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RESEARCH ARTICLE

Stress, stressors, stress responses and coping strategies among student nurses in Anambra State, South-East Nigeria

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Abstract: The study was a cross-sectional survey, aimed at assessing the level of perceived stress, common sources of perceived stress, physio-psycho-social responses and coping strategies to stress among student nurses undergoing training in Anambra State, Nigeria. A multistage sampling technique method was adopted for the study in which 183 student nurses from 4 different institutions were surveyed. Perceived stress scale (PSS) was used to determine the respondent's level of stress and sources of stress. Physio-psycho-social response scale (PPSRS) was used to ascertain the respondent's physio-psycho-social well-being, while coping behaviour inventory (CBI) was used to assess the respondents coping strategies. Results showed that 77.66 % of the participants had moderate level of perceived stress (mean score range 1.34-2.66), while 8.83 % had high level of stress (mean score range 2.67-4.00) and 13.51 % low stress level (mean score range 0-1.33). The major source of stress for most of the students was from assignments and workload. The overall mean PPSRS indicated a best health status for most of the institutions. The scores for all the institutions fell within the moderate use of the coping strategies, and the most common coping strategy adopted by the students was problem-solving behaviour. It is recommended that institutions and nurse educators should adopt measures to reduce stress on the students, by giving out assignments at the commencement of a course to give ample time for students to accomplish the academic tasks.

Keywords: academic performance, acute stress, coping behaviour, physio-psycho-social response

1 Introduction

Stress has been identified as a complex and dynamic transaction between individuals and their environments [1]. According to Tan and Yip [2], the first and most generic definition of stress is that proposed by Hans Selye, who defined stress as the body's response to certain situations.

Stress has a different meaning for different people under different conditions. Stress is a psychological factor that influences all human performances, including students' academic performances and welfare. Some events are important and stressful, like academics, and some are small, producing less stress, like driving to work. There is 'bad' stress, called distress, and also 'good' stress, called eustress. Distress occurs when an event has a negative effect on the body and mind, while eustress occurs when the level of stress is not high enough for a given individual to have negative consequences, rather it produces positive effects. The effects of distress can result in decrease in job performance and can lead to anxiety, hostility and depression [3]. Thus, stress has been described as the "wear and tear" our bodies experience as we adjust to our continually changing environment, having physical and emotional effects on an individual with the ability to create positive or negative influence [4]. As a positive influence, stress can help compel someone to action and as a negative influence, it can result in feelings of distrust, rejection, anger, and depression, which in turn can lead to health problems such as headaches, stomach upset, rashes, insomnia, ulcers, high blood pressure, heart disease and stroke. According to American Psychological Association (APA), there are three types of stress – acute stress, episodic acute stress, and chronic stress [5]. Acute stress is usually brief, and most common and frequent presentation. It is most often caused by reactive thinking. Episodic acute stress has been described as when people experience acute stress frequently, or when peoples' lives present with frequent triggers of stress. People who always seem to be having a crisis tend to have episodic acute stress. Such people take on many responsibilities, and usually cannot stay organized with so many time demands. They are often short-tempered, irritable, and anxious. Chronic stress is the most harmful type of stress and occurs when acute stress begins to increase or lasts for long periods of time. If left untreated over a long period of time, it can, significantly and often irreversibly, damage physical health and deteriorate mental health [5].

A stressor is something that applies stress to a person. It has been broadly defined as situation or event that has the potential to affect health outcomes, that is, a stressor is perceived as stressful when the situation is appraised by a person as exceeding her ability to cope with and endangering her well-being [1]. Strain is used in mechanics to describe deformation in a structure due to stress applied. In humans, strain equates to changes (biological or physiological) that occur as a result of stress. Stress does not mean distress. Stress and the identification of potential stressors among nursing students have received some level of attention in the literature [1,6,7]. Nursing students have the same academic stressors as other college students, such as midterm and final examinations, research papers and other assignments [1]. In addition, nursing students experience clinical component of their training, which is highly stressful. They have a large amount of preparatory work before their clinical assignments. They often must travel long distances to clinical sites and use highly technical equipment [8]. Thus, they perform procedures that can cause serious harm to their patients, thereby enhancing their fear of making mistakes. Stress has a detrimental effect not only on the physio-psycho-social health of an individual but as well affect the whole being. Studies have shown that excessive stress can be harmful to a student's academic performance, welfare and could interfere with learning a complex psychomotor skill [9]. Stress could result to deleterious symptoms such as alcoholism and drug dependence, eating disorder, indiscriminate use of illegal substances, sleep disorder and suicide [10]. Labrague in his study had argued that the stresses encountered by nursing students are severe enough to cause some mental health problems such as depression and anxiety [11]. Nursing colleges are now recognised as a stressful environment, which often influences the academic performance and the psychological well-being of the students. Indeed, stress level is reported to increase during the time of training in nursing [12]. Improvement in the learning performance of a nursing student is dependent on several stress factors [13]. Sometimes the challenges faced in the clinical setting make the student more stressed [14]. However, since students cannot avoid stress, their ability to cope with these stressors is important in achieving success in their academic performances [15].

