Original Research

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Perceived Stress and Stressors among Undergraduate Medical Students of a Nigerian Institution

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Abstract

Aim

To identity stressors and measure the intensity of stress perceived by clinical students in a Nigerian institution.

Methods

This study was a cross-sectional study of fifth and sixth-year medical students using the 40-item Medical Student Stressor Questionnaire (MSSQ). Students marked their responses to each of the 40 questions on a Likert scale ranging from-causing no stress at all (0) to causing severe stress (4)

Results

The median stress scores for the six domains were as follows: Academic related stressor (ARS)- 2.1, Teaching and Learning related stress (TLRS)-1.29, Desire related stressors (DRS)- 1.00, Group activities related stressors (GARS)- 1.00, Social related stressor (SRS) – 0.83, and Interpersonal related stressor (IRS)- 0.57. Overall, ARS was perceived to cause high-level stress in 51.6%, and severe stress in 7.8% of students. Specifically, 'Heavy workload' and 'large amount of content to be learnt' caused severe stress in 45.3% and 40.6% of students respectively. Skipping meals was frequent and associated with high stress scores in IRS, SRS and GRS domains.

Conclusion

Academic related stressors cause high-severe stress among a considerable proportion of medical students studied, while interpersonal related stress caused mild stress. 'Heavy workload', 'Tests/Examinations', and 'lack of time to review what has been learnt' are some major stressors identified. Universities need to prioritise accessibility to healthy meals, improved students' living environment, provision of psychological support and formal training on time management and other soft skills, to reduce stress and promote better academic performance. There may be a need to review medical students' curriculum to prioritise relevance over breadth of content.

Keywords: Medical Student Stressor, academic related stress, Teacher and learning related stress.

Introduction

Stressors are personal or environmental events that cause stress, while stress is the body's non-specific response or reaction to demands or to disturbing environmental stimulation[1,2]. The overall impact of a stressor depends on its characteristics and that of the individual exposed; and humans' perception of stressors depend on their cultural background, personal traits, experience, and coping skills[3].

Several studies have shown that medical students undergo tremendous stress during their education[4-8]; the situation may be even worse for students in less endowed nations due to peculiar socio-economic and environmental pressures. Karasek & Theorell in 1990, proposed that stress could either promote and enhance learning (favourable stress) or suppress learning (unfavourable stress) [9]. Negative stressors can lead to poor academic performance as well as overall poor quality of life, and as such, requires the attention of all stakeholders[9]. A Nigerian study reported that 52.8% of first-year students perceived academics as their major stressor, however, the intensity of stress was not objectively scored[10]. Another Nigerian study of clinical students, also reported that the most considerable proportion of the students (82.3%) perceived excessive academic work as the primary stressor[11]. Local data on stressors among medical students and severity of stress induced are lacking. A clear understanding of the stressors as perceived by students will inform effective interventions (physical or psychological) that will equip students to cope with stress better or eliminate adverse stressors. The ultimate benefit is the improvement in physical, mental and psychological well being of the student, and by extension, enhance the ability to achieve learning outcomes. This study aimed to identify and measure the intensity of stressors as perceived by clinical students in a Nigeria institution, using the Medical Student Stressor Questionnaire (MSSQ 40).

Materials and Methods

This was a cross-sectional study conducted in 2018/2019 academic year, among fifth and sixth-year of a medical school in southern Nigeria. The total number of students in both classes was 86, and minimum calculated sample size was 72. Sample size was calculated using the Cochran formula[12] for descriptive studies based on a known clinical student population of 86, a 5% margin of error, and an assumed response distribution of 50%. The Health Research and Ethical Committee of the Delta State University Teaching Hospital granted ethical approval for this study.

Yusoff et al. developed a 40-item (MSSQ) that identifies sources of medical student stressors and measures the intensity of stress caused[3]. This instrument was developed and validated among 1st to 5th-year students of a Medical school in Malaysia.

