INTRODUCTION

Stress is the third human problem after death and taxes (1). Stress is a common phenomenon to mankind, no matter how rich one is. Eustress is a positive form of stress that is beneficial to an individual (2); it is a response when there is balance between what one has and the demands that come across and is psychologically boosting. On the other hand, Selye defined distress as that form of stress which an individual fails to cope with (3).

Tertiary institution has been considered as highly stressful environment to students (4). Studying in tertiary institutions is one of the stressful stages of life characterised by lifestyle changes of the students which are
stress stimulating agents (5). The students are exposed to many stressful events such as meeting new faces, staying away from home, family and studying (6).

Academic stress and low social support are the highest sources of stress to the clinical medical and physiotherapy students with medical students being more stressed by academic workload and physiotherapy students by low social support. The study further cited physiotherapy students to have higher resilience than the medical students (7). Similarly, a study by Othman et al. (8) showed that academic requirements are the major sources of stress to health science students.

Clinical phase of study is perceived to be more stressful than the pre-clinical phase (9). Female students had higher stress than male students in response to academic stressors (10). The distress affecting health students can make them personally and socially incapacitated which is not good to the future of health sector as these students are thought to be the future health personnel. However; there is dearth of literature assessing stress in allied sciences training especially in northern Nigeria and hence the need of such study. The study is significant in the sense that it highlighted the level and sources of stress among the students which may be used to develop positive coping strategy. The study aimed to determine the level and sources of stress among allied health sciences.

**METHODOLOGY**

**Study Design**

The study was a cross-sectional study.

**Population of Study**

The population of the study were the full time undergraduate students of the Faculty of Allied Health Sciences (Physiotherapy, Nursing, Medical Laboratory, Science, Radiography, and Optometry) both clinical and pre-clinical students.

**Sample Size and Sampling Techniques**

The sample size was calculated using the formula, $n = \frac{Z^2 P (1-P)}{e^2}$

where

- $n$ = sample size
- $N$ = population size = 1,700 (570 pre-clinical and 1,130 clinical students)
- $e$ = error margin which is the alpha value 0.05
- $P$ = prevalence of stress among Nigerian medical university students 23% (11).

$$1.96^2 \times 0.23(1-0.23)/0.05^2 = 272$$

The sampling technique used was stratified sampling technique since the population was heterogeneous. The students were divided into two strata, of pre-clinical and clinical students. Thereafter, a simple random sampling, a form of probability sampling technique was employed to draw the final sample from each stratum. The study was carried out after mid semester break when half of the syllabus was expected to be covered.

**Setting**

Faculty of Allied Health Sciences is one of the five faculties of College of Health Sciences at Bayero University Kano. It comprises five departments namely; Physiotherapy, Radiography, Nursing, Medical Laboratory Science, and Optometry.

**Data Collection Instrument**

The data collection instrument was a structured and self-administered questionnaire consisting of two sections; A and B. Section A enquired the student’s demographic data while Section B enquired the stressors as perceived by the students using Medical Student Stressors Questionnaire (MSSQ). The MSSQ
Data Collection Procedure

An introductory letter was collected from Department of Physiotherapy, Bayero University Kano and was taken to ethical approval committee of College of Health Sciences for ethical clearance. Participation was made voluntary by using informed consent form. The questionnaires were distributed to allied health students that consented to participate and were present at the faculty premises, old campus (Mamud Tukur theatre or Biochemistry complex) where the clinical and pre-clinical students take their lectures respectively. Students were given 30 minutes to answer the questionnaire thereafter, the questionnaires were collected. Two hundred and eighty questionnaires were distributed but 230 were retrieved.

Data Analysis

Data analysis was done in SPSS Version 20 utilising both descriptive and inferential statistics. Frequency distribution tables, percentages, means and standard deviations were the descriptive statistics used for data summary and illustrated using charts while inferential statistics of independent t-test was used to compare pre-clinical and clinical student’s level of stress and sources of stress, independent t-test to compare between male and female student’s level of stress and sources of stress, and ANOVA to compare the differences between the various departments. All assumptions were made at 0.05 significance level.