An individual's response to stress can be influenced by personality traits, coping skills and coping reserves. Furthermore, belief in the value of stress can have an impact on the outcome; thus, the person's belief on the beneficial effect of stress on health would contribute to the effects stress would manifest on the person [16]. In nursing education, students are exposed to busy schedules, critical thinking examinations, and clinical experiences at hospitals. Students often feel overwhelmed by the many requirements of nursing curricula. All of these elements, combined with outside responsibilities such as family, children, and jobs have the potential to create intense stress in students' lives. During nursing training, students are frequently exposed to various stressors which may directly or indirectly impede their learning and performance. The nature of clinical education presents challenges that may cause students to experience stress. Moreover, the practical components of the program which is important in preparing students to develop into professional nurse role by its nature have made the programme more stressful. According to Pryjmachuk and Richards [17], various stressors encountered by the student nurses can be broadly classified into groups like academic, clinical practice-related, relational, interpersonal and environmental stressors.

Coping is an act to manage emotion by a person in order to decrease physical and psychological effects of stressful condition. This is done with a view to solving personal and interpersonal problems, in order to try to master, minimize or tolerate stress and conflict [18]. Coping strategies are ways by which external or internal stress is managed, adapted to or acted upon. Student nurses adopt various mechanisms to help them attain balance in their academics, health and social lives. The coping mechanisms adopted by students depend on the environment and other factors. Caver and Connor-Smith [19] identified three types of coping strategies, which include: the appraisal-focused or adaptive cognitive, the problem-focused or adaptive behavioural, and the emotion-focused strategies.

Various studies have reported stress among student nurses in some parts of Nigeria [20–22], but these studies addressed only the levels of stress, sources of stress and coping strategies, with none addressing the physio-psycho-social response. Very sparse data can be found on student nurses in South-Eastern part of Nigeria. This study, therefore, was set to determine the level of perceived stress, identify common sources of perceived stress, determine the physio-psycho-social responses and coping strategies to stress, among student nurses undergoing training in Anambra State, South-East Nigeria.

2 Materials and methods

2.1 Study area

The study was carried out in Anambra State, South-East Nigeria. Anambra State is bounded by the States of Kogi to the North, Enugu to the East, Imo to the South, and Delta to the West.

It includes the valley of the lower Anambra River, which is a tributary of the Niger River. The state covers an area of 4,844 km^2(1,870 m^2) or 0.5% of Nigeria's total land area. It has tropical rain forest vegetation and humid climate with average temperature of 300 ^oC. Anambra State has a projected population of 5,527,809 million people as at 2016 [23]. Anambra residents engage mainly in commerce and industry, with Onitsha and Nnewi being the hub of the state's business activities. Agriculture also plays an important role in the state's economy, with yam, oil palm products, rice, corn, cassava and citrus fruits the principal crops produced in the area.

2.2 Study design

The study was a cross-sectional survey of the assessment of perceived stress, response and coping behaviour to stress of student nurses at the Schools of Nursing in Anambra State, Nigeria. The survey was conducted between December 2020 to June 2021.

2.3 Target population

The study population was students from the Schools of Nursing (SON) in Anambra State, Nigeria. As at the time of the study, there were seven SON in Anambra State. Of these, five were established by two religious organizations: Our Lady of Lourdes College of Nursing Sciences (CON), Ihiala; St. Charles Borromeo CON, Onitsha; and St Joseph's Hospital CON, Adazi Nnukwu, established by the Catholic Church, while SON, Iyi-Enu Mission Hospital, Ogidi; and CON, Diocesan Hospital Amichi were established by the Anglican Church. The Anambra State Government established the SON, Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Nkpor, while the Federal Government of Nigeria established the SON, Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi. There was also a nursing degree training programme at Nnamdi Azikiwe University, Nnewi Campus, but this was not part of the present study.

A multistage sampling technique method was adopted to select the target population for the study. To select the mission schools used for the survey, a simple random sampling method was used: from the three Catholic schools, CON, St. Charles Borromeo Specialist Hospital Onitsha was selected, while from the two Anglican schools, SON, Iyi-Enu Mission Hospital, Ogidi, was selected. Purposive sampling method was adopted in selecting the SON, NAUTH, Nnewi, and COOUTH, Nkpor, since these were the only Federal and State hospital-based nursing training institutions, respectively, in the State. The inclusion criteria were: students at their 2^{nd} and 3^{rd} years of study, and undertaking their training at a SON in Anambra State. Students who were at their 1^{st} year of training were excluded from the study, as they had limited clinical experiences as at the time of the study. Students who were undertaking their training at SON outside Anambra State, or at the Universities were also excluded from the study.

