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Stress Coping Strategies Amidst Preparation for Examinations: An Analytical Study among Undergraduate Medical Students

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Abstract

Background: Many rewarding life activities are associated with some stress, and academic activities are no exception. This study aimed to evaluate the sources of stress, stress-coping strategies adopted, hours of personal

study. And outcome of students examinations, among undergraduate medical students in a private medical university in the third quarter of year 2022.

Materials and Methods: A questionnaire-based cross-sectional analytical study was conducted in Port Harcourt, Nigeria at a private medical university using total population of students.

Results: A total of 237 students participated in this study, and 91 (38%) were males while 146 (62%) were females. Seventy-three (30.8%) studied for 2 – 4 hours, 66 (27.8%) did so for 4 – 6 hours, and 68 (28.7%) studied for >6 hours per day, one “week” to the date of examination. Sources of stress identified were academic, personal, social and family-related. A wide range of stress-coping strategies were adopted by the students; 50% of the respondents strongly agreed to engaging in religious-meditation / praying and playing or listening to music (both one week and a day to their examinations). Two hundred and nine (92.4%) respondents had an average score of 51% and above in their first and last examinations using their stress-coping strategies. Forty (16.8%) respondents scored >80% as average score in their first examination, and 46 (19.4%) in their last examination.

Conclusion: The identified sources of stress were numerous most of which were academic, personal, social and family-related issues, and a wide-range of stress-coping strategies were used. Religious meditation / praying and playing / listening to music were common stress-coping strategies adopted by more than 50% of the students both a week and a day to their examinations. Using their preferred stress-coping strategies, majority of the students had scores of 51-80% in their last examinations.

Keywords

Stress coping strategies; Medical students; Private university; Port harcourt; Nigeria.

Introduction

Many rewarding life activities are associated with some stress, and academic activities are no exception. When a drive to achieve set goals amidst daunting challenges of much academic work load within a regulated time frame is associated with threat of withdrawal following failure to beat pre-set pass mark as is often the case in medical education, it can possibly be referred to as “medicated stress”. Fifty seven percent (57%) of medical students were found to be under psychological stress and 23% had clinical depression in a United States-based study [1]. The work load is known to be high and therefore could affect the overall performance of the students with known consequences, as reported in many other studies [2-7]. This is often associated with mental, physical, financial, psychologic, and social demands to beat the hurdles and achieve set goals in medical training. The impact of this academic stress was reported to be higher among female students in a study carried out in China, [8] although it was higher among males in another independent study, [9] and yet another found no statistical difference in the sexes [10]. Self-medication with drugs like caffeine, nicotine, etc., has been reported among these students [11].

Although stress has both positive and negative components, with the positive side (eustress) being capable of enabling body alarm to enhance performance and creativity, [12] most of the time, attention is often drawn to the negative side due to its capacity to cripple the sufferer. Individuals and institutions therefore evolve measures to tackle stress based on their paradigm and environment. In the academic environment, stress factors and coping strategies among students may vary. Financial and relationship problems were the two most common source of stress reported in a Malaysian study among medical students [13]. A study done in a private medical university in Nigeria, reported high perceived stress among first year medical students with females being more affected [14]. In another Nigerian medical school, about 95% of the students were known to have adopted some stress-coping strategies during the COVID-19 pandemic [15].

It is a known fact that medical students undergo special training in the university system. This is understandably due to their pass mark being fixed at fifty percent (relatively higher than the average university pass mark), relatively higher academic demands, longer duration of training, relatively higher financial burden, and the associated psychosocial implications. How do students cope amidst these challenges in our environment? What stress-coping strategies work for them? This study explored these issues and aimed at evaluating the sources of stress, stress-coping strategies adopted, hours of personal study, and outcome of students' examinations, among undergraduate medical students in a private medical university in the third quarter of year 2022.

Materials and Methods

Research Design

A cross-sectional analytical observational study.

Study Area

The study was conducted in Port Harcourt, the Capital City of Rivers State, Nigeria. Rivers State is a major crude-oil producing State like others in the Niger Delta region of Nigeria, housing many multinational crude-oil exploring, processing and marketing companies. The activities of these companies and the accompanying economic potentials attracts human traffic from within and outside the country.

Study Sites

The study site was at the PAMO University of Medical Sciences, a private medical university in Port Harcourt, Nigeria.

Study Population/Participants

Undergraduate medical students from the first year to the fifth year constituted the study population. This was a new private medical institution which only had students up to 500 level at the time of the study.

Sample Size Determination

Total population of students who gave consent for the study was used.

Study Instrument

Semi-structured self-administered questionnaire was used for collection of data. The study instrument was partly adapted from pre-validated questionnaire used in a study by Mona Soliman [16].

Variables

Information on socio-demographics, average daily hours of preparations for examinations, sources of stress, stress-coping strategies, students' examination average score (outcome of students' examinations results) were collated.

Bias

Only students in a private university were used for this study. This is intended to allow conclusions to be drawn among students with similar experiences.

