ORIGINAL ARTICLE

The Prevalence and Associated Factors of Stress among Engineering Students of Bells University in Nigeria during the COVID-19 Movement Control Order (MCO).

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Abstract

The novel coronavirus (COVID19) pandemic and the subsequent lockdown have taken the world by storm, forcing dramatic alterations to daily living and generating a considerable degree of worry, fear, and concern among university students. The pandemic has disrupted the education of over one billion students in 129 countries around the world. As universities worldwide shifted to emergency remote teaching (ERT) via online platforms, this has further caused anxiety amongst the students. This study was conducted to assess the prevalence and associated factors of stress among Engineering students at Bells university in Nigeria during the pandemic. Four hundred engineering students were randomly selected from Bells university during the movement control order. A cross-sectional online survey, using Cohen's perceived stress scale questionnaire, was distributed among the students to measure their perception of stress during the COVID-19 pandemic and lockdown. The questionnaire consisted of sociodemographic characteristics and stress-related variables. It was found that of the 400 respondents, 13.8%, 74.8%, and 11.5% experienced low, moderate, and high levels of stress, respectively. Female gender ($p < 0.05$), Igbo ethnicity ($p < 0.05$) and smoking ($p < 0.05$) were significantly associated with higher levels of stress. Age group, regular exercise, and average daily sleeping hours were not associated with stress levels. Negative changes were reported in family income status (44.3%), internet connection status (54.3%), and satisfaction with online classes (55.0%). However, negative changes to family income, internet status, and online classes were not associated with higher stress levels. It was then concluded that there is a significant association between gender, ethnicity, smoking and stress among Bells university students during MCO.

Keywords: *COVID-19; Engineering students; MCO; Pandemic; Prevalence; Stress.*

Introduction

In December of 2019, in the city of Wuhan China, a new virus known as COVID-19 emerged [1]. This new virus resulted in an atypical pneumonia presentation among patients, leading to its rapid global spread and emergence as a significant health concern. [2] There have been numerous viral diseases in the past 20 years including Severe Acute Respiratory Syndrome (SARS) in 2003, Middle East Respiratory Syndrome (MERS) in 2012, Influenza virus with the H1N1 subtype in 2009, Ebola virus in 2014, Severe Acute Respiratory Syndrome (SARS) in 2003 [3][4][5]. COVID-19 stands out from other respiratory viruses due to its severe lethality, high infectivity, and potential for significant social and economic devastation. [6]. COVID-19, a novel coronavirus, can range from mild symptoms to severe illnesses like MERS and SARS. Symptoms include fever, cough, sore throat, and more. Men with pre-existing conditions face higher risks. Severe cases may lead to respiratory failure or death, impacting mental health as well. [7]. During the virus outbreak, a wide array of psychological effects occurs across personal, community, national, and international levels. Personally, individuals may fear illness, feel vulnerable, and face stigma. [6] The pandemic has negatively impacted public mental health, potentially leading to psychological crises. [8] Health crises such as COVID-19 trigger psychological changes in healthcare workers and citizens, driven by stress, anxiety, fear, insecurity, or depression.[9]. The highly infectious nature of the COVID-19 virus has resulted in significant social, health, and economic impacts worldwide. [7]. As the COVID-19 pandemic spreads globally, it's causing widespread fear and anxiety, particularly among groups like caregivers, older adults, and those with underlying health issues. Anxiety and stress rates are already high, with potential increases in depression, loneliness, self-harm, substance abuse, and suicidal behaviors due to quarantine measures disrupting daily lives and livelihoods. [10]. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) reports over one billion students in 129 countries face disrupted education due to the pandemic. [11] Universities globally resort to emergency online teaching, heightening student anxiety. Research from China highlights the detrimental psychological impact of COVID-19 and lockdowns on college students, leading to increased anxiety levels. [12][13][14][15]. COVID-19 may prompt negative shifts in health behaviors like smoking, physical activity, sleep, and alcohol consumption. Social isolation measures in 2020 closed traditional activity spaces, impacting physical activity. While some adapt with alternate activities, others reduce activity due to lack of support or virus fears outdoors.