2.4 Sample size and sampling technique

The sample size was calculated using the formula by Cochran [24], for calculating sample size for categorical variable: $\mathrm{n_o} = \frac{\mathrm{t^2 \times (p)(q)}}{\mathrm{d^2}}$

Where, n_o= required return sample size; t = alpha level (type I error, which was set at 0.05). The t-value for 0.05 is 1.96; p = maximum possible proportion (77 %), chosen from a similar study done at Osogbo, South-West Nigeria [25]; $q = 1 - p$ (estimate of variance); d = acceptable margin of error for proportion being estimated = 0.05.

Computing the values:

$\mathrm{n_o} = \frac{(1.96)^2 \times 0.77(1-0.77)}{(0.05)^2} = 272$

Since the sample size calculated was > 5 % of the population, Cochran's correction formula was used to calculate the final sample size using the formula: $\mathrm{n_1} = \frac{\mathrm{n_o}}{1+\mathrm{n_o/N}}$

where, n_1= corrected sample size; n_o = required return sample size (272); N = population size (446). So, the corrected sample size (n_1) was approximately 169.

Using the oversampling procedures of Cochran [24], with anticipated return rate of 93 % (from pilot study), the minimum sample size was calculated as n_2 = n_1/return rate, where n_2= minimum sample size adjusted for return rate, and n_1 = corrected sample size (169).

Thus, the minimum sample size was calculated to be 182, but 183 samples were used for the study.

To select the number of students from each institution, proportionate sampling technique was used, according to their years of study for proper representation. This was determined as follows:

$\mathrm{NS} = \frac{\mathrm{Ns}}{\mathrm{N}} \times \frac{\mathrm{n}}{1}$

Where, NS = sample size for each level of study; Ns = number of students in each level; n = sample size for the study; N = total population for the study.

Applying the formula for proportional allocation according to class population, the following were obtained: SON, NAUTH, Nnewi 50; SON, COOUTH, Nkpor 50; SON, Iyi-Enu 42; and CON, St Charles Borromeo Special Hospital, Onitsha 41.

Using a systematic random sampling, the students were selected at intervals of 2, from a list containing the registration numbers of each level written serially for proper selection. The first student was selected by simple random sampling, since the sampling interval was 2, until the required size for each class was reached.

2.5 Instrument for data collection

Data were collected using a standardized, structured, questionnaire, originally developed in Chinese by Sheu and co-workers, and translated by Sheu et al. [26]. This questionnaire consists of four sections. Section A comprises the socio-demographic characteristics of the respondents, section B, perceived stress scale (PSS), section C physio-psycho-social response scale (PPSRS), and section D coping behaviour inventory (CBI). The socio-demographic characteristics of the respondents included: sex, age, marital status, family type, family income, hours spent in study, hours of sleep, alcohol drinking and cigarette smoking habits. The PSS consists of 29 items grouped into six factors, with each item rated on a five-point Likert scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often and 4 = very often). Higher scores indicate higher level of stress. To determine the level of stress, the following scaling were used; 2.67-4.00 high stress, 1.34-2.66 moderate stress and 0-1.33 low stress. The PPSRS describes nursing students' responses to and emotions caused by stress in clinical practice, and also measures the physio-psycho-social health status of students during clinical practice. It consists of 21 items, each item is rated on a five-point Likert-type scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often and 4 = very often). A higher score means presence of more and serious symptoms reported and poorer physio-psycho-social health status. To determine the level of stress, the following scaling were used; 2.67-4.00 poor, 1.34-2.66 good, and 0-1.33 best health status. The CBI was used to find out the nursing students' coping strategies. The inventory consists of 19 items classified into four types, rated on a 5 Likert scale (0 = never, 1 = infrequently, 2 = sometimes, 3 = frequently and 4 = always). High scores indicate greater use of coping behaviour.

The instrument was validated by research experts in nursing education, measurement and evaluation, for face and content validity, while the reliability was done by carrying out a pilot study of thirty randomly selected nursing students of University of Nigeria, Enugu Campus, Enugu, Nigeria. Test-retest method was used. Data were tested for internal consistency using Cronbach Alpha reliability method. The reliability coefficient of PSS, PPSRS and CBI were considered as having good internal consistency with Cronbach's Alpha value of 0.78, 0.87and 0.92, respectively.

2.6 Data collection

Prior to the distribution of the questionnaires, appropriate measures were considered to protect the participant's rights, such as interactive orientation briefing with students regarding the aim of the study, and the need to answer all the questions, as only instruments fully filled were used for the study. Informed consent was obtained from the students prior to participation in the study. The questionnaires were administered to the respondents during break time and free lecture periods. Completion and collection of the questionnaires were on the spot.

2.7 Ethical consideration

Ethical approval for the study was sought and collected from the Ethical Review Committee of Faculty of Health Sciences and Technology, Nnamdi Azikiwe University, Nnewi Campus (Ref: ERC/FHST/NAU/2018/043), and Ministry of Health, Anambra State (Ref: MH/AWK/M/321/353). Confidentiality of the participants identity and responses was maintained throughout the study.

2.8 Data analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) software (version 25). Kruskal Wallis and Fisher's exact tests were used to test the hypotheses at $p < 0.05$, while Kendall tau b and Point Biseral correlation tests were used to test for relationships.