Table 1: Socio-demographic characteristics and habits of the students

Socio-demographic Variables		Frequency (%)
Sex	Male	31 (48.4)
	Female	33 (51.6)
Residence	Hostels	55 (85.9)
	Localities	9 (14.1)
Family size	≤5 members	39 (60.9)
	>5 members	25 (39.1)
At least one parent is a graduate?	Yes	57 (89.1)
	No	7 (10.9)
Socio-economic status	Class II	10 (15.6)
	Class III	41 (64.1)
	Class IV	12 (18.8)
	Class V	1 (1.6)
History of chronic illness	Yes	34 (53.1)
	No	30 (46.9)
Personal Habits		
Hours of sleep in a day	<6 hours	21 (32.8)
	6-8 hours	35 (54.7)
	>8 hours	8 (12.5)
Bowel habits	Regular	41 (64.1)
	Irregular	23 (35.9)
Fruit consumption	≥3 times/week	15 (23.4)
	<3 times/week	49 (76.6)
Junk food consumption	≥3 times/week	43 (67.2)
	<3 times/week	21 (32.8)
Do you skip meals?	Yes	44 (68.8)
	No	20 (31.3)
Do you fast regularly?	Yes	10 (15.6)
	No	54 (84.4)

The Cronbach's Alpha was 0.96-0.97 for the entire instrument, indicating a high internal consistency[13]. This study used a questionnaire consisting of two parts: Part 1 contained questions on socio-demographic characteristics and personal habits, while Part 2 consisted of MSSQ 40[3], with questions on self-perceived stressors and the intensity of stress.

Some of the 40 questions in the MSSQ addressing six domains of stress are as follows;

Academic Related Stressor (ARS)- understanding lectures, examination, learning context, competition, falling behind in schedule, and vast syllabus.

Intrapersonal and Interpersonal Related Stressor (IRS)- verbal/physical abuse, the task given by seniors, conflicts with peers & teachers, health problems amongst others.

Teaching and learning-related stressor (TLRS)- inadequate study material, maintaining high attendance in class, lack of guidance, teaching skills, feedback from teachers, amongst others.

Social Related Stressor (SRS)- interruption by peers, love affairs related, lack of time for friends and families.

Desire Related Stressor (DRS)- parental wish, unwillingness

Group Activities Related Stressor (GARS). peer pressure, performance in projects, seminars and college functions.

The Questionnaire were distributed to all students in their hostels after obtaining verbal informed consent, no personal identification was required in the questionnaire; the students were asked to submit questionnaire to the research assistant on completion. Students marked their responses to each of the 40 questions on a Likert scale ranging from-causing no stress at all (0) to causing severe stress (4). A Mean score of 0.00 to 1.00 indicate mild stress, 1.01 to 2.00– moderate stress, 2.10 to 3.00– high stresses and 3.01 to 4.00– severe stress[3]. Mild and moderate stress are manageable by the individual; high stress causes much stress affecting emotions and daily activities, while severe stress disturbs emotions compromising daily activities [3].

Data Analysis

The International Business Machines Statistical Product and Service Solutions (IBM-SPSS, New York, USA) version 22 was used for data management and analysis. Categorical variables including socio-demographics and personal habits of the students were presented as percentages. Personal habits included hours of sleep, bowel habits, fruit consumption, junk food consumption, skipping meals, fasting. Since the stress scores were not normally distributed, the Mann-Whitney U test, and the Kruskal-Wallis H test were used to examine the association between median stress scores and socio-demographic and personal habits. $P < 0.05$ at 95% CI were considered statistically significant.

Results

Sixty-four clinical students completed and returned the questionnaire giving a response rate of 74.4%. Mean age was 23.6±1.6 yr, and 51.6% were females. A majority (85.9%) of the students lived in the hostels, and 54.7% of students slept for 6-8hours a day. Forty-one (64.1%) out of the 64 students placed themselves in socio-economic class III, See Table 1. Skipping meals was frequent among students (68.8%), while 76.6% ate fruits <3 times a week (Table 1)

Table 2: Association of socio-demographic characteristics and the students' median stressor scores

