



## Study of Stressors in a Cohort of Undergraduate Medical Students: Implications for Student Support

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### ABSTRACT

**Objective:** Increasing stress levels among medical students have been a source of concern for medical educators and administrators. The aim of this study was to investigate the various stressors experienced by undergraduate medical students in Nile University of Nigeria, Abuja.

**Methods:** A descriptive cross-sectional study in which 113 respondents participated. Participants were drawn from the 2nd to 4th year medical students. Data were collected between January and February 2020 using the 20 item version of Medical Student Stressor Questionnaire (MSSQ-20).

**Results:** Demographic data showed that age range of the respondents was 16-17 years with mean age of  $19.37 \pm 1.9$  years, majority of which are females ( $n=84$ , 74.3%) while males were in the minority ( $n=29$ , 25.7%). 37 (32.7%) of the respondents were second year medical students, while 42 (37.2%) and 34 (30.1%) were third and fourth year medical students respectively. The test instrument showed internal reliability with a Cronbach's alpha of 0.889. Stressor prevalence showed that academic related activities produced severe stress ( $3.07 \pm 0.80$ ), while the other domains produced moderated stress ( $1.14 \pm 0.10$ – $1.89 \pm 0.96$ ) except drive and desire which produced only mild stress ( $1.00 \pm 0.10$ ) in the respondents.

**Conclusion:** Stressors of academic origin produces severe stress. Hence, there is need to improve on academic related factors and curriculum for medical training to ensure proper learning and retention for future practice.

**Key words:** Medical education, Medical students, MSSQ, Stress, Student stressors

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### INTRODUCTION

Factors such as pressure, frustration, tension, anxiety, irritation can produce a response known as stress [1]. Stress is a daily ubiquitous experience of all individuals [2]. Overwhelming stress, however, produces disastrous outcomes [3]. High levels of stress are widely reported among medical students [4-7], yet specifics of the origins of this stress are most often unreported. Identification of the origins together with the

prevalence is crucial for its management to avert any negative consequences. Studies have linked negative effects of stress to poor academic performance and general wellbeing [8-11]. Stress has been suggested as a cause of students' suicide [12], substance abuse [13], antisocial behaviours [14], and drop out from school [15].

From the foregoing, increasing stress levels among medical students should be a source of concern for medical educators and administrators. Timely recognition of the sources of this stress will provide authorities with evidence to plan targeted interventions to forestall any consequences. In their study of medical student stressors, Yusoff et al. [16]

identified and grouped the stressors into six domains: academics, relationships, teaching and learning, social, drive and desire, and group activities. Nile University of Nigeria having recently established her medical school, this study investigated stressors in the pioneer three sets of admitted medical students. Using the 20 item version of Medical Student Stressor Questionnaire (MSSQ-20), the study sort to identify the various sources of students stress, and quantify the prevalence of stress across the six domains.

## MATERIALS AND METHODS

### Research design

This study is a descriptive cross-sectional study.

### Population and setting

The population for the study was students in the medical college of Nile University of Nigeria, Abuja specifically, 2nd, 3rd and the 4th year medical students. The first year (pre-medical students) were excluded.

### Sampling method and sample size

The convenience sampling method was used, and students who were willing to participate were recruited in the study. Out of the 143 medical students in the 2nd to 4th year, 113 students consented and participated in the study following suitable explanation.

### Data collection

Data for this study were collected between January and February 2020.

### Instrument

The Medical Student Stressor Questionnaire (MSSQ-20) developed by Yusoff et al. [16] to test for levels of stress and its sources was used for the study. Aside the 20 items, a demographic section was also included. The 20 items are sub grouped into six domains; Academic Related Stressor (ARS), Teaching and Learning Related Stressor (TLRS), Social Related Stressor (SRS), Drive and Desire Related Stressor (DRS), Intrapersonal and Interpersonal Related Stressor (IRS), and Group Activities Related Stressor (GARS) representing the possible origins of stress.

In scoring the MSSQ-20, a 5-point Likert scale ranging from 0-4 was used where 0=causing no stress at all, 1=causing mild stress, 2=causing moderate stress, 3=causing high stress and

4=causing severe stress. Mean scores are interpreted as follows: mild stress (0.00 - 1.00), moderate stress (1.01 - 2.00), high stress (2.10 - 3.00) and severe stress (3.01 - 4.00).

### Reliability and validity

The MSSQ-20 is reported to have strong internal consistency as indicated by the 0.95 Cronbach's alpha value [17].

### Statistical analysis

The Statistical Package for Social Sciences (SPSS) for Windows Version 23 (Armonk, NY: IBM Corp, 2015) was used for data analysis. Means and frequency for each domain was calculated. Internal consistency for each of the domains and the whole instrument was calculated using Cronbach's coefficient alpha.