3 Results

3.1 Socio-demographic characteristics of the respondents

A total of 200 questionnaires were distributed and all were returned, but only 183 were fully completed. This gave a return rate of 91.5 %. The socio-demographic characteristics of the study participants are presented in Table 1. From the table, 88.52 % of the participants were females, while 11.48 % were males. Most of the participants (59.01 %) were within the age group of 21-25 years, while 1.64 % were within the age group of 36 and above. Single persons accounted for 84.7 % of the surveyed population, while 15.3 % were married. Majority of the respondents (31.15 %) were from families with monthly income $>$ 100,000 Nigerian Naira, while 20.76 %

were from families with monthly income of < 20,000 Naira. Those from monogamous families were 92.35 %, while 2.1 % were from polygamous families, and 5.46 % from single parenthood. While 20.76 % of the participants admitted drinking alcohol, 1.09 % admitted they smoke.

Table 1 Socio demographic characteristics of the respondents

Variable	Total (n = 183)	Government SON (%) (n = 100)	Mission SON (%) (n = 83)
Gender			
Male	21(11.48%)	12(12%)	9(10.84%)
Female	162(88.52%)	88(88%)	74(89.15%)
Age Range			
15-20	37(2022%)	21(21%)	16(19.28%)
21-25	108(59.01%)	56(56%)	52(62.65%)
26-30	28(15.30%)	18(18%)	10(12.05%)
31-35	7(3.82%)	4(4%)	3(3.61%)
36 and above	3(1.64%)	1(1%)	2(2.41%)
Marital Status			
Married	28(15.30%)	18(18%)	10(12.05%)
Single	155(84.70%)	82(82%)	73(87.95%)
Level of Study			
Year 2	94(51.37%)	53(53%)	41(49.39%)
Year 3	89(48.63%)	47(47%)	42(50.60%)
Hours Spent in Study			
< 2 hours	22(12.02%)	9(9%)	13(15.66%)
2-4 hours	78(42.62%)	39(39%)	39(46.99%)
4-6 hours	53(28.96%)	35(35%)	18(21.69%)
> 6 hours	30(16.39%)	17(17%)	13(15.66%)
Hours of Sleep			
< 2 hours	3(1.64%)	1(1%)	2(2.41%)
2-4 hours	46(25.14%)	23(23%)	23(27.71%)
4-6 hours	83(45.35%)	48(48%)	35(42.17%)
> 6 hours	51(27.87%)	28(28%)	23(27.71%)
Family Monthly Income			
< 20,000 Naira	38(20.76%)	16(16%)	22(26.51%)
20,000-50,000 Naira	38(20.76%)	23(23%)	15(18.07%)
50,000-100,000 Naira	50(27.32%)	24(24%)	26(31.32%)
> 100,000 Naira	57(31.15%)	37(37%)	20(24.09%)
Family Type			
Monogamy	169(92.35%)	95(95%)	74(89.16%)
Polygamy	4(2.18%)	2(2%)	2(2.41%)
Single Parenthood	10(5.46%)	3(3%)	7(8.43%)
Do you drink alcohol?			
Yes	38(20.76%)	17(17%)	21(25.30%)
No	145(79.23%)	83(83%)	62(74.69%)
Do you smoke?			
Yes	2(1.09%)	2(2%)	0(0)
No	81(98.91%)	98(98%)	83(100)

3.2 Perceived stress level

Majority of the total participants from the four institutions (77.66 %) reported moderate level of perceived stress, with 84 % from SON, NAUTH, Nnewi, having moderate mean score of 1.99 ± 0.35, 70 % from SON, COOUTH, Nkpor 2.03 ± 0.34, 78.05 % from CON, St. Charles Borromeo Specialist Hospital, 2.02 ± 0.33, and 78.57 % from SON, Iyi-Enu Mission Hospital, Ogidi, 1.83 ± 0.32 (Table 2). Overall, 13.51 % had low stress level, while 8.83 % of had high stress level. Participants from SON, NAUTH, Nnewi, had the least percentage of respondents (2 %) with high mean score of perceived stress (2.78 ± 0.0), while SON COOUTH, Nkpor, had the highest percentage of persons (16 %) with low mean score of perceived stress (0.87 ± 0.38). There were no significant differences in the respondents' perceived stress levels between government SON and mission SON ($p > 0.05$) (Table 3).

The mean scores for the six sources of perceived stress showed stress from assignment and workload as the most common stressor among student nurses across the various institutions, followed by stress from teachers and nursing staff (Table 4). Kruskal Wallis test indicated that stress from assignments and workload was significantly higher at SON, COOUTH, Nkpor, and CON, St. Charles Borromeo Specialist Hospital, Onitsha, than the average Likert score of 2 ($H = 13.82$; $p = 0.003$). Also, the result of comparative analysis of the respondents' sources of perceived stress between government-owned SON and Mission-owned SON showed that stress

from assignments and workload was significantly lower (Z = -2.07; p = 0.041) than the average Likert score of 2 (Table 5).