	Median Scores					
Variables	ARS	IRS	TLRS	SRS	DRS	GARS
Sex						
Male	2.08	0.57	1.29	1.00	1.00	1.00
Female	2.23	1.00	1.29	1.17	0.67	1.25
P value	0.17	0.13	0.28	0.24	0.51	0.15
Age category (year)						
20-24	2.08	0.57	1.29	1.00	0.67	1.00
≥25	2.23	0.71	1.43	1.00	1.00	1.25
P value	0.63	0.51	0.27	0.68	0.09	0.94
Residence						
Hostels	2.15	0.57	1.29	1.00	1.00	1.25
Localities	1.92	0.71	1.43	1.00	0.67	1.00
P value	0.47	0.98	0.87	0.98	0.46	0.14
Family size						
<5	2.15	0.71	1.29	1.00	0.67	1.00
≥5	2.08	0.57	1.43	1.00	1.00	1.25
P value	0.73	0.47	0.30	0.54	0.06	0.19
At least one parent a graduate						
Yes	2.15	0.57	1.29	1.00	0.67	1.00
No	1.92	0.71	1.71	1.00	1.00	1.00
P value	0.53	0.85	0.67	0.75	0.85	0.91
Socio-economic status						
Class I[1]	-	-	-	-	-	-
Class II	2.15	0.79	0.93	1.08	0.67	1.25
Class III	2.15	0.57	1.43	1.00	1.00	1.00
Class IV	2.04	0.57	1.36	1.00	0.50	1.00
Class V	2.62	2.71	3.57	2.50	1.67	2.50
P value	0.57	0.99	0.21	0.94	0.70	0.62
History of Chronic illness						
Yes	2.08	0.57	1.43	1.00	1.00	1.00
No	2.23	0.64	1.29	1.25	0.67	1.25
P value	0.45	0.83	0.88	0.45	0.49	0.90

ARS=Academic related stressor, IRS=Interpersonal and intrapersonal related stressor, TLRS=Teaching and Learning related stressor, SRS=Social related stressor, DRS=Desire related stressor, GARS=Group activity related stressor

[1]No student was in this category

The median stress scores for the six domains were as follows: Academic related stressor (ARS)- 2.1, Teaching and Learning related stress (TLRS)-1.29, Desire related stressors (DRS)- 1.00, Group activities related stressors (GARS)- 1.00, Social related stressor (SRS) – 0.83, and Interpersonal related stressor (IRS)- 0.57. ARS was perceived to cause high-level stress in 51.6%, and severe stress in 7.8% of students. Majority of students reported mild level stress in DRS domain (70.3%), IRS domain (65.6%), SRS (57.8%), and GARS domain (53.1%) (Fig 1).

Females had higher median stress scores in all domains except DRS, and TLRS, however these were not statistically significant (Table 2). Students aged >25years had higher median stress scores in all domains, but did not reach statistical significance; students who classified themselves into socio-economic class V had higher median stress scores in all domains (Table 2). Those who slept for <6hours daily had significantly higher median stress scores (1.50) in GARS domain compared to those who slept for 6-8hours (1.00) and >8hours(0.88) respectively (P=0.03), see Table 4. Those who skipped meals had higher median stress scores in IRS (P=0.009), SRS (P=0.002), and GARS (P=0.005) stressor domains compared to those who did not skip meals; students who deliberately fasted had significantly lower stress scores in IRS domain, compared to those who did not, P=0.03 (Table 3)

Table 4 shows specific stressors within the six domains that caused high or severe level stress in students. Students reported high and severe level of stress mainly in the ARS Domain.

Table 3: Association of personal habits of students and median stress scores

Variables	Median Scores					
	ARS	IRS	TLRS	SRS	DRS	GARS
Hours of sleep in a day						
<6 hours	2.08	0.71	1.29	1.00	1.00	1.50
6-8 hours	2.15	0.57	1.43	1.00	0.67	1.00
>8hours	2.08	0.71	1.29	0.83	0.33	0.88
P value	0.99	0.84	0.75	0.42	0.10	0.03*
Bowel Habits						
Regular	2.15	0.57	1.29	1.00	1.00	1.25
Irregular	2.08	0.57	1.29	1.00	0.67	1.00
P value	0.74	0.36	0.75	0.47	0.91	0.99
Fruit consumption						
<3 times/week	2.15	0.57	1.29	1.00	0.67	1.00
≥3 times/week	2.00	0.57	1.43	0.83	1.00	1.00
P value	0.13	0.94	0.70	0.19	0.92	0.29
Junk food consumption						
<3 times/week	2.08	0.57	1.29	0.83	1.00	1.25
≥3 times/week	2.23	0.71	1.29	1.00	0.67	1.00
P value	0.63	0.16	0.74	0.12	0.72	0.87
Do you skip meals?						
Yes	2.23	0.86	1.43	1.17	0.83	1.13
No	2.08	0.57	1.21	0.75	0.83	1.00
P value	0.22	0.009*	0.07	0.002*	0.87	0.05
Do you fast regularly?						
Yes	1.96	0.43	1.29	0.67	0.83	1.13
No	2.15	0.71	1.36	1.00	0.83	1.00
P value	0.46	0.03*	0.36	0.10	0.78	0.99

ARS=Academic related stressor, IRS=Interpersonal and intrapersonal related stressor, TLRS=Teaching and Learning related stressor, SRS=Social related stressor, DRS=Desire related stressor, GARS=Group activity related stressor

Table 4: Specific stressors causing high and severe stress among medical students.