## RESULTS

### Reliability of the instrument

Internal reliability expressed as Cronbach's alpha coefficients for respective domains and the overall are presented in Table 1. The coefficients for each domain were: ARS (0.822), GARS (0.624), SRS (0.697), IRS (0.881), DRS (0.635) and TLRS (0.761). The alpha coefficient for the entire MSSQ-20 calculated from this study was 0.889.

### Demography of study participants

Out of 143 students, a total of 113 respondents participated in the study resulting in 79.0% percentage compliance from the study population. The response rate of the respondent was 100%. The age range of the respondents was 16-17 years with a mean age of  $19.37 \pm 1.9$  years. Other demographic information is presented in Table 2. Majority of the respondents were females (n=84, 74.3%) while males were in the minority (n=29, 25.7%). For religious affiliation, 39 (34.5%) respondents were Christians while

**Table 1: The cronbach's alpha value for stressor domains.**

Stressor Domain (number of items)	Cronbach's Alpha Value
ARS (5)	0.822
GARS (3)	0.624
SRS (3)	0.697
IRS (4)	0.881
DRS (2)	0.635
TLRS (3)	0.761
Overall (20)	0.889

ARS (Academic Related Stressor), GARS (Group Activities Related Stressor), SRS (Social Related Stressor), IRS (Intrapersonal and Interpersonal Related Stressor), DRS (Drive and Desire Related Stressor), TLRS (Teaching and Learning Related Stressor)

**Table 2: Frequency distribution table of demographic data of respondents (n=113).**

Items	Variables	Frequency (%)
Gender	Male	29 (25.7)
	Female	84 (74.3)
Religion	Christian	39 (34.5)
	Islam	74 (65.5)
Academic year	2nd	37 (32.7)
	3rd	42 (37.2)
	4th	34 (30.1)
Civil status	Single	107 (94.7)
	Married	6 (5.3)

**Table 3: Source of stress among respondents.**

Domain	Levels of Stress (Frequency)					Mean Score ± S.D
	No Stress	Mild	Moderate	High	Severe	
ARS	5	34	114	177	235	3.070.80
GARS	64	79	84	54	58	1.89 ± 0.96
SRS	72	47	136	37	47	1.82 ± 0.09
IRS	232	67	58	47	48	1.14 ± 0.11
DRS	119	38	35	18	16	1.00 ± 0.10
TLRS	94	56	78	58	53	1.76 ± 0.11
						1.78 ± 0.36

ARS (Academic Related Stressor), GARS (Group Activities Related Stressor), SRS (Social Related Stressor), IRS (Intrapersonal and Interpersonal Related Stressor), DRS (Drive and Desire Related Stressor), TLRS (Teaching and Learning Related Stressor).

74 (65.5%) were Muslims. In terms of academic year, 37 (32.7%) were second year of medical school, 42 (37.2%) in third year of medical school and 34 (30.1%) in fourth year of medical school. Majority of the students were unmarried (n=107, 94.7%) while a hand few were married (n=6, 5.3%).

**Respondents’ stressors and prevalence**

Table 3 shows the stressors, prevalence and mean values for each domain. The top three stressors producing stress in the respondents according to their mean values were academic related stressors (3.07 ± 0.80), group activity related stressors (1.89 ± 0.9) and social related stressors (1.82 ± 0.09). The three least stressors of the respondents were drive and desire related stressors (1.00 ± 0.10), interpersonal and intrapersonal related stressors (1.14 ± 0.11) and teaching and learning related stressors (1.76 ± 0.11). The results revealed that academic related activities produced severe stress in the respondents while the others produced moderate stress except drive and desire which produced only mild stress in the respondents. Collectively, the respondents reported moderate levels of stress (1.78 ± 0.36).

Mean values for each stressor domain according to gender are presented in Table 4. Academic

**Table 4: Mean stress levels between males and females across the domains.**

Domains	Mean ± S.D	
	Male	Female
ARS	2.66 ± 0.84	3.21 ± 0.65
GARS	1.39 ± 0.83	2.06 ± 1.03
SRS	1.39 ± 1.07	1.97 ± 0.93
IRS	0.97 ± 1.11	1.20 ± 1.25
DRS	1.03 ± 0.98	0.99 ± 1.14
TLRS	1.51 ± 1.11	1.85 ± 1.16
	1.49 ± 0.99	1.88 ± 1.03

ARS (Academic Related Stressor), GARS (Group Activities Related Stressor), SRS (Social Related Stressor), IRS (Intrapersonal and Interpersonal Related Stressor), DRS (Drive and Desire Related Stressor), TLRS (Teaching and Learning Related Stressor).