Table 2 Level of perceived stress among student nurses in Anambra State

Perceived Stress Level	A (n = 50)	B (n = 50)	C (n = 42)	D (n = 41)	Overall
Low	1.02 ± 0.33 (14.00%)	0.87 ± 0.38 (16.00%)	1.09 ± 0.11 (14.29%)	1.19 ± 0.15 (9.76%)	13.51 %
Moderate	1.99 ± 0.35 (84.00%)	2.03 ± 0.34 (70.00%)	1.83 ± 0.32 (78.57%)	2.02 ± 0.33 (78.05%)	77.66 %
High	2.78 ± 0.00 (2.00%)	2.89 ± 0.08 (14.00%)	2.93 ±0.21 (7.14%)	2.98 ± 0.23 (12.19%)	8.83%

Note: PSS scores: 2.67-4.00 high stress; 1.34-2.66 moderate stress and 0-1.33 low Stress. A = SON, NAUTH, Nnewi; B = SON, COOUTH, Nkpor; C = SON, Iyi-Enu Mission Hospital, Ogidi; D = CON, St. Charles Borromeo Specialist Hospital, Onitsha.

Table 3 Comparative Analysis of the Respondents' Perceived Stress level between Government SON and Mission SON

Perceived Stress level	Government SON (n = 100)	Mission SON (n = 83)	z	p
Low	0.94 ± 0.36 (15.00)	1.13 ± 0.13 (12.05)	-1.332	0.196
Moderate	2.01 ± 0.35 (77.00)	1.92 ± 0.34 (78.31)	-1.437	0.151
High	2.88 ± 0.08 (8.00)	2.96 ± 0.21 (9.64)	-0.315	0.798

Note: Government SON: SON, NAUTH, Nnewi and SON, COOUTH, Nkpor. Mission SON: SON, Iyi-Enu Mission Hospital, Ogidi and CON, St. Charles Borromeo Specialist Hospital, Onitsha. PSS score: 2.67-4.00 mean range for high stress; 1.34-2.66 mean range for moderate stress; 0-1.33 mean range for low stress. Values are the mean PSS ± S.D (% N); Z = Fisher's exact test statistic.

Table 4 Sources of perceived stress among student nurses in Anambra State

Sources of stress	A (n = 50)	B (n = 50)	C (n = 42)	D (n = 41)	H	p
Stress from lack of professional knowledge and skills	1.69 ± 0.82	1.62 ±1.04	1.35 ± 1.04	1.85 ± 0.80	5.86	0.119
Stress from assignments and workload	2.10 ± 0.87	2.55 ± 0.96*	2.05 ± 0.73	2.52 ± 0.77*	13.82	0.003
Stress from taking care of patients	1.73 ± 0.61	1.56 ± 0.88	1.79 ± 0.78	1.60 ± 0.86	1.81	0.613
Stress from clinical environment	1.87 ± 0.67	1.98 ± 0.76	1.82 ± 0.87	2.01 ± 0.72	2.42	0.490
Stress from teachers and nursing staff	1.99 ± 0.66	2.15 ± 0.94	1.94 ± 0.74	2.17 ± 0.81	2.43	0.487
Stress from peers and daily life	1.86 ± 0.81	1.93 ± 0.77	1.86 ± 0.85	2.18 ± 0.67	3.79	0.285
Overall PSS	1.87 ± 0.50	1.97 ± 0.65	1.80 ± 0.50	2.05 ± 0.53	6.09	0.107

Note: A = SON, NAUTH, Nnewi; B = SON, COOUTH, Nkpor; C = SON, Iyi-Enu Mission Hospital, Ogidi; D = CON, St. Charles Borromeo Specialist Hospital, Onitsha. *Significantly higher than average scale of 2.

Table 5 Comparative analysis of the respondents' sources of perceived stress between government-owned SON and mission-owned SON

Sources of perceived stress	Government SON (n = 100)	Mission SON (n = 83)	Z	p
Stress from lack of professional knowledge and skills	0.56±0.45	0.70±0.55	-0.60	0.567
Stress from assignments and workload	1.09±0.55	1.62±0.57	-2.07	0.041
Stress from taking care of patients	0.90±0.70	0.88±0.70	-0.22	0.849
Stress from clinical environment	0.95±0.52	0.93±0.66	-0.36	0.723
Stress from teachers and nursing staff	1.07±0.44	1.12±0.56	-0.59	0.567
Stress from peers and daily life	1.07±0.64	1.53±0.86	-1.29	0.216

3.3 Physio-psycho-social response (PPSR) to perceived stress

The PPSR to perceived stress were not significantly different for emotional symptoms, social behavioural symptoms and physical symptoms for all the institutions studied (Table 6). Generally, the overall mean PPSRS indicated a best health status (0-1.33) for all the institutions, except SON, Iyi-Enu Mission Hospital, Ogidi, with a value of 1.47 ± 0.83, a score indicative of good health status.