Validity/Reliability of Instrument

The study instrument was scrutinized by all authors and piloted in similar institutional environment and corrections made before commencement of study. The Cronbach alpha (in SPSS) was used for the validity of the study instrument. The Cronbach alpha was 0.995 showing that the collection of items was consistently measured with the same characteristics, and from the item statistics table (see appendix), the corrected item-total correlation for all the questions were above 0.900, and thus, no questions or items was deleted.

Data Analysis

Descriptive statistics was used in analyzing the research questions in this study. The 5-likert scale (a type of rating scale used to measure attitudes or opinions) was used. The decision rule for the 5-likert scale was based on the "criterion mean" score. Value of 3.00 and above was considered as benchmark for the "do not reject", while a mean score below 3.00 was "rejected". The Cronbach's alpha coefficient was used to measure the internal consistency or reliability of a set of survey items - to determine whether a collection of items consistently measures the same characteristics on a standardized 0 to 1 scale. "0" means no relationship or correlation, and "1" means perfect relationship or perfectly correlated, and the benchmark was "0.7". The data was analyzed using regression analysis (identifying the relationship between a dependent variable; source of stress and the independent variables; stress coping strategies "a week" and "a day" to the exam), and the outcome was used in taking decisions on the stress coping strategies. The Statistical Products and Services Solution (SPSS) version 21 and Microsoft excel were used in carrying out the analysis.

Results

Socio-demographic data of respondents shown in Table 1.

	Male	Female	Total	Percentage (%)
Gender	91 (38%)	146 (-62%)	237	100
Age (in Years)				
14 – 19 Years	36	89	125	53
20 – 24 Years	47	42	89	38
25 – 29 Years	7	13	20	8
30 – 34 Years	1	2	3	1
Total	91	146	237	100
Marital Status				
Single	87	139	226	95
Married	4	3	7	3
Complicated	0	2	2	1
Separated	0	1	1	1
Religion				
Christianity	84	138	222	94
Islamic	2	4	6	3
Buddhist	0	1	1	0.4
Atheist	1	1	2	0.8
Grail Messenger	0	1	1	0.4
Traditionalist	1	2	3	1.3
Level in training				
100 Level	23	42	65	28
200 Level	5	9	14	6
300 Level	3	7	10	4
400 Level	26	45	71	30
500 Level	20	57	77	32

Table 1: Socio-demographic data of respondents.

Table 1 shows the socio-demographic characteristics of the students. A total of 237 students participated in this study. Ninety-one (38%) were males and 146 (62%) were female. One hundred and twenty-five (53%) respondents were within 14 – 19 years age groups, 89 (38%) were in the 20 – 24 years age bracket, 20 (8%) were within 25 – 29 years, and 3 (1%) were aged 30 – 34 years. Two hundred and twenty-six (95%) were single, and 222 (94%) were Christians. Respondents' level of training varied from 100 level (65 = 28%) to 500 level (77 = 32%).

How many hours per day do you usually put into personal studies (readings) a “week” to the date of examination?				
	Male	Female	Total	Percentage (%)
<2 hours per day	12	18	30	12.7
2-4 hours per day	24	49	73	30.8
4-6 hours per day	25	41	66	27.8
>6 hours per day	30	38	68	28.7
Total	91	146	237	100
How many hours per day do you usually put into personal studies (readings) a “day” to the date of examination?				
	Male	Female	Total	Percentage (%)
<2 hours per day	9	15	24	10.1
2-4 hours per day	14	23	37	15.6
4-6 hours per day	25	38	63	26.6
>6 hours per day	43	70	113	47.7
Total	91	146	237	100
Outcome of student’s examinations results				
What was your average score (result) of your first examination using your stress-coping strategies amidst the stressful environment?				
	Male	Female	Total	
< 50%	8	10	18 (7.6%)	
51 – 60%	22	36	58 (24.5%)	
61 – 70%	29	48	77 (32.5%)	
71 – 80%	17	27	44 (18.6%)	
>80%	15	25	40 (16.8%)	
Total	91	146	237 (100%)	

What was your average score (result) of your last examination using your stress-coping strategies amidst the stressful environment?

	Male	Female	Total
< 50%	7	11	18 (7.6%)
51 – 60%	22	36	58 (24.5%)
61 – 70%	27	44	71 (29.9%)
71 – 80%	17	27	44 (18.6%)
>80%	18	28	46 (19.4%)
Total	91	146	237 (100%)

Table 2: Hours of personal study and Outcome of student’s examinations results.

Table 2 shows respondents hours of personal studies. Thirty (12.7%) respondents studied for < 2hours/day a “week” to the date of examination, 73 (30.8%) studied for 2 – 4hours, 66 (27.8%) did so for 4 – 6hours, and 68 (28.7%) studied for >6hours per day a “week” to the date of examination. However, a “day” to the date of examination 24 (10.1%) had < 2hours/day of personal studies, 37 (15.6%) studied for 2 – 4hours, 63 (26.6%) studied for 4 – 6hours, and 113 (47.7%) respondents studied for >6hours. The female respondents devoted higher number of hours to personal studies than their male counterpart, a week and a day to examinations. Table 2 also shows the outcome of the students’ examination results. Two hundred and nine (92.4%) respondents had average score of 51% and above in their first and last examination using their preferred stress-coping strategies. Forty (16.8%) respondents scored >80% as average score in their first examination, and 46 (19.4%) in their last examination.