**Table 5: Mean stress levels according to academic class across the domains.**

Domain	Mean ± S.D		
	2nd year	3rd year	4th year
ARS	3.04 ± 0.60	3.20 ± 0.82	2.92 ± 0.76
GARS	1.72 ± 0.81	2.17 ± 1.20	1.74 ± 0.93
SRS	1.51 ± 0.92	2.12 ± 0.99	1.79 ± 1.01
IRS	0.65 ± 0.80	1.49 ± 1.36	1.25 ± 1.25
DRS	0.82 ± 0.89	1.15 ± 1.31	1.00 ± 1.02
TLRS	1.51 ± 0.98	2.23 ± 1.13	1.46 ± 1.20
	1.54 ± 0.83	2.06 ± 1.14	1.69 ± 1.03

ARS (Academic Related Stressor), GARS (Group Activities Related Stressor), SRS (Social Related Stressor), IRS (Intrapersonal and Interpersonal Related Stressor), DRS (Drive and Desire Related Stressor), TLRS (Teaching and Learning Related Stressor).

related stressors were reported to produce high stress in male respondents (2.66 ± 0.84), while it produces severe stress in female respondents (3.21 ± 0.65). Group activity related stressors produced moderate stress in males (1.39 ± 0.83), but high stress (2.06 ± 1.03) in females. Social related stressors brought about moderate stress in both males (1.39 ± 1.07) and females (1.97 ± 0.93) respondents. Interpersonal and intrapersonal stressors in males resulted in mild stress (0.97 ± 1.11) but caused moderate stress in females (1.20 ± 1.25). On the contrast, drive and desire related stressors resulted in moderate stress (1.03 ± 0.98) in males but mild stress in females (0.99 ± 1.14). Teaching and learning related stressors resulted to moderate stress in both males (1.51 ± 1.11) and females (1.85 ± 1.16). Generally, both genders in the study had moderate levels of stress, males (1.49 ± 0.99) and females (1.88 ± 1.03).

Mean values for each stressor domain are presented in Table 5 according to academic year. Second (3.04 ± 0.60) and third (3.20 ± 0.82) year medical students both reported that academic related stressors caused them severe stress, while it resulted to high stress among

the fourth year students ( $2.92 \pm 0.76$ ). Group activity related stressors produced moderate stress in second ( $1.72 \pm 0.81$ ) and fourth ( $1.74 \pm 0.93$ ) year students, while it caused high stress in third year students ( $2.17 \pm 1.20$ ). Similarly, social related stressors produced moderate stress in both second ( $1.51 \pm 0.92$ ) and fourth ( $1.79 \pm 1.01$ ) year students but high stress in third year students ( $2.12 \pm 0.99$ ). Respondents in the second year reported that interpersonal and intrapersonal related stressors caused mild stress ( $0.65 \pm 0.80$ ), while respondents in the third ( $1.49 \pm 1.36$ ) and fourth ( $1.25 \pm 1.25$ ) years reported moderate stress from the same source. Furthermore, drive and desire generated mild stress in second ( $0.82 \pm 0.89$ ) and fourth ( $1.00 \pm 1.02$ ) year students, while in third year students it resulted in moderate stress ( $1.15 \pm 1.31$ ). Teaching and learning related stressors were reported to produce moderate stress in second ( $1.51 \pm 0.98$ ) and fourth ( $1.46 \pm 1.20$ ) year respondents, but high stress in third year respondents ( $2.23 \pm 1.13$ ). Collectively, respondents in the third year reportedly experienced high levels of stress ( $2.06 \pm 1.14$ ), while those in the second ( $1.54 \pm 0.83$ ) and fourth ( $1.69 \pm 1.03$ ) year experienced moderate stress levels.

## DISCUSSION

The MSSQ-20 has been applied to different student groups in different countries and has shown to be a reliable instrument. According to the results obtained from our study, all the six domains had Cronbach's alpha values ranging from 0.624 to 0.881, and an overall value of 0.889, which suggests that the scale and its items have high reliability and internal consistency respectively. The overall Cronbach's alpha value (0.889) falls above the accepted threshold for alpha values  $\geq 0.70$  [18,19]. This finding is similar to the results obtained by previous studies; Bob et al. [20], using the same instrument reported domains' Cronbach's alpha values ranging from 0.704 to 0.902 and an overall value of 0.884, while Pokhrel et al. [21] reported an overall Cronbach's alpha value of 0.91 and domains' values ranging from 0.70 to 0.89.