Table 6 Physio-psycho-social response to perceived stress among student nurses

PPSR	A (n = 50)	B (n = 50)	C (n = 42)	D (n = 41)	H	p
Emotional symptoms	1.39±0.77	1.38±0.88	1.82±0.95	1.55±0.80	7.15	0.067
Social behavioral symptoms	1.22±0.80	1.04±1.00	1.33±1.16	1.26±0.98	2.17	0.538
Physical symptoms	1.13±0.82	1.10±0.79	1.26±0.89	1.10±0.91	1.10	0.778
Overall PPSR	1.25±0.62	1.17±0.74	1.47±0.83	1.30±0.77	3.78	0.287

Note: PPSR scores: poor health status 2.67-4.00; good health status 1.34-2.66; best health status 0-1.33. A = SON, NAUTH, Nnewi; B = SON, COOUTH, Nkpor; C = SON, Iyi-Enu Mission Hospital, Ogidi; D = CON, St. Charles Borromeo Specialist Hospital, Onitsha.

3.4 Coping strategies

Problem solving behaviour was mostly adopted by the students at NAUTH, Nnewi (2.83 ± 0.75), COOUTH, Nkpor (2.89 ± 0.79), St. Charles Borromeo Specialist Hospital, Onitsha (3.04 ± 0.72), except at Iyi-Enu Mission Hospital, Ogidi, where the students adopted mostly transference behaviour as their coping strategy (2.77 ± 1.00) (Table 7). Avoidance behaviour was the least adopted coping strategy among students across the various institutions. Kruskal Wallis test indicated that there were no significant differences ($p > 0.05$) in the mean scores of all the coping strategies in all the institutions. However, the overall scores for all institutions fell within the moderate use of the coping strategies (1.34-2.66).

Table 7 Coping strategies among student nurses in Anambra State

Coping strategies	A (n = 50)	B (n = 50)	C (n = 42)	D (n = 41)	H	*p*
Avoidance behaviour	1.28±0.68	1.30±0.67	1.57±0.77	1.64±0.78	6.96	0.073
Problem solving behaviour	2.83±0.75	2.89±0.79	2.63±0.84	3.04±0.72	6.33	0.097
Staying optimistic behaviour	2.72±0.86	2.68±0.85	2.50±0.92	2.92±0.64	4.12	0.239
Transference behaviour	2.55±0.81	2.53±0.80	2.77±1.00	2.45±0.81	3.29	0.349
Overall CBI	2.35±0.54	2.35±0.58	2.37±0.62	2.51±0.48	2.39	0.495

Note: CBI scores: 2.67-4.00 high use of CB; 1.34-2.66 moderate use of CB; 0-1.33 for low use of CB. A = SON, NAUTH, Nnewi; B = SON, COOUTH, Nkpor; C = SON, Iyi-Enu Mission Hospital, Ogidi; D = CON, St. Charles Borromeo Specialist Hospital, Onitsha.

3.5 Correlation of stress indices and socio-demographic characteristics

The correlation matrix of stress indices and some of the socio-demographic characteristics showed that the overall PSS had a significant positive correlation with PPSRS (r = 0.342) and CBI (r = 0.188; $p < 0.01$) (Table 8). It also had a negative relationship with family monthly income (r = –0.148; $p < 0.01$). The PSS also had a positive relationship with marital status (r = 0.122; $p < 0.05$) (Table 9), with the singles showing higher perceived stress than the married (Figure 1). The age range and year of study of the respondents had significant positive relationships with their year of study (r = 0.281; $p < 0.01$) and hours spent in studying (r = 0.166; $p < 0.05$), respectively. Likewise, gender had significant ($p < 0.01$) positive relationships with alcohol consumption (r = 0.196) and smoking habit (r = 0.292) (Table 9), with the males having a higher perceived stress than females (Fig. 1). The number of hours spent in studying, however, had a significant negative relationship with the of hours of sleep (r = –0.145; $p < 0.05$), and the hours of sleep has a positive relationship with the family monthly income (r = 0.0172; $p < 0.01$) (Table 8).

Table 8 Correlation matrix of stress indices and some socio-demographic characteristics using Kendall's tau-b

	Overall PSS	Overall PPSRS	Overall CBI	Age range	Year of study	Hours spent in study	Hours of sleep	Family monthly income	Family type
Overall PSS	1.000								
Overall PPSRS	0.342*	1.000							
Overall CBI	0.188*	0.030	1.000						
Age range	-0.006	-0.062	-0.003	1.000					
Year of study	-0.013	-0.069	0.005	0.218*	1.000				
Hours spent in study	0.004	0.014	-0.021	0.037	0.166*∗	1.000			
Hours of sleep	-0.029	0.057	-0.019	-0.125	0.003	-0.145*∗	1.000		
Family monthly income	-0.148*	-0.096	-0.098	0.007	0.026	-0.009	0.172*	1.000	
Family type	0.066	0.091	0.041	-0.023	0.049	-0.009	-0.003	-0.001	1.000

Note: *Correlation is significant at less than 0.01 level; **Correlation is significant at less than 0.05 level.