Domains	High Stress n (%)	Severe Stress n (%)
ACADEMIC RELATED STRESSOR		
Tests/Examination	29 (45.3)	10 (15.6)
Heavy workload	28 (43.8)	29 (45.3)
Not enough medical skill practice	5(7.8)	8 (12.5)
Difficulty understanding content	26 (40.6)	7 (10.9)
Getting poor marks	20 (31.3)	10 (15.6)
Lack of time to review what has been learnt	29 (45.3)	5 (7.8)
Large amount of content to be learnt	22 (34.4)	26 (40.6)
INTERPERSONAL & INTRAPERSONAL RELATED STRESSOR		
Poor motivation to learn	12 (18.8)	8 (12.5)
Verbal or physical abuse by teacher(s)	4 (6.2)	9 (14.1)
Verbal or physical abuse by personnel(s)	3 (4.7)	7 (10.9)
TEACHING AND LEARNING RELATED STRESSOR		
Not enough study material	7 (10.9)	3 (4.7)
Uncertainty of what is expected of me	8 (12.5)	6 (9.3)
Teacher –lack of teaching skills	5 (7.8)	7 (10.9)
SOCIAL RELATED STRESSOR		
Facing illness or death of patients	7 (10.9)	3 (4.7)
Frequent interruption of my work by others	16 (25.0)	3 (4.7)
GROUP ACTIVITIES RELATED STRESSORS		
Feeling of incompetence	6 (9.3)	7 (10.9)
Need to do well (imposed by others)	8 (12.5)	6 (9.3)
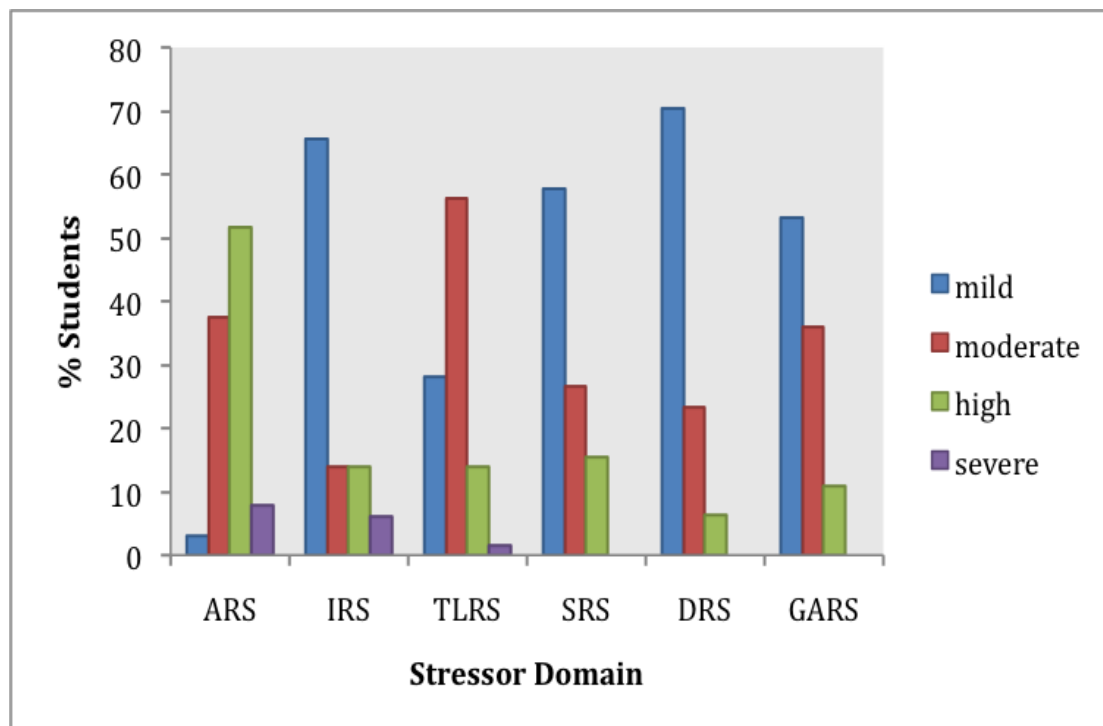
ARS- Academic related stressor; IRS– Interpersonal/intrapersonal related stressor; TLRS–Teaching related stressor; SRS– Social related stressor; DRS- Desire related stressor; GARS -Group activities related stressor

