subject were found to have major stress levels ^[7]. Saipanish in Thailand also revealed similar results with 61.4% cases with elevated stress ^[15]. The study by Firth in British reported 31.2% subjects with elevated stress ^[16]. The variety in stress levels might be attributable to variances in curriculum, instructional facilities,

teacher qualification and experience, and the quality of care provided to pupils. Furthermore, changes in stress levels among various reports may be attributed to differences in the diagnostic tools utilised. In the study context, there is a severe scarcity of skilled teachers in both the preclinical and clinical disciplines. Because of the enormous number of medical students and limited number of faculties, academic counselling is not a widespread practise in the current setup, which may lead to a high incidence of stress. In this study, the prevalence of stress decreased as the study year progressed. Possible causes include growing acclimatisation to the learning environment and reduced failure rates in later years of study. Stress was shown to be the most common among first-year students. This was due to the fact that first-year students were adjusting to a new setting away from their families. This conclusion is consistent with the findings of research, which revealed that students considered medical school hard in the first year, but that the amount of stress decreased in following years [7, 8, 16, 17]. The explanation for this might be because older students have gained abilities in managing their academics and as a result, are better equipped to cope with stress than younger students.

Academic associated stressor was the primary source of stress, according to the MSSQ, followed by teaching-learning related stressor and drives and desire linked stressor. The current result that the most prevalent sources of stress among medical students were the vastness of the courses and the frequency of tests is supported by research done in Nepal by Sreeramareddy and coauthors in 2007 [18]. The volume and complexity of material to be mastered in medical school's first year is a major source of stress for students.

Kholoud 2010 [19] and Siraj *et al.*, 2014 in Malaysia [20] provided more evidence that high levels of stress in medical students can be ascribed to course overload, a lack of leisure time, a lack of learning resources, and frequent tests. Students are stressed by progressive evaluations of anatomy, physiology, and biochemistry since they must pass these courses to advance to the next level. The complexity and breadth of the course content, as well as the teacher's attitude and qualification, were shown to be prevalent sources of stress for all students, particularly in preclinical courses.

Medical students are often bombarded with information, particularly during preclinical interactions. They have a limited amount of time to integrate all of the knowledge they've learned. The overabundance of knowledge causes discomfort and disappointment since they do not cover all topics and, as a result, do not succeed during the examination time [8]. Excessive stress during medical school causes students to have difficulty answering issues, lose attention and eventually develop depression [9]. Furthermore, stress among medical students can lead to a loss of mental stability, skewed judgements, and absence from class. All of these factors, in effect, jeopardise academic success of students. This might be explained by the fact that extreme stress induces an increase in the release of the stress hormone cortisol, which causes a decrease in the hippocampus and amygdala memory retrieval activities owing to the total blocking of glucocorticoid receptors.

The consequences of chronic stress on memory include interference with a person's capacity to encode memory and recall information, as indicated in study reports by Kuhlmann and coauthors 2005 [21] and Oei *et al.*, 2007 [22]. The body responds to stress by secreting stress hormones into the circulation. Overproduction of the stress hormone cortisol has a deleterious impact on memory. Cortisol affects the hippocampus, prefrontal cortex and amygdala in particular. Because it possesses numerous receptors that are sensitive to cortisol, the hippocampus controls cortisol production through a negative feedback process under normal conditions. Excess cortisol, on the other hand, affects the hippocampus' capacity to both encode and remember memories in the case of chronic stress.

In the present study, according to calculated AUDIT scale scores for alcohol use, 40.5% of students engaged in harmful/hazardous alcohol consumption and 16.5% had scores indicating likelihood of alcohol dependence. As per calculated DAST scores, 10.5% students had scores indicating no drug problems, 56.5% had low levels of use, 28.5% moderate and 4.5% (only males) showed substantial levels of drug use other than alcohol. The prevalence of academic and other general life stressors was significantly and positively co-related with use of alcohol ($p < 0.0$; $r = 0.480$) and other drugs of abuse ($p < 0.01$; $r = 0.378$).

Students who drink alcohol are more likely to be stressed. Alcohol has a significant impact on the brain

and endocrine system. There is a clear link between drinking alcohol and having a high amount of cortisol, a stress hormone. Alcohol affects the central nervous system as a sedative and a depressant. Serotonin and other neurotransmitters in the brain are affected by alcohol. This can exacerbate stress^[23, 24]. Britton 2004 revealed a similar finding: there is a positive association between stress and alcohol usage^[25]. Chronically stressed persons drink more alcohol and eat less healthy meals than non-stressed people, according to Brady and Sonne^[26]. Alcohol stimulates the synthesis of stress hormones, which amplifies the stress response. The hypothalamus-pituitary-adrenal axis is directly activated by alcohol, causing it to create excessive cortisol. Alcohol use causes physiological stress, which means that some of the body's responses to alcohol are comparable to those to other stressors.

Conclusion

The study shows that stress is a significant problem among medical students and this leads to consumption of alcohol and other illicit mind-altering psychoactive substances in an attempt to cope with various academic and other life stressors. Academic related stressors were among the main sources of stress and high levels of stress can have negative impact on the academic performance. These high levels of prevalence of stress and drug use/abuse among medical students indeed needs attention, as it can impair the learning ability, which may ultimately affect the quality of patient care they provide as future doctors after their course completion. Awareness creation about the adverse effects of substance use and academic counseling in the first 2-3 years of course and putative stress reduction interventions are recommended and needed.

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