In general, the overall prevalence of stress among the students who participated in this study ranged between moderate to high. This

agrees with similar studies conducted in other medical student populations where stress was noted as a common occurrence [22-25]. The results from this study showed that the academic related stressors were the most frequent cause of stress, often producing severe stress in the medical students. Previous studies have also reported that the academic stressors are the main cause of stress in students, thereby amounts to the highest frequency of stress [25-27]. Other stressor domains generally produce less stress (ranging from mild to moderate), and are unlikely to result into any disastrous effects.

Results from our present study also agree with findings from other studies which reported that the stressors in the drive and desire domain produced the least stress [25, 26]. Aside academic related stressors, this present study reported that the next highest stressor domain is the group activity related stressors followed by social related stressors. This finding is comparable with a study [26] conducted among Bulgarian students where group activity related stressors was second to academic related stressors in terms of producing stress. On the contrary, other studies reported interpersonal related stressor [25] and teaching and learning related stressors [27] as being next to academic stressors in producing stress. The differences in results may be attributed to different educational contexts.

Furthermore, our results showed that female students experienced more stress than their male counterparts. This was in line with previous studies that used the same instrument as the one employed herein [26-29]. Also, our findings showed that males experienced less stress than female students in all the domains with the exception of the drive and desire domain where males experienced moderate stress while females experienced mild stress. Academic stressors produced severe stress in female, but high stress in males. Similarly, group activity related stressors resulted in moderate stress in females but only mild stress in male students. The possible reasons for a high prevalence of stress among female students may be linked to the assumption that several physiological conditions including stress, fear, and social phobia are more frequent in females and result in high levels of neuroticism than males [30]. More so, males are

generally less communicative in their feelings and have the tendency to express fear and react to stress not as quickly as females do [30, 31]. Stress levels in the respondents were moderate in the second and fourth year students but high in third year. For all classes, academic stressors produced the most stress while other stressors produced stress ranging from mild to moderate stress.

Stress among medical students is inevitable but needs to be kept within manageable limits. Other domains of stressors except academic related stressors may portend little or no consequential effects on the medical students, as mild to moderate stress are easily managed without any intervention. However, high stress can affect emotions leading to negative influences on school work. On the other hand, severe stress has a great potential to disturb students' emotions and completely disrupt their daily routines alongside personal and academic activities. Therefore, medical educators and administrators need to pay particular attention to stress emanating from academic activities of their students. Ohrstedt et al. [32] noted that students with uncontrolled stress levels performed poorly in their academics. The ability for students to perform well in their academics may be hindered if they are unable to cope with such stress, and the overall aim and objective of effective learning may not be achieved if students are over stressed.

The revision and amendment of some medical curricula activities such as assessments, timetables, curriculum content and hours allotted to teaching is highly encouraged and may be necessary to ensure they do not result in severe stress to medical students. Some peculiar activities like cadaver dissection in most medical curricula have been reported to be known stressors to medical students [33]. Such activities need to be arranged in way that reduces the stress characteristic of them. For instance, a study conducted by Anyanwu [34] suggested the inclusion of background music during dissection classes to ameliorate some undesired outcomes of cadaver dissection. Additional interventions in the form of providing specialist counseling services at medical faculties or colleges for students will assist in managing any stress experienced by students. Students must be

guided on how to balance their academic and social lives to ensure they are not burned out from academics activities. These approaches will be effective in managing mild to moderate stress experienced by medical students, thereby increasing their level of concentration, absorption, and retention of curricula contents during medical training.

### CONCLUSION

The MSSQ-20 employed in this study showed good reliability and consistency. Stress originating from academic related activities produced severe stress in medical students, with a high prevalence reported among female students as compared to their male counterparts. Though other stressor domains resulted into mild to moderate levels of stress, the adoption and use of effective strategies to manage stress experienced by medical students in their training is highly encouraged. Therefore, in preparing medical students to join the health workforce in the future, it is expedient that their training is conducted in a non-tensed learning environment and one devoid of high to severe levels of stress. This will have wider implications for their learning, retention and future professional practice.

### RECOMMENDATIONS

- ✓ Since the results of this study may not be generalised to the entire Nigerian and African population, we recommend the need to use the instrument to test for levels of stress and its sources at a multicenter level nationally and continentally.
- ✓ Further studies should be developed to compare the findings of the MSSQ-20 with other established instruments for stress evaluation.
- ✓ Findings from past, present, and future studies should be obtained and synchronized towards the formation of useful stress management strategies and guide for curricula review, policy draft and implementation, decision making, student support schemes, and guidance and counselling (G&C) services.

### CONFLICT OF INTEREST

There is no conflict of interest.

**CONSENT**

The participants were advised concerning the objective of the study and provided informed consent before their participation.

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