Sources of Stress	Strongly Agree	Agree	Sometimes True	Disagree	Strongly Disagree	Mean	Remarks
Frequent Tests	79(33%)	47(20%)	72(30%)	32(14%)	7(3%)	3.67	Do not Reject (DNR)
Lack of time to study the material to be tested	114(48%)	62(26%)	38(16%)	20(8%)	3(1%)	4.11	DNR
Studying into the night	108(46%)	52(22%)	41(17%)	26(12%)	10(4%)	3.94	DNR
Missing class	24(10%)	39(16%)	51(22%)	66(28%)	57(24%)	2.61	Rejected
The number of materials covered on test	125(53%)	58(24%)	33(14%)	16(7%)	5(2%)	4.19	DNR
Multiple tests at the same time	116(49%)	55(23%)	38(16%)	24(10%)	4(2%)	4.07	DNR
Test subject matters go beyond what was covered in the classroom	72(30%)	43(18%)	63(27%)	42(18%)	17(7%)	3.47	DNR
The number of details required by the teachers	85 (39%)	71 (30%)	63 (27%)	11 (5%)	7 (3%)	3.91	DNR
Dealing with new forms of assessment such the OSPE and PBL	68 (29%)	80 (34%)	56 (24%)	17 (7%)	16 (7%)	3.70	DNR
The large amount of extra-curricular activities carried out by Students	19 (8%)	32 (14%)	51 (22%)	72 (30%)	63 (27%)	2.45	Rejected
Daily activities unrelated to school (paying bills, cleaning house, etc.	29 (12%)	31 (13%)	54 (22%)	73 (31%)	50 (21%)	2.64	Rejected
Teachers' lack of time for	24	27	57	84	45	2.58	Rejected

students	(10%)	(11%)	(24%)	(35%)	(19%)		
Feelings of guilt because of giving more priority to personal life than to studies	43 (18%)	46 (19%)	81 (34%)	44 (14%)	23 (10%)	3.17	DNR
Heavy demand of students to study	98 (41%)	63 (27%)	50 (21%)	20 (8%)	6 (3%)	4.80	DNR
Concern about trying to learn all the content	139 (59%)	54 (23%)	38 (16%)	4 (2%)	2 (1%)	4.36	DNR
Difficulty in memorizing the contents presented	106 (45%)	73 (31%)	39 (16%)	16 (7%)	3 (1%)	3.97	DNR
Studying material that students consider unnecessary for their professional qualifications	85 (36%)	63 (27%)	52 (22%)	27 (11%)	10 (4%)	3.78	DNR
Competitiveness among students	75 (32%)	47 (20%)	60 (25%)	43 (18%)	12 (5%)	3.55	DNR
Waking up very early to go to school	96 (41%)	52 (22%)	44 (19%)	39 (16%)	6 (3%)	3.81	DNR
Family problems	53(22%)	48(20%)	71(30%)	43(18%)	22(9%)	3.28	DNR
Marriage and children	33(14%)	21(9%)	41(17%)	58(24%)	84(35%)	2.41	Rejected
High parental expectations	99(42%)	67(28%)	31(13%)	15(2%)	25(11%)	3.84	DNR
Relationship problems with students	53 (22%)	47 (20%)	54 (23%)	47 (20%)	36 (15%)	3.14	DNR
Relationship problems with lecturer	46 (19%)	39 (16%)	39 (16%)	60 (25%)	53 (22%)	2.85	Rejected

Table 3: Sources of stress among respondents.

The sources of stress among respondents are shown in Table 3. Some sources of stress met the criterion mean benchmark of 3.00, and they include: frequent tests, lack of time to study the material to be tested, studying into the night, the amount of materials covered on test, multiple tests at the same time, test subject matter goes beyond what was covered in the classroom, the number of details required by the teachers, dealing with new forms of assessment such the objective structured practical examination (OSPE) and project based learning (PBL), feeling of guilt because of giving more priority to personal life than to studies, heavy demand of students to study, concern about trying to learn all the content, studying material that students consider unnecessary for their professional qualifications, competitiveness among students, waking up very early to go to school, family problems, high parental expectations, and relationship problems with students. However, some others did not meet the criterion mean bench mark.