RESULTS

A total number of 280 students were proposed to participate in this study but only 230 students completed and returned the questionnaires giving a response rate of 82%.
Socio-demographic Characteristics of the Students

The socio-demographic characteristics of the students are summarised in Table 1. Two hundred and thirty students participated in this study, majority 113 (49.1%) were within the age range of 21–25 years while 68 (29.6%) were within the age range of 16–20 years, 44 (19.1%) were within the age range of 26–30 years, and 5 (2.2%) were above 30 years of age respectively. Of the respondent’s gender, 116 (50.4%) were male and 114 (49.6%) were female. Regarding the level of study (academic year), 300 level students were the majority of the participants 68 (29.6%), followed by 200 level students 59 (25.7%), then 400 level students 42 (18.3%), 100 level students 33 (14.5%) while, the minority of the students 28 (12.2%) were 500 level students. Nursing students has the highest participants 89 (38.7%), followed by Physiotherapy 67 (29.1%), Medical Laboratory Science 26 (11.3%), Optometry 25 (10.9%), and least Radiography 23 (10%). One hundred and twenty five students (54.3%) were from clinical and 105 (45.7%) from pre-clinical.

Perceived Stress by the Students (Level)

Of 230 students that participated in the study, 18 (7.8%) are mildly stressed, 113 (49.1%) are moderately stressed, 98 (42.6%) are highly stressed, and only 1 (0.4%) is severely stressed as can be seen in Figure 1.

Stressors as Perceived by the Students

Table 2 showed that ARS has the highest score which is 2.04, indicating that it was perceived as the highest stressor to the students. The other stressors were perceived as causing moderate stress by the students. In descending order of other stressors, TLRS mean of 1.87 followed by SRS (1.73), IRS (1.72), GARS (1.69), and DRS (1.43). Based on the results, it appeared that the major sources of stress experienced by the students were related to academic requirements.

Comparison of Level of Stress between Pre-clinical and Clinical Student’s

Table 3 shows the result of independent t-test differential analysis in perceived stress between pre-clinical and clinical students. There was significant difference in the level of pre-clinical and clinical student’s perceived stress ($p < 0.05$).

### Table 1: Socio-demographic characteristics of the students

| Variables | N    | %   |
|-----------|------|-----|
| Age       |      |     |
| 16–20     | 68   | 29.6|
| 21–25     | 113  | 49.1|
| 26–30     | 44   | 19.1|
| Others    | 5    | 2.2 |
| Gender    |      |     |
| Male      | 116  | 50.4|
| Female    | 114  | 49.6|
| Level of study | |     |
| 100       | 33   | 14.3|
| 200       | 59   | 25.7|
| 300       | 68   | 29.6|
| 400       | 42   | 18.3|
| 500       | 28   | 12.2|
| Department |      |     |
| Physiotherapy | 67 | 29.1|
| Radiography | 23  | 10.0|
| Medical lab | 26  | 11.3|
| Nursing    | 89   | 38.7|
| Optometry  | 25   | 10.9|
| Phase     |      |     |
| Pre-clinical | 105 | 45.7|
| Clinical  | 125  | 54.3|
| Tribe     |      |     |
| Hausa     | 176  | 76.5|
| Yoruba    | 11   | 4.8 |
| Igbo      | 1    | 0.4 |
| Others    | 42   | 18.3|

Note: n = frequency; % = percentage
Level of stress among Faculty of Allied Health Sciences students

Figure 1: Percentage of student’s perceived of stress.

Table 2: Sources of stress based on domains of stress

| Domain | Mean | Std. Dev |
|--------|------|----------|
| ARS    | 2.04 | 0.63     |
| IRS    | 1.72 | 0.92     |
| TLRS   | 1.87 | 0.77     |
| SRS    | 1.73 | 0.71     |
| DRS    | 1.43 | 0.93     |
| GARS   | 1.68 | 0.76     |

Note: Score interpretation: 0.00–1.00 = Mild; 1.01–2.00 = Moderate; 2.01–3.00 = High; 3.01–4.00 = Severe