Amidst the COVID-19 pandemic, communities globally implement strategies like social distancing, closure of religious and educational institutions, and partial or full lockdowns to curb virus transmission. [16][17] Amidst the virus outbreak in Nigeria and its rapid escalation, the government implemented measures to curb its spread. On March 30, a movement restriction order was announced in major states like Lagos, Abuja, and Ogun. [18]. The MCO imposed restrictions on gatherings, closed religious institutions, companies, airports, stores, markets, and suspended public meetings, schools, and universities. Despite their effectiveness in reducing virus spread, studies indicate that prolonged isolation or quarantine can negatively impact mental well-being, leading to symptoms such as low mood, insomnia, stress, anxiety, anger, irritability, emotional exhaustion, depression, and post-traumatic stress. This study aims to assess stress levels among engineering students at Bells University during COVID-19 and the MCO and identify associated factors.

This research addresses the substantial impact of the COVID-19 pandemic on public mental health. While numerous studies have explored its effects globally, including in China and Western countries, there's a gap in research within Nigeria. This study aims to fill this gap by examining the

socio-psychological effects of the pandemic and lockdowns on engineering students at Bells University between September 2020 and March 2021.

The study's findings can aid Nigerian colleges and universities in establishing frameworks for assessing students' psychological well-being and implementing evidence-based interventions during future pandemics. They can also offer policymakers guidance on mitigating the impact of anxiety on students during health crises. Additionally, the results will provide baseline data on the prevalence of perceived stress among undergraduates at Bells University of Technology, informing the institution and its departments about student stressors, psychological distress, and social support needs.

Methodology

To gauge stress prevalence among engineering students at Bells University during the peak of COVID-19 and the MCO in Nigeria, exploratory research employed a cross-sectional survey using the Cohen's Perceived Stress Scale from September 2020 to March 2021. Participants were selected from the engineering department at Bells University using simple random sampling. Unique identification numbers were assigned to each engineering student, and Random Digit Numbers generated by OpenEpi software were matched to these identification numbers. Students corresponding to the selected random numbers were included in the sample and invited to participate via Google Forms shared on platforms like WhatsApp. Participation was voluntary, with students providing consent before starting the survey. Confidentiality was ensured, as no names were required. The research instrument included sociodemographic characteristics and stress-related variables such as age, gender, ethnicity, smoking, sleep duration, exercise habits, family income, online class satisfaction, and internet connection status.

Sample Size
374 sample populations were selected from the source population.
The estimated sample size required for the study was calculated thus:

$$n = \frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$$

n = estimated sample size required.
Za [Z alpha] = $Z_{1-\alpha/2}^2$ = is the value of standard normal variables (at 5% type 1 error ($p<0.05$) it is 1.96 and at 1% type 1 error ($p<0.01$) it is 2.58. As in most studies, p values are considered significant below 0.05 hence 1.96 is used in the formula.
Zα= the value of standard normal variables at 95% confidence interval = 1.96.
α = type I error = 0.05 (5%) (at 95% confidence interval)
P= the prevalence of stress and stressors among first-year undergraduate students at a private medical school in Nigeria =52% (Fasoro *et al.*, 2019) (result from similar research).
d = Absolute marginal error or precision 5%.

$$SAMPLE\ SIZE = \frac{1.96^2 \times 0.52(1-0.52)}{0.05^2} = 384$$

n = 0.84/ 0.0025 = 384
n = 384 + 38 = 422 (38 = additional 10% for non-response rate)
Simple random sampling was used to select 422 Engineering students from three departments at Bells University (Civil Environmental Engineering, Electrical Electronics, Mechanical and Biomedical Engineering). This sample, aiming for a 5% marginal error and 95% confidence interval, resulted in 400 successfully retrieved questionnaires, yielding a retrieval rate of approximately 94.79%.

Study Instrument
The study utilised the Cohen Perceived Stress Scale, a validated questionnaire comprising sociodemographic characteristics and stress-related variables. All participants completed the Perceived Stress Questionnaire (PSQ), a widely used psychological instrument for measuring stress perception. PSS scores are obtained by

reversing the scores for questions 4,5,7, and 8 (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1, and 4 = 0) and then summing up the scores across all scale items. Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores ranging from 0-13 would be considered low stress, 14-26 would be considered moderate stress and scores ranging from 27-40 would be considered high perceived stress.

Data Analysis
IBM SPSS version 19 software (IBM Corporation, NY, USA) was used in data analysis. Chi-square analysis was used to determine the factors associated with levels of perceived stress with the level of significance set at $p < 0.05$.

Ethical Consideration
This research study obtained ethical approval from the institutional review board (IRB) of the university involved.