Fig 1: Intensity of Stress as Perceived by Students in Six Stressor Domains.
'Heavy workload' and 'large amount of content to be learnt' caused severe stress in the highest proportion of students (45.3% and 40.6% of students respectively). 'Tests/ Examinations' (45.3%), 'Lack of time to review what has been learnt' (45.3%), 'Heavy work-load' (43.8%) and 'difficulty understanding content' (40.6%) caused high-level stress.

The Cronbach's Alpha calculated using the SPSS software was 0.925 for the entire MSSQ, indicating a high internal consistency. However, the Cronbach's Alpha was <0.7 in the following domains- SRS (0.659), GARS (0.307), and DRS (0.454).

Discussion

This cross-sectional study undertaken in a low-resource country reveals that clinical students experience varying degrees of stress in the different stressor domains. Academic related stressors had the highest median stress score (2.1), and the highest proportion of students reported high/severe stress in this domain. This finding corroborates reports from earlier studies [10,11, 14,15].

A study of first and second-year medical undergraduates in Pakistan [14] using a different stress scale (Perceived Stress Scale, PSS-14) similarly reported that academic concerns were one of the major stressors. Patil et al. in India [15] reported the highest mean stress score in the ARS domain. However, ARS caused moderate-level stress (mean score 1.6) compared to the high-level stress score observed in the current study. The authors proposed that the student-friendly school environment explained the overall moderate level stress perceived by students in all stressor domains. The physical school environment has the potential of positively influencing learning, and this is an area that may require improvement in many Nigerian schools. Nigerian studies have similarly reported high proportion of medical

students undergoing academic stress[10,11], however not all stressors were considered and the severity of stress was not assessed. Like the present study, both studies were cross-sectional and questionnaire-based with possibility of recall bias and over-reporting, and not all undergraduate medical students were studied limiting generalisability. However, the authors' report provide insight into the stress among Nigerian students and their coping mechanisms.

This study shows that the most considerable academic stressors amongst students were 'Heavy workload', 'a large amount of content to be learnt', 'Tests/Examinations', 'Lack of time to review what has been learnt' and 'difficulty understanding content'. A study of both pre-clinical and clinical students in Saudi Arabia [12] revealed a similar trend; 'performance in practical', 'examinations frequency', 'lengthy academic curriculum/ syllabus', and 'periodic examinations performance' amongst others were rated as severe academic stressors. The Pakistan study also reported that 'frequency of examinations', 'dissatisfaction with the class lectures', 'vastness of academic curriculum/syllabus', were rated as the most severe academic stressors [13].

These observations are explainable since one of the significant causes of stress is when requirements and demands exceed a student's real or perceived ability to cope [17]. The Medical student curriculum in medical institutions is often heavily loaded; the expectations from the student increase as one transits from pre-clinical to clinical years, with many schools incorporating a research component. The current study focused on clinical students and has shown that these students perceive academics as major stressor above all else. This suggests the need for a review of the students' curriculum (this process was ongoing in the index medical school at the time this study was conducted). An effective curriculum should be outcome-based, comprising of relevant content that will promote the achievement of learning outcomes without necessarily watering down its content; the ultimate goal is to graduate a doctor who can function in society and not 'an encyclopedia of factual knowledge'. In addition to addressing the curriculum content, other factors that may require attention are the timing of lectures and acquisition of competences; the physical learning environment and teaching methods. The observation in this study that tests/examination caused high level stress in the greatest proportion of students, emphasizes the need to coach students on how to effectively prepare for examinations.

Teacher related stress caused moderate stress in half of the student with a median stress score of 1.4; this was similar

to 1.33 reported by Patil et al. in India [15]. This observation suggests that teaching is generally effective in the school studied; however, there is always room for improvement. Precisely, 'uncertainty of what was expected of them', 'not enough study material', 'teacher –lack of teaching skills' caused high to severe stress in only about a tenth of the students in the current study. Teaching related stressors generally relate to the clarity of learning objectives provided by teachers to students, the appropriateness of tasks given to students, teachers' competency in their roles, effectiveness and efficiency of the feedback given to students by their teachers, recognition and support for students [3]. The teacher plays a pivotal role in students' achievement of their learning outcomes; these learning outcomes need to be explicit and effectively communicated to the students. Furthermore, teachers and their employers need to commit to continuous training in the field of medical education, and consider more utilisation of modern learning technologies.