Coping strategies	Strongly Agree	Agree	Sometimes True	Disagree	Strongly Disagree	Mean	Remarks
Identifying with models of physicians who prioritize their own quality of life	68 (29%)	48 (20%)	63 (27%)	43 (18%)	15 (6%)	3.47	Do not Reject (DNR)
Study the minimum needed to pass subjects	71 (30%)	64 (27%)	54 (23%)	46 (19%)	2 (1%)	3.66	DNR
Respect their own physical limits, avoiding spending many hours without sleeping	89 (38%)	58 (24%)	51 (22%)	26 (11%)	13 (5%)	3.78	DNR
Avoiding comparing grades with other students	102 (43%)	69 (29%)	46 (19%)	15 (6%)	5 (2%)	4.05	DNR
Going to the movies on weekends	44 (19%)	29 (12%)	59 (25%)	49 (21%)	56 (24%)	2.81	Rejected
Going for walks	67 (28%)	62 (26%)	58 (24%)	22 (9%)	28 (12%)	3.50	DNR
Getting together with families and friends	62 (26%)	47 (20%)	51 (22%)	38 (16%)	39 (16%)	3.24	DNR
Cooking	21 (9%)	30 (13%)	34 (14%)	80 (34%)	72 (30%)	2.36	Rejected
Eating well	90 (38%)	49 (20%)	33 (14%)	29 (12%)	36 (15%)	3.54	DNR
Skipping classes to perform other activities that gives pleasure (sports, etc.)	27 (11%)	19 (8%)	35 (15%)	77 (32%)	79 (33%)	2.32	Rejected
Reading of literary non-medical works	55 (23%)	37 (16%)	69 (29%)	39 (16%)	37 (16%)	3.14	DNR
Playing or listening to music	119 (50%)	49 (21%)	43 (18%)	12 (5%)	15 (6%)	4.05	DNR
Playing or watching football games on television	56 (24%)	34 (14%)	57 (24%)	54 (23%)	38 (16%)	3.09	DNR
Going out to dinner	52 (22%)	45 (19%)	35 (15%)	63 (27%)	42 (18%)	3.01	DNRd
Going to Academic Guidance Office	29 (12%)	28 (12%)	47 (20%)	59 (25%)	74 (31%)	2.49	Rejected
Student Council	32 (13%)	23 (10%)	49 (21%)	57 (24%)	76 (32%)	2.49	Rejected

Student Rights	34 (14%)	31 (13%)	44 (19%)	58 (24%)	70 (30%)	2.58	Rejected
Stay away from reading for some time	63 (27%)	37 (16%)	50 (21%)	36 (15%)	51 (22%)	3.11	DNR
Sexual activities	39 (16%)	16 (7%)	30 (13%)	59 (25%)	93 (39%)	2.36	Rejected
Humor	94 (40%)	64 (27%)	50 (21%)	17 (7%)	15 (6%)	3.90	DNR
Religion-Meditation / Praying	125 (55%)	55 (23%)	28 (12%)	11 (5%)	18 (8%)	4.09	DNR
Substance abuse	39 (16%)	16 (7%)	30 (13%)	54 (54%)	98 (4%)	2.34	Rejected

Table 4: Stress Coping Strategies: "A Week" before the Examination.

Table 4 shows the respondents' coping strategies "a week" before the date of the examination. The percentage of each of the scales on the itemized coping strategies were as well shown. Some coping-strategies met the criterion mean benchmark of 3.00 and these include: identifying with models of physicians who prioritize their own quality of life; studying the minimum needed to pass subjects; respecting by their own physical limits, avoiding spending many hours without sleeping; avoiding comparing grades with other students; going for walks; getting together with families and friends; eating well; reading of literary non-medical works; playing or listening to music; playing or watching football games on television; going out to dinner; staying away from reading for some time; making humor; and practicing religious meditation / praying. Some others did not meet the criterion mean benchmark. However, the stress-coping strategies "a week" before the date of examination as itemized in Table 4 were "Accepted, Not Rejected", since the grand mean; 3.15 was greater than the criterion mean (3.00).

Coping Strategies	Strongly Agree	Agree	Sometimes True	Disagree	Strongly Disagree	Mean	Remarks
Identifying with models of physicians who prioritize their own quality of life	75 (3%)	40 (17%)	55 (23%)	42 (18%)	25 (11%)	3.41	Do not Reject (DNR)
Study the minimum needed to pass subjects	85 (36%)	71 (30%)	37 (16%)	35 (15%)	9 (4%)	3.79	Do not Reject
Respect their own physical limits, avoiding spending many hours without sleeping	78 (33%)	50 (21%)	57 (24%)	31 (13%)	21 (9%)	3.56	DNR
Avoiding comparing grades with other students	112 (47%)	55 (23%)	29 (12%)	25 (11%)	16 (7%)	3.93	DNR
Going to the movies on weekends	37 (16%)	22 (9%)	31 (13%)	66 (28%)	81 (34%)	2.44	Rejected
Going for walks	59 (25%)	52 (22%)	32 (14%)	46 (19%)	48 (20%)	3.12	DNR