Table 3: Independent t-test differential analysis in level of stress between pre-clinical and clinical students

| Stressors | Phase     | Mean | SD  | t-cal | p-value |
|-----------|-----------|------|-----|-------|---------|
| Level of stress | Pre-clinical | 1.91 | 0.55 | 3.57  | 0.00    |
|            | Clinical  | 1.70 | 0.57 |       |         |

Comparison in stressors (sources of stress)

| Stressors | Phase     | Mean | SD  | t-cal | p-value |
|-----------|-----------|------|-----|-------|---------|
| ARS       | Pre-clinical | 2.12 | 0.58 | 1.89  | 0.06    |
|           | Clinical   | 1.96 | 0.66 |       |         |
| IRS       | Pre-clinical | 1.92 | 0.98 | 3.03  | 0.03    |
|           | Clinical   | 1.56 | 0.84 |       |         |
| TLRS      | Pre-clinical | 2.02 | 0.78 | 2.86  | 0.05    |
|           | Clinical   | 1.73 | 0.74 |       |         |
| SRS       | Pre-clinical | 1.92 | 0.76 | 3.79  | 0.05    |
|           | Clinical   | 1.57 | 0.63 |       |         |
| DRS       | Pre-clinical | 1.66 | 0.95 | 3.46  | 0.01    |
|           | Clinical   | 1.24 | 0.89 |       |         |
| GARS      | Pre-clinical | 1.79 | 0.73 | 1.82  | 0.070   |
|           | Clinical   | 1.60 | 0.79 |       |         |
Comparison of Stressors between Pre-clinical and Clinical Student’s

Table 3 shows the result of independent t-test differential analysis of stressors between pre-clinical and clinical students. There was no significant difference in ARS, TLRS, SRS and GRS score of pre-clinical and clinical students (p > 0.05) but there was a significant difference in IRS and DRS score of pre-clinical and clinical (p > 0.05).

Comparison between Male and Female Students’ Level of Stress

Table 4 shows the result of independent t-test differential analysis of perceived stress between male and female students. There was no significant difference in perceived stress between male and female students (p > 0.05).

Comparison between Male and Female Students’ Stressors

Table 4 shows the result of independent t-test differential analysis of stressors between male and female students. There was significant difference in the ARS score of male and female students (p = 0.041) but no significant difference in all other domain (p > 0.05).

Comparison of Level of Stress among Various Departments of Faculty of Allied Health Sciences

The result of one-way ANOVA shows no significant difference of perceived stress among the various departments of Faculty of Allied Health Sciences (p > 0.05) as can be seen in Table 5.

Comparison of Stressors among Various Departments of Faculty of Allied Health Sciences

Table 5 shows the result of one-way ANOVA to compare the stressors among various departments of Faculty of Allied Health Sciences. There was no significant difference across all domains of MSSQ among various departments of Faculty of Allied Health Sciences in (p > 0.05).

DISCUSSION

The study reveals that majority of the students of Faculty of Allied Health

| Stressors          | Gender | X  | SD  | t-cal | p-value |
|--------------------|--------|----|-----|-------|---------|
| Level of stress    | Male   | 1.79| 0.85| −1.01 | 0.32    |
|                    | Female | 1.86| 0.58|       |         |

Table 4: Independent t-test differential analysis in level of stress between male and female students

Comparison of stressors (sources of stress)

| Stressors | Gender | X       | SD  | t-cal | p-value |
|-----------|--------|---------|-----|-------|---------|
| ARS       | Male   | 1.95    | 0.66| −2.05 | 0.04    |
|           | Female | 2.12    | 0.58|       |         |
| IRS       | Male   | 1.73    | 0.83| 0.141 | 0.89    |
|           | Female | 1.73    | 1.02|       |         |
| TLRS      | Male   | 1.80    | 0.75| −1.33 | 0.19    |
|           | Female | 1.93    | 0.79|       |         |
| SRS       | Male   | 1.97    | 0.74| 0.15  | 0.88    |
|           | Female | 1.73    | 0.70|       |         |
| DRS       | Male   | 4.46    | 0.93| 0.53  | 0.60    |
|           | Female | 1.40    | 0.94|       |         |
| GRS       | Male   | 1.65    | 0.79| −0.83 | 0.41    |
|           | Female | 1.73    | 0.75|       |         |
The pre-clinical phase was found out to be more stressful than clinical phase of study. This may be due to the fact that the students are new to the university environment and might not be familiar with new medical terms they are introduced to. This is consistent with the findings of Borjalilu, Mohammadi and Mojtahedzadeh (9) but contrary to Koochaki et al, which found no significant differences in the level of stress among these phases of study (15).