Results

Demographic analysis

In this study, 422 questionnaires were distributed. Following data cleaning, 400 responses were received and deemed usable. The demographic characteristics of the respondents are shown in Table 1. Among the 400 respondents, 60% were males, and the majority were in the older age group, consisting of 312 respondents (78%). Almost one-third of the respondents were Igbos (29.8%). Majority (78%) of the students did not smoke, and a little over half (51.5%) of the respondents reported less than 6.9 hours of sleep, while less than half of the students regularly exercised. A substantial number (44.3%) of the students also reported a decrease in family income during the pandemic. At the time of data collection, almost all the university students were on virtual mode of learning. Most of the students in this study were dissatisfied with online learning modes, and over half of the students (54.4%)

reported bad internet connections during the pandemic.

Level of stress among engineering students during MCO

Based on Cohen's perceived stress scale, out of the 400 respondents in the study sample, 55 (13.8%), 299 (74.8%), and 46 (11.5%) experienced low, moderate, and high levels of stress respectively (Table 2).

Factors associated with engineering students' stress levels during the pandemic

Chi-square analysis
The results from the chi-square analysis for the test of association between engineering students' demographic variables and stress are shown in **Error! Reference source not found.** . Among the tested variables, gender, ethnicity, smoking status were significant at p value < 0.05.

Discussion

The result of this study revealed that 13.8% of undergraduate students experience low levels of stress, with 74.8% experiencing moderate levels of stress, and only 11.5% having high levels of stress. This finding is consistent with that of Cao et al., (2020) [13], Odriozola-González et al., (2020) [19] and Sundarasen et al., (2020) [20]. The result however differed when compared with previous research "evaluating the prevalence of stress among UK university students" by Denovan et al., (2019) [21]. In comparison, more Bells engineering students experienced higher stress levels. The elevated levels of stress in the study might be attributed to the inclusion of only engineering students as participants, rather than students from all faculties. Variations in results may arise from differences in measurement periods during the COVID-19 pandemic, as well as cross-cultural disparities, both of which should be taken into account when assessing perceived stress among the student population. Conversely, the findings corroborate previous research

indicating increased stress levels among students during the COVID-19 pandemic. Additionally, within this study, female students exhibited a higher prevalence of stress compared to their male counterparts. Consistent with other research, female students reported significantly elevated stress levels compared to males. [15][22][23][24][25][26].

Females generally express emotions to a greater extent than males do, and the recent pandemic may have exacerbated this situation. Studies have shown that females' uncertainty tolerance threshold is lower than that of males, and crossing that threshold triggers undue stress. Female students may further be subject to fewer coping strategies in times of uncertainty and stressful situations. The findings also revealed a correlation between ethnicity and perceived stress levels, indicating that Igbo undergraduates exhibited higher stress mean scores compared to students of other ethnicities.This is in line with research done by Ekpenyong, Daniel and Aribo, (2013) [27] which suggested that individual variables like age, sex, lifestyle, ethnicity among others can influence one's response to stress. This may be as a result of cultural differences and beliefs existing in each ethnic group. Particularly, the Igbos, renowned for their industriousness, many of them manage small businesses, a significant portion of which have been forced to close due to lockdown measures, adversely impacting their income sources. This economic strain could contribute to their elevated stress levels relative to others. This contrasts with research done by Mirza and Jenkins, (2004) [28], LN et al., (2008) [29]; Omotola, (2018) [30]; Sundarasen et al., (2020) [20], which found no evidence for a particular ethnicity to be susceptible to depression, anxiety, and stress. However, the minority ethnic group may predispose to this psychological distress.

This study revealed that smokers reported higher perceived stress levels compared to non-smokers. Given COVID-19's respiratory nature and smokers' increased susceptibility to respiratory infections, this population faces a significant risk of adverse events. Initial findings from China indicate a potentially strong association [31], or at least a trend [32] towards smoking being associated with poor prognosis in COVID-19 cases. Supported by a prior survey conducted during periods of self-isolation, lockdown, and social distancing, it was discovered that female gender, younger age, lower annual income, smoking, and multiple physical morbidities were associated with an increased risk of mental health issues. [33] While further research is necessary, there is a pressing need for health promotion initiatives aimed at informing the population about the heightened risks faced by smokers during the COVID-19 pandemic.