Getting together with families and friends	48 (14%)	33 (14%)	46 (19%)	50 (21%)	60 (25%)	2.83	Rejected
Cooking	33 (14%)	16 (7%)	38 (16%)	65 (27%)	85 (36%)	2.35	Rejected
Eating well	97 (41%)	42 (18%)	39 (16%)	23 (10%)	36 (15%)	3.54	DNR
Skipping classes to perform other activities that give pleasure (sports, etc.)	29 (12%)	17 (7%)	30 (13%)	65 (27%)	96 (41%)	2.23	Rejected
Reading of literary non-medical works	43 (18%)	24 (10%)	51 (22%)	49 (21%)	70 (30%)	2.74	Rejected
Playing or listening to music	104 (44%)	41 (17%)	49 (21%)	23 (10%)	20 (8%)	3.78	DNR
Playing or watching football games on television	44 (19%)	17 (7%)	47 (20%)	55 (23%)	74 (31%)	2.59	Rejected
Going out to dinner	41 (17%)	30 (13%)	44 (19%)	66 (28%)	56 (24%)	2.72	Rejected
Going to Academic Guidance Office	31 (13%)	19 (8%)	39 (16%)	60 (25%)	88 (37%)	2.35	Rejected
Student Council	30 (13%)	23 (10%)	37 (16%)	60 (25%)	87 (37%)	2.36	Rejected
Student Rights	33 (14%)	20 (8%)	32 (14%)	80 (34%)	72 (30%)	2.41	Rejected
Stay away from reading for some time	39 (16%)	30 (13%)	38 (16%)	58 (24%)	72 (30%)	2.61	Rejected
Sexual activities	27 (11%)	21 (9%)	38 (16%)	46 (19%)	105 (44%)	2.24	Rejected
Humor	75 (32%)	49 (21%)	51 (22%)	28 (12%)	34 (14%)	3.43	DNR
Religion-Meditation/Praying	138 (58%)	39 (16%)	26 (11%)	14 (6%)	20 (8%)	4.10	DNR
Substance abuse	17 (7%)	12 (5%)	22 (9%)	32 (14%)	154 (65%)	1.75	Rejected

Table 5: Stress coping strategies: “A Day” before the examination.

Table 5 shows respondents’ coping strategies and percentage of each of the scales on the itemized coping strategies “a day” before the date of the examination. Those that met the criterion mean benchmark of 3.00 were: identifying with models of physicians who prioritize their own quality of life; studying the minimum needed to pass subjects; respecting own physical limits, avoiding spending many hours without sleeping; avoiding comparing grades with other students; going for walks; eating well; playing or listening to music; humour; and religion / meditation / praying. At least 50% of the respondents strongly agreed to engaging in religious-meditation / praying and playing or listening to music (both a week and a day to their examinations). Others could not meet the criterion mean benchmark, as the grand mean was 2.92 was less than the criterion mean (3.00).

Model	R	R Square	Adjusted R Square		Std. Error of the Estimate		
1	.955 ^a	.912	.911		.3989		
Model	Sum of Squares	Df	Mean Square	F-ratio	p-value.		
1	Regression	384.009	2	192.005	1206.492	.000 ^b	
	Residual	37.239	234	.159			
	Total	421.249	236				
Estimated model coefficients and statistical significance of the stress-coping strategies.							
Model	Unstandardized Coefficients		Standardized Coefficients	t	p-value	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	0.904	0.062		14.542	0.000	0.782	1.027
Stress coping strategies a week before the date of exam.	0.515	0.058	0.572	8.879	0.000	0.401	0.629
Stress coping strategies a day before the date of exam	0.345	0.056	0.393	6.105	0.000	0.234	0.456

Table 6: Model Summary - Sources of stress / Regression analysis/statistical significance for stress-coping strategies.

Table 6 shows the relationship between sources of stress and the stress-coping strategies; and the statistical significance Table (ANOVA). The first model summary that provides the R , R^2 , adjusted R^2 , and the standard error of estimate, which can be used to determine how well a regression model, fits the data. The “ R ” column is the multiple correlation coefficient, with 0.955, which indicates a good level of prediction. The “ R^2 ” column is the coefficient of determination which is the proportion of variance in the source of stress that can be explained by the stress-coping strategies “a week” and “a day” before the date of examination which is 0.912, meaning that the stress-coping strategies explain 91.2% of the variability of the source of stress. The F-ratio above tests whether the overall regression model is a good fit for the data. The table shows that stress-coping strategies statistically significantly predict the source of stress, $F(2,234) = 1206.492$, $p = 0.000$, which is < 0.0005 , which implies that the regression model is a

good fit of the data.

Table 6 also shows the general form of the equation to predict source of stress from stress-coping strategies “a week” before the date of examination, and stress-coping strategies “a day” before the date of examination is: predicted source of stress = 0.904 + 0.515 (stress coping strategies a week before the date of exam) +0.345 (stress coping strategies a day before the date of exam). Also, the statistical significance of each of the stress-coping strategies was tested, and this test whether the unstandardized (or standardized) coefficients are equal to 0 (zero) in the population. As can be seen from the “p-value” column that all stress-coping strategies coefficients are statistically significantly different from 0 (zero). A multiple regression analysis shows that these variables statistically significantly predicted source of stress, $F(2,234) = 1206.492$, $p < 0.0005$, $R^2 = 0.912$. The two variables added statistically significantly to the prediction, $p < 0.05$.