Pre-clinical students experience more stress in IRS (this may be due to the fact that the students are new to one another as such may not entertain the mistakes of one another which may result into physical or emotional abuse) and DRS (this may due to the fact most of the student in Faculty of Allied Health Sciences did not choose the programmes they are now and as such during their pre-clinical phase; they do not know much about the programmes as such become distressed, but when they move to the clinical phase and found out more about the programmes they tend to be satisfied) but there was no significance differences in ARS, SRS, TLRS and DRS.

### Table 5: ANOVA differential analysis in level of stress among the departments of Faculty of Allied Health Sciences

| Stressors | Variables | Sum of squares | Df | Mean square | F   | p-value |
|-----------|-----------|----------------|----|-------------|-----|---------|
| Level of stress | Between groups | 0.98 | 4 | 0.24 | 0.73 | 0.57 |
| | Within groups | 75.59 | 225 | 0.33 | | |
| Comparison of stressors (sources of stress) | | | | | | |
| ARS | Between groups | 0.93 | 4 | 0.23 | 0.58 | 0.67 |
| | Within groups | 89.28 | 225 | 0.39 | | |
| IRS | Between groups | 3.12 | 4 | 0.78 | 0.92 | 0.46 |
| | Within groups | 191.96 | 225 | 0.85 | | |
| TLRs | Between groups | 2.01 | 4 | 0.50 | 0.85 | 0.50 |
| | Within groups | 133.04 | 225 | 0.59 | | |
| SRS | Between groups | 3.09 | 4 | 0.77 | 1.52 | 0.20 |
| | Within groups | 113.96 | 225 | 0.51 | | |
| DRS | Between groups | 1.16 | 4 | 0.29 | 0.33 | 0.86 |
| | Within groups | 198.34 | 225 | 0.88 | | |
| GRS | Between groups | 5.16 | 4 | 1.29 | 2.23 | 0.07 |
| | Within groups | 130.14 | 225 | 0.58 | | |

Sciences student’s level of stress ranges from moderate to high level of stress. This is similar with findings of Sohail which indicated that 71.6% of medical students had moderate stress (12) and similar to the findings of Othman et al. which found out that allied health sciences students experiences moderate to high level of stress (8). However, the result is contrary to the studies of Schafer and Fisher that reported strong (high) relationship between stress and college students (13, 14).
This study found no significant difference in the level of male and female students' stress which is similar to findings of Niemi and Vainiomäki (16) and Firth (17), but contrary to other studies such as Abu-Helalah et al. (18), Yusoff and Abdul Rahim (10). However, the female student's experiences more academic stress than their male counterpart and this is consistent with other studies, Abu-Helalah et al. (18), and Yusoff and Abdul Rahim (10). But there was no significance differences in all other domains. This may be as a result of male constituting most of the participants.

This study found no significant difference in the level of stress among the various departments of Faculty of Allied Health Sciences which is inconsistent with a study by Omigbodun et al. (19). There was also no significant difference across all domains of MSSQ among the departments of Faculty of Allied Health Sciences.

LIMITATIONS

The study was conducted only in one university, Bayero University Kano and as such generalising to the whole Nigerian allied health students should be done with care. Furthermore, the study was carried out using a structured questionnaire developed elsewhere as such the study may not explore some stressors specific to the setting.

CONCLUSION AND RECOMMENDATION

This study found out that the allied health sciences students experienced moderate to high level of stress. The highest stressor was academic stress. Therefore, emphasis should be put in increasing the length of semesters or revising the criteria for promotion to the next level. This will ensure that our curriculum and other activities set for allied health sciences students are in the range of their coping limit. This will avoid any acute or chronic stress which eventually will affect their academic performance and later their work performance in life. The allied health sciences curriculum should be developed with the consideration of all domains that contribute to the stress especially those that are academic related stressor.

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