Table 9 Correlation matrix of stress indices and some socio-demographic characteristics using Kendall's tau-b

	Overall PSS	Overall PPSRS	Overall CBI	Gender	Marital Status	Do you drink alcohol?	Do you smoke?
Overall PSS	1.000						
Overall PPSRS	0.342*	1.000					
Overall CBI	0.188*	0.030	1.000				
Gender	-0.080	-0.068	0.018	1.000			
Marital Status	0.122*∗	0.073	-0.056	-0.010	1.000		
Do you drink alcohol?	0.022	-0.025	0.058	0.196*	0.007	1.000	
Do you smoke?	-0.018	-0.030	0.144*∗	0.292*	-0.045	0.076	1.000

Note: *Correlation is significant at < 0.01; **Correlation is significant at < 0.05.

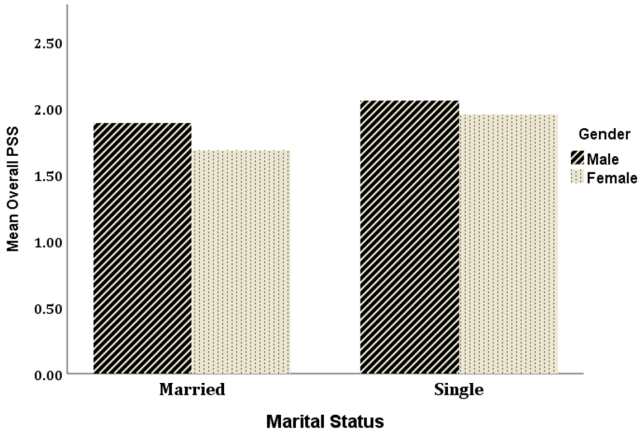

Figure 1 Respondents' relationship between overall Perceived stress and marital status

4 Discussion

This study assessed the level of perceived stress, common types of stressors, physio-psycho-social responses and coping behaviours adopted by student nurses in SON in Anambra State, Nigeria. The results showed that majority of the students (77.66 %) had moderate level of perceived stress, while 8.83 % had high stress levels. This gave a total of 86.5 % of the student nurses in Anambra State that actually have stress. Student nurses undertake numerous examinations, assignments and scheduled clinical postings, in course of their trainings; activities that could be exerting stress on the students. Moderate levels of stress have been reported among majority of student nurses in Philippine [11], Spain [7], India [27], Malawi [28] and Northern Nigeria [22]. Studies in Vietnam [29] and Calabar, South-South Nigeria [21], reported high levels of stress among majority of the students studied, while a study in South-West Nigeria reported a low level of stress [20]. A meta-analysis involving 2 countries in Europe, 2 in Asia, and Saudi Arabia, also reported stress levels of intern nurses to be moderate [30], while a systematic review in Middle East and North Africa reported the prevalence range of low perceived stress of 0.8-65%, moderate stress of 5.9-84.5%, and high stress of 6.7-99.2% [31]. It is crucial to note that low or moderate levels of stress may enhance students' motivation, leading to greater perseverance when studying and achieving future goals. Conversely, high levels of stress can have a negative influence on students, leading to depression and despair, thereby affecting students' health and academic levels [7]. Though, positive stress provide challenge that motivate students to work hard to achieve excellence, nurse educators should enforce better strategies to execute nursing curriculum so as to reduce the stress experienced by majority of the students. There were no differences in the levels of perceived stress between government and mission schools of nursing in Anamnbra State, Nigeria. This, ostensibly, could be due to the similar curricular and training format employed by the schools, despite the type of ownership.

The most commonly reported sources of stress among the students were related to clinical training. The major stressors in course of clinical training are associated with assignments and workload. This is followed by stress from teachers and nursing staff. There is need, therefore, to review the assessment and teaching methods used in nursing education in this study area, even as tutors and preceptors need to provide appropriate guidelines to students on how to carry out assignments given to them, while improving student-instructor relationships. Studies in China [32], Philippine [11], South-West Nigeria [20] and Northern Nigeria [22] also reported assignment and workload to be the most common sources of stress among student nurses. The congested programmes of nursing training in Nigeria, orchestrated by numerous examinations, assignments and clinical postings could explain this common source of stress. In Malawi, however, lecturers, clinical teachers and nursing staff were the major contributors of stress among students [28], while in Najran University, Saudi Arabia, stress from lack of professional knowledge and skills was the most common stressor, followed by stress from assignments and workload [33]. There is need for the school administrators and professional councils to develop policies that will support student nurses that will address the increasing levels of stress. Such policies should include reviewing the academic load of nursing students, improving the design of curricula, and providing some financial support for students with difficulties. Students should also have easy access to mental health counselling services, when necessary. Nursing educators should implement targeted training programmes based on the characteristics of nursing students to reduce the stress they may experience during the initial period of the clinical practicum.