Discussion

“Real or interpreted threat to the physiological or psychological integrity of an individual that results in physiological and behavioral responses” defines stress [17]. The stress-coping strategies therefore are acts of responses to external stimuli, which is a known characteristic of every living thing. The form of response to stress is known to be determined by genetic and environmental influences, [18] and the students in this study are no exception. Out of the 237 respondents in this study, 62% were females suggesting almost twice female enrolment in this private medical university. Our finding is different from observations in other studies that highlighted limited female enrolment in Nigerian Universities [19-20]. However, these studies were carried out about 18 years ago. The trend is therefore changing as social or cultural factors are known to influence this occurrence [21]. The likely explanation for the high female enrolment in our study could be the trust the parents and guardians of the students had in the institution in grooming their female students in the relatively regimented environment of a private medical university. The location of the university in a Christian-dominant southern Nigeria State could explain why 94% of respondents were Christians. Majority of respondents were within 14 – 24 years age group. This is typical of most Nigeria universities.

A week before set examination date students studied for varied number of hours per day, and more than 50% of them invested a minimum of two hours and maximum of 6 hours (or more) per day. In another study carried out among students in federal universities in Nigeria, 50% of student read for two to four hours per day [22]. In this study a few students (28.7%) had more than 6 hours of personal study per day, and the number of hours of study generally increased a day to the examination for the majority. In a study trying to understand what makes a good study day among undergraduate students, daily study satisfaction was observed to be directly related to time invested in studying [23]. Daily study satisfaction will therefore be associated with a feeling of guilt (a source of stress) for not doing enough as expected.

It is interesting to note that the females spent more time per day in personal studies than the males in this private university. It is not surprising that there were more females in the study with higher scores in their first and last examinations. Our findings differ from a Dutch study where female students were

noted not to have performed as well as their male counterparts in Science, Technology, Engineering, and Mathematics (STEM) programs [24]. However, in Ethiopia, an increasing female participation in academics was noted with lower graduation rate, for which university-related factors and socio-cultural factors were implicated [25]. In another study, also in Ethiopia, the determinants were reported to be personal and university factors [26]. Our study findings differ from a study done among accounting students where no significant difference was observed in the performance of male and female students in Nigeria, [27] and among medical students in Pakistan [28]. An Ibadan-based Nigerian study reported higher academic achievement in favour of males [29]. However, our study shares some similarity with the study in Saudi Arabia where gender differences in study time and performance outcomes were observed [30].

Numerous sources of stress among respondents were rated and some met the mean benchmark of 3.00, while others did not. All the students (100%) adopted one form of stress-coping strategy or the other. Some stress-coping strategies were used a week to examination (also a day to examination) by students and some of these included identifying with models of physicians who prioritized their own quality of life; studying the minimum needed to pass subjects; respecting own physical limits, avoiding spending many hours without sleeping; avoiding comparing grades with other students; going for walks; getting together with families and friends; eating well; reading of literary non-medical works; playing or listening to music; playing or watching football games on television; going out to dinner; staying away from reading for some time; making humor; and practicing religious meditation/praying. Interestingly, at least 50% of the respondents strongly agreed to engaging in religious-meditation/praying and playing or listening to music (both a week and a day to their examinations). These findings are similar to those of Johari and Hassan on stress and coping strategies among medical students in national university in Malaysia where such self-distracting or stress-coping mechanisms were reported among the students [13]. In a Saudi Arabian study, planning and time management were additional stress-coping strategies reported among medical students, although others viewed them as additional stressors [31].

Amidst the stressful environment, 92.4% of respondents had $\geq 51\%$ average score in their examinations. The outcome of the study revealed that the stress-coping strategies explained 91.2% of the variability of the source of stress. This implies some degree of resilience among the students. Resilience has been emphasized as a useful and interesting construct in medical education and research [32]. Another researcher expressed this phenomenon as mental toughness which varies with situation and time and with crucial role in performance, goal progress, and thriving under stress [33]. A writer in a study among university students in Mexico reported a distinction between hindrance stressors which diminish appraisals of life satisfaction, and challenge stressors which promote life satisfaction [34]. Medical training is one of the toughest programs in the University, and resilience, mental toughness and physical fitness are important and necessary attributes for every medical student to acquire in order to get through the training and graduate.

Limitations

This study is questionnaire-based, and the findings were self-reported. The study is therefore subject to the demerits of such studies in its category. The examination result scores quoted were not actual

scores, but average estimations in the opinion of the respondents.

Conclusion

The identified sources of stress were numerous most of which others academic, personal, social and family issues. A wide range stress-coping strategy were adopted by the students. At least 50% of the respondents strongly agreed to engaging in religious-meditation / praying and playing or listening to music (both a week and a day to their examinations). Thirty percent or more strongly agreed to studying the minimum that was needed to pass subjects; respecting their own physical limits, avoiding spending many hours without sleeping; avoiding comparing grades with other students; and eating well. Using their preferred stress-coping strategies, at least 16% of the respondents had scores of 80% and above in their examinations, while 75% had scores of 51-80% in their last examinations. Stress-coping strategies are therefore individual-based.

Recommendations

Administrators and counsellors/mentors of students should identify which stressors are hindrance stressors and challenge stressors to properly direct counselling of the students. The stress-coping strategies adopted by the students are helping them to undertake the programs in the university, and need minimal interference. Students who are not thriving should be identified for counselling services. Students should be encouraged to draw up their personal study schedule to avoid work overload and its attendant stressful consequences. The university should look in the direction of organizing stress management workshops to entrench in the new intake students on how to cope in the medical training.