Majority of students experienced only mild stress in other domains (IRS, DRS, SRS, GARS), and this is similar to an earlier report by Patil et al [15]. Conversely, in the Pakistan study 'high parental expectations' was the most frequent stressor causing high-level stress in 63% of students [14]; this observation may be because the study sample were first and second-year students who may not be fully acquainted with the vastness of the overall curriculum and are more concerned about pleasing their parents, friends and relatives.

In the current study, some of the clinical students also experienced high-severe stress in IRS, DRS, and GARS domains. Specifically, 'need to do well imposed by others', 'poor motivation to learn', 'verbal or physical abuse by teachers/personnel', 'frequent interruption of work by others', 'facing illness or death of patient', and 'feeling of incompetence', caused high-severe stress in 10-25% of students. This finding begs the need for psychology/counselling unit in medical schools to support students in developing stress coping skills; this is currently lacking in many Nigerian schools [18,19].

Students who slept for less hours daily, had higher stress scores in the GARS domain, while those who skipped meals compared to those who did not, had significantly higher stress scores in IRS, SRS, and GARS domains. Researchers have also reported similar findings [14,15]. Poor sleep is generally known to be associated with poor mental performance, and may become even more apparent when students engage in interactive and reflective learning as occurs during groups activities. Skipping meals may suggest that such students lack the resources to procure meals, miss meals due to tight schedule/poor time management, or are simply used to certain eating patterns. Skipping meals has been associated with poor cognition, lower grades, higher rates of lateness and absenteeism [20]. Centre for Disease Control recommends increased access to healthy meals in schools to enhance academic performance and has suggested strategies for stakeholders to take action [20].

Surprisingly, in this study, students who deliberately fasted had lower stress scores in the IRS domain. The reason for this observation is not clear; however deliberate fasting is usually associated with religion/spirituality and sometimes lifestyle modification. Religion or spirituality generally teaches goodwill, ethics, good morals, selfless service, forgiveness, sense of community, inner strength and courage to do right amongst others; these are virtues required for healthy interpersonal relationship.

Although the MSSQ is valid and reliable [13], it is not without drawbacks. Firstly, it has not been used widely beyond Asia (where it was developed) and a few European countries [21,22]. The stressor score relies entirely on the subjective self-reporting and self-scoring of students, the response statements on the MSSQ could be leading and students may find it difficult distinguishing between stress levels (mild or moderate; moderate or high; high or severe) [23,24]. In the current study, domains assessing social, emotional and psychological related stressors i.e. SRS, DRS and GARS, showed low internal consistency, indicating the need to improve upon questions in these domains. Students may be less inclined to provide information related to the afore-mentioned domains, and some of the questions may induce stress. However, the MSSQ-40 is a comprehensive and potentially useful tool that helps to identify sources and quantify the intensity of stressors.

The main limitation of this study is the small sample size, although it reflects the usual clinical student population of the study institution (a maximum of 50 students per class). This was a cross-sectional study which relied on self-report of respondents leaving room for information bias. Pre-clinical and early (4th year) clinical students were excluded in this study, and so findings are not generalisable to all undergraduate medical students; this was largely because the pre-clinical students are accommodated in a different town from clinical students, and the fourth-year students were considered less experienced in the clinical training. Large multi-centre studies involving all levels of medical students are recommended in the future.

Conclusion

Academic related stressors cause high-severe stress among a considerable proportion of medical students. 'Heavy workload', 'Tests/Examinations', and 'lack of time to review what has been learnt' are some major academic related stressors identified. Skipping meals and lesser sleep hours were associated with higher stress scores in IRS, SRS and GARS domains. The results of this study should inform interventions that will improve the medical students' learning experience. Universities need to prioritise accessibility to healthy meals, improved students' living environment, provision of psychological support and formal training on time management and other soft skills, to reduce stress and promote better academic performance. Finally, the author recommends a review of medical students' curriculum to prioritise relevance over breadth of content, and revisit the time allocated to didactic lectures and skill acquisition. Future studies should explore the stress coping mechanisms among medical students with a view to identifying positive and effective coping mechanisms amongst student in our local context.

Competing Interests

The author declares no competing interests

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