From our findings, the mean physio-psycho-social response scale indicated best health status

for all the students, except in one of the schools (Iyi-Enu Mission Hospital, Ogidi), with a mean value indicative of good health status. The difference in the physio-psycho-social symptoms noted in this study may be related to specific attributes of the various training institutions. This result differed slightly from those of Northern Nigeria [22] and Philippine [11], where the physio-psycho-social response of the participants was reported as being in good health status. The outcome of this study's physio-psycho-social response could be an indication that students are able to regulate their emotions and adopt good strategies in coping with the stress at the schools.

Problem-solving behaviour was mostly adopted as the preferred coping strategy by majority of the students from all the schools, except those of Iyi-Enu Mission Hospital, Ogidi, who chose transference behaviour. There were no differences in the mean scores of all the coping strategies (problem-solving, staying optimistic, transference behaviours and avoidance strategy) among the institutions. The choice of problem-solving behaviour as the most adopted coping strategy by the students may be attributed to the knowledge on critical thinking, they have acquired in the course of their training, especially in the clinical setting, where they are involved in management of patients with various disease conditions. Other findings that corroborate with the present are those of Onieva-Zafra et al. [7] and Ajibade et al. [20]. However, the findings of Karaca et al. [34] and Ayaz-Alkya and Simones [35], reported avoidance behaviour, as the frequently used coping strategy, and Chaabane et al. [31], reported emotion-focused coping strategy differed from the present study. Avoidance behaviour was least used by students across all the various institutions in this study. The use of the problem-solving strategies requires individuals to make an active effort to understand problems and generate solutions. It also involves seeking social support for instrumental reasons like, asking others for help and developing social support. Transference behaviour is a form of mental disengagement, which is a dysfunctional coping strategy and requires the individual to become involved in other activities [31]. Students may use the avoidance strategy, particularly when they do not feel confident [36]. It is also seen as non-constructive and does not eliminate underlying problem.

The significant positive relationship of perceived stress level with physio-psycho-social responses and coping behaviour, implies that physio-psycho-social response and coping behaviour increased, as perceived stress level increased. Thus, the students' physical, psychological and social health are likely to become poorer, when they experience higher level of stress and unable to adopt coping strategies that will effectively deal with perceived stress, in the course of their training; a relationship that also observed in Northern Nigeria [22] and Philippine [11]. Perceived stress, however, had a significant negative relationship with family monthly income, an indication that students with low family monthly income had higher stress than those with higher family monthly income. This could be due to the fact that students from such families do not meet up with their financial demands, which may affect their responses to perceived stress. Sarier had reported that the level of family's income affects the academic achievement of students, with students in good financial status tending to perform better academically [37], apparently, since money will not be a barrier to providing the necessities that would help them perform well in school. Thus, it can be inferred that good academic achievement, to an extent, could possibly relieve students' stress. The hours spent in studying had a negative relationship with hours of sleep, while the hours of sleep had positive relationship with the respondents' family monthly income. Also, students who spent more hours studying have less hours of sleep. Much as less sleep might increase psychological stress, such is a positive stress, which would spur a student to study more in order to pass exams. Perceived stress had a relationship with marital status, with the singles having a higher perceived stress than the married. Obviously, married students tend to have relaxed minds, since they have their spouses and children to ease off with. The students' gender had a positive correlation with alcohol consumption and smoking habit, with the male students taking alcoholic drinks more than females, while only few male students smoke. This is expected since males tend to drink and smoke more in this part of Nigeria. It has however, been reported that students who did not drink alcohol had higher perceived stress level [34]. They stated that use of alcohol and smoking were ineffective ways of coping stress and would lead to a negative lifestyle.

5 Conclusion

Our study shows that majority (77.66 %) of student nurses have moderate level of perceived stress, while 8.83 % and 13.51 % had high and low levels of stress, respectively. Stress from assignments and workload comprised the most common sources of stress, followed by stress from teachers and nursing staff. The students' physio-psycho-social response scale indicate best health status for most of the institutions. The overall scores for all the institutions fell within moderate use of the coping strategies, and the coping strategy mostly adopted by the students was problem-solving behaviour. There were no differences in the stress levels, response or

coping strategies of the schools, irrespective of whether government- or mission-owned. Overall stress level of the student nurses had a significant positive correlation with physio-psycho-social response and coping behaviours.

6 Recommendations

There is need to reduce the number or intensity of stressors through curriculum revision or improving students' coping response by the authorities of the institutions. Schools of Nursing are advised to provide supportive learning environment and ensure a strong support system to equip both nursing students and educators with effective coping strategies. Institutions should know their role in improving stress management in their schools even as nurse educators should develop programmes like seminars and workshops to help prepare student nurses on coping behaviours over challenges they may encounter in the course of their training. Nurse educators should give out assignments at the commencement of a course to give reasonable time for students to accomplish the task. Further study is advocated on perceived stress level and academic performance outcomes of student nurses Anambra State.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

Afonne AJ: Designed the work, collected, analysed and interpreted the data and revised the manuscript.

Agbakoba NR: Approved the work and revised the manuscript.

Nwankwo CU: Approved the work, interpreted the data and revised the manuscript.

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