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Ethical Considerations

The approval of the Research Ethics Committee of the PAMO University of Medical Sciences was obtained before commencement of the study.

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The study was self-funded by the researchers.

		AVERAGE SCORES (RESULTS)					
Hours of Personal Studies		FIRST EXAM (%)	Frequency	%	LAST EXAM (%)	Frequency	%
A WEEK BEFORE THE DATE OF EXAMINATION.	< 2hours	< 50	5	2%	< 50	5	2%
		51 - 60	13	5%	51 - 60	8	3%
		61 - 70	3	1%	61 - 70	1	0.40%
		71 - 80	4	2%	71 - 80	3	1%
		> 80	6	3%	> 80	10	4%
		S.Total	31(13%)			27 (11%)	
	2 - 4hours	< 50	2	1%	< 50	7	3%
		51 - 60	21	9%	51 - 60	19	8%
		61 - 70	26	11%	61 - 70	18	8%
		71 - 80	9	4%	71 - 80	15	6%
		> 80	13	5%	> 80	14	6%
		S. Total	71 (30%)			73 (31%)	
	4 - 6hours	< 50	3	1%	< 50	5	2%
		51 - 60	18	8%	51 - 60	16	7%
		61 - 70	22	9%	61 - 70	23	10%
		71 - 80	12	5%	71 - 80	9	4%
		> 80	12	5%	> 80	14	6%
		S.Total	67 (28%)			67 (28%)	
	> 6hours	< 50	3	1%	< 50	4	2%
		51 - 60	6	3%	51 - 60	10	4%
	61 - 70	32	14%	61 - 70	32	14%	
	71 - 80	20	8%	71 - 80	18	8%	
	> 80	7	3%	> 80	6	3%	
	S.Total	68 (29%)			70 (30%)		
	Grand Total	237			237		
A DAY BEFORE THE DATE OF EXAMINATION	< 2hours	< 50	3	1%	< 50	2	1%
		51 - 60	7	3%	51 - 60	8	3%
		61 - 70	3	1%	61 - 70	5	2%
		71 - 80	4	2%	71 - 80	1	0.40%
		> 80	4	2%	> 80	5	2%
		S.Total	21(9%)			21(9%)	
	2 - 4hours	< 50	0	0%	< 50	1	0.40%
		51 - 60	16	7%	51 - 60	15	6%
		61 - 70	10	4%	61 - 70	10	4%
		71 - 80	8	3%	71 - 80	8	3%
		> 80	7	3%	> 80	7	3%
	S.Total	41 (17%)			41 (17%)		

4 - 6hours	< 50	5	2%	< 50	7	3%
	51 - 60	19	8%	51 - 60	15	6%
	61 - 70	19	8%	61 - 70	16	7%
	71 - 80	8	3%	71 - 80	7	3%
	> 80	14	6%	> 80	19	8%
	S.Total	65 (27%)			64 (27%)	
> 6hours	< 50	6	3%	< 50	9	4%
	51 - 60	21	9%	51 - 60	20	8%
	61 - 70	43	18%	61 - 70	44	19%
	71 - 80	27	11%	71 - 80	25	11%
	> 80	13	5%	> 80	13	5%
	S.Total	110 (46%)			111 (47%)	
	Grand Total	237			237	

APENDIX 1: Study hours versus average scores.

Sources of Stress	STRONGLY AGREE			AGREE		
	Male	Female	Total	Male	Female	Total
Frequent Test	30 (13%)	49 (21%)	79 (33%)	18 (8%)	29 (12%)	47 (20%)
Lack of time to study the material to be tested	43 (18%)	71 (30%)	114 (48%)	24 (10%)	38 (16%)	62 (26%)
Studying into the night	41 (17%)	67 (28%)	108 (46%)	20 (8%)	32 (14%)	52 (22%)
Missing class	9 (4%)	15 (6%)	24 (10%)	15 (6%)	24 (10%)	39 (16%)
The amount of materials covered on test	48 (20%)	77 (33%)	125 (53%)	22 (9%)	36 (15%)	58 (24%)
Multiple tests at the same time	44 (19%)	72 (30%)	116 (49%)	21 (9%)	34 (14%)	55 (23%)
Test subject matters goes beyond what was covered in the classroom	27 (11%)	45 (19%)	72 (30%)	16 (7%)	27 (11%)	43 (18%)
The number of details required by the teachers	32 (14%)	53 (22%)	85 (36%)	24 (10%)	47 (20%)	71 (30%)
Dealing with new forms of assessment such the OSPE and PBL	26 (11%)	42 (18%)	68 (29%)	30 (13%)	50 (21%)	80 (34%)
The large amount of extra-curricular activities carried out by Students	7 (3%)	12 (5%)	19 (8%)	12 (5%)	20 (8%)	32 (14%)
Daily activities unrelated to school (paying bills, cleaning house, etc	11 (5%)	18 (7%)	29 (12%)	12 (5%)	19 (8%)	31 (13%)