This study reveals that perceived stress correlates with gender, student ethnicity, and smoking status. It underscores the necessity for increased support for students experiencing stress, particularly among marginalized groups. Neglecting this issue in higher education can severely impact mental health and quality of life. The findings emphasize the importance of tailored counseling interventions targeting stress sources among specific student demographics, such as Igbo students, females, and smokers. Incorporating stress management into orientation programs, especially for engineering students, is recommended to mitigate academic and social repercussions.

Conclusion

The stress-test questionnaire showed significant associations between various factors and stress levels among Bells University students during MCO. Notably, gender, ethnicity, and smoking correlated significantly with stress levels. However, no significant associations were found with age, sleeping hours, exercise, family income, satisfaction with online classes, or internet connection status. The study faced limitations in participant recruitment and relied on self-reported measures, potentially impacting data accuracy. Generalization is limited to Bells University engineering students. Recommendations include

implementing health promotion strategies, providing psychological services, and offering financial support programs. Combating misinformation and adjusting the curriculum for online learning are advised. Further research is recommended to explore stress severity, coping strategies, and qualitative evaluation of e-learning challenges among undergraduates on a wider scale nationally, regionally, and internationally.

Competing interest

The author declares no competing interest.

Table 1. Demographic characteristics of the respondents

Variables	Frequency	%
Age group		
Younger age group (<19 years old)	88	22
Older age group (>20 years old)	312	78
Gender		
Male	240	60
Female	160	40
Ethnicity of participants		
Yoruba	73	18.3
Igbo	119	29.8
Hausa	132	33.0
Others	76	19.0
Smoking status		
Yes	87	21.8
No	313	78.3
Average sleeping hours		
Less than 6.9 hours	206	51.5
7 hours and above	194	48.5
Regular exercise		
Yes	182	45.5
No	218	54.5
Family Income Status		
Decreased	177	44.3
Increased	24	6.0
The Same	199	49.8
Online Classes		
Less Satisfied	220	55.0
The same	108	27.0
Very Satisfied	72	18.0
Internet Connection Status		
Bad	217	54.3
Fair	99	24.8
Good	84	21.0

Table 2. Stress levels based on Cohen's classification

Level of stress	Frequency	Prevalence
Low	55	13.8%
Moderate	299	74.8%
High	46	11.5%
Total	400	100%

Table 3. Results from Chi-square test

Variable	Low Stress	Moderate Stress	High Stress	Chi-Square p-Value
Age				0.258
Younger age group	16 (18.2%)	60 (68.2%)	12 (13.6%)	
Older age group	39 (12.5%)	239 (76.6%)	34 (10.9%)	
Gender				0.008*
Male	43 (17.9%)	168 (70%)	29 (12.1%)	
Female	12 (7.5%)	131 (81.9%)	17 (10.6)	
Ethnicity				0.011*
Yoruba	14 (19.2%)	50 (68.5%)	9 (12.3%)	
Igbo	21 (17.6%)	89 (74.8%)	9 (7.6%)	
Hausa	18 (13.6%)	101 (76.5%)	13 (9.8%)	
Others	2 (2.6%)	59 (77.6%)	15 (19.7)	
Smoking Status				
Yes	6 (6.9%)	62 (71.3%)	19 (21.8%)	0.001*
No	49 (15.7%)	237 (75.7%)	27 (8.6%)	
Average sleeping hours				
Less than 6.9 hours	23 (11.2%)	159 (77.2%)	24 (11.7%)	0.300
7 hours and above	32 (16.5%)	140 (72.2%)	22 (11.3%)	
Regular exercise				
Yes	19 (10.4%)	141 (77.5%)	22 (12.1%)	0.213
No	36 (16.5%)	158 (72.5%)	24 (11%)	
Family Income Status				0.599
The same	25 (12.6%)	152 (76.4%)	22 (11.1%)	
Increased	3 (12.6%)	16 (66.7%)	5 (20.8%)	
Decreased	27 (15.3%)	131 7(4.0%)	19 (10.7%)	
Online Classes				0.293
The Same	12 (11.1%)	85 (78.7%)	11 (10.2%)	
Less Satisfied	29 (13.2%)	161 (73.2%)	30 (13.6%)	
More Satisfied	14 (19.4%)	53 (73.6%)	5 (6.9%)	
Internet Connection Status				0.265
Good	14 (16.7%)	58 (69%)	12 (14.3%)	
Fair	15 (15.2%)	78 (78.8%)	6 (6.1%)	
Bad	26 (12%)	163 (75.1%)	28 (12.9%)	

Note: Variables significant at $p < 0.05$

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