Teachers' lack of time for students	9 (4%)	15 (6%)	24 (10%)	10 (4%)	17 (7%)	27 (11%)
Feelings of guilt because of giving more priority to personal life than to studies	16 (7%)	27 (11%)	43 (18%)	17 (7%)	29 (12%)	46 (19%)
Heavy demand of students to study	37 (15%)	61 (26%)	98 (41%)	24 (10%)	39 (16%)	63 (27%)
Concern about trying to learn all the content	53 (22%)	86 (36%)	139 (59%)	21 (9%)	33 (14%)	54 (23%)
Difficulty in memorizing the contents presented	40 (17%)	66 (28%)	106 (45%)	28 (12%)	45 (19%)	73 (31%)
Studying material that students consider unnecessary for their professional qualifications	32 (14%)	53 (22%)	85 (36%)	24 (10%)	39 (16%)	63 (27%)
Competitiveness among students	29 (12%)	46 (19%)	75 (32%)	23 (8%)	24 (10%)	47 (20%)
Waking up very early to go to school	36 (15%)	60 (25%)	96 (41%)	20 (8%)	32 (14%)	52 (22%)
Family problems	20 (8%)	33 (14%)	53 (22%)	18 (7%)	30 (13%)	48 (20%)
Marriage and children	13 (5%)	20 (8%)	33 (14%)	8 (3%)	13 (5%)	21 (9%)
High parental expectations	38 (16%)	61 (26%)	99 (42%)	25 (10%)	42 (18%)	67 (28%)
Relationship problems with students	20 (8%)	33 (14%)	53 (22%)	18 (8%)	29 (12%)	47 (20%)
Relationship problems with lecturer	17 (7%)	29 (12%)	46 (19%)	15 (6%)	24 (10%)	39 (16%)

Appendix 2: Category of students affected more by the sources of stress.

Coping strategies a day before exam	EXAMINATION OUTCOMES (LAST EXAM) for "Strongly agree" and "Agree"					Total
	< 50%	51-60%	61-70%	71-80%	>80%	
Identifying with models of physicians who prioritize their own quality of life	4 (2%)	25 (11%)	29 (12%)	22 (9%)	20 (8%)	Do Not Reject (DNR)
Study the minimum needed to pass subjects	13 (5%)	36 (15%)	37 (16%)	28 (12%)	34 (14%)	DNR
Respect their own physical limits, avoiding spending many hours without sleeping	3 (1%)	33 (14%)	39 (16%)	25 (11%)	25 (11%)	DNR
Avoiding comparing grades with other students	7 (3%)	39 (16%)	50 (21%)	32 (14%)	33 (14%)	DNR

Going to the movies on weekends	3 (1%)	12 (5%)	13 (5%)	16 (7%)	10 (4%)	Rejected
Going for walks	6 (3%)	26 (11%)	30 (13%)	20 (8%)	21 (9%)	DNR
Getting together with families and friends	4 (2%)	20 (8%)	20 (8%)	14 (6%)	15 (6%)	Rejected
Cooking	3 (1%)	11 (5%)	10 (4%)	11 (5%)	10 (4%)	Rejected
Eating well	2 (1%)	28 (12%)	40 (17%)	32 (14%)	35 (15%)	DNR
Skipping classes to perform other activities that gives pleasure (sports, etc)	2 (1%)	11 (5%)	6 (3%)	10 (4%)	8 (3%)	Rejected
Reading of literary non-medical works	6 (3%)	20 (8%)	13 (5%)	15 (6%)	8 (3%)	Rejected
Playing or listening to music	8 (3%)	40 (17%)	43 (18%)	30 (13%)	27 (11%)	DNR
Playing or watching football games on television	3 (1%)	18 (8%)	15 (6%)	10 (4%)	12 (5%)	Rejected
Going out to dinner	4 (2%)	13 (5%)	20 (8%)	18 (8%)	13 (5%)	Rejected
Going to Academic Guidance Office	2 (1%)	9 (4%)	15 (6%)	10 (4%)	9 (4%)	Rejected
Student Council	1 (0%)	13 (5%)	10 (4%)	10 (4%)	8 (3%)	Rejected
Student Rights	1 (0%)	18 (8%)	11 (5%)	8 (3%)	11 (5%)	Rejected
Stay away from reading for some time	3 (1%)	13 (5%)	17 (7%)	13 (5%)	14 (6%)	Rejected
Sexual activities	3 (1%)	11 (5%)	8 (3%)	7 (3%)	9 (4%)	Rejected
Humor	9 (4%)	30 (13%)	44 (19%)	27 (11%)	17 (7%)	DNR
Religion-Meditation/Praying	8 (3%)	48 (20%)	54 (23%)	33 (14%)	37 (16%)	DNR
Substance abuse	3 (1%)	9 (4%)	7 (3%)	7 (3%)	3 (1%)	Rejected

Appendix 3: Stress Coping Strategies: “A Day” Before The Examination And The Outcome Of The Last Examination For The Students That “Strongly Agree” And “Agree”.

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