

Covid-19 Pandemic and Its Psychological Effects On Health Care Workers In A Socio-Economically Challenged Environment; A Cross-Sectional Analytical Study

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Abstract

Background: COVID-19 pandemic, an unprecedented global public health event, is a potential precipitating factor of psychological distress especially among Health Care Workers (HCWs) in developing countries already operating under challenging socioeconomic conditions. The study aims to assess the prevalence, sociodemographic patterns and predictors of stress, anxiety and depression during the COVID-19 Pandemic among HCWs in a socio-economically challenged environment.

Methods: A cross-sectional analytical design used convenience and snowballing techniques to enrol 386 HCWs from public health institutions in Imo State, Nigeria from 2nd to 27th October 2021. A structured online questionnaire was used and the Kruskal Wallis H test and Logistic Regression were performed at a significance level, $p \leq 0.05$.

Results: Prevalence and sample median levels of stress, anxiety and depression among the HCWs were 76.7% (18.0), 32.6% (43.8) and 33.4% (45.6) respectively. The median stress levels in the following subcategories were above the stress cut-off point (13.9) and were the highest amongst their respective subcategories. Those aged 20-29 years, female, single and also, those on the job for less than 1 year; who usually take public transport and are without training in infection, prevention and control (IPC). Similarly, the median anxiety levels in females and those without IPC training were above the anxiety cut-off point (49.9) and were highest amongst their respective subcategories and also, the median depression levels in females and single HCWs were above the depression cut-off point (52.9) and were highest amongst their respective subcategories. However, singles compared to married HCWs were significantly more likely to experience anxiety (OR: 1.84; $p=0.049$). and also, females compared to male HCWs were significantly more likely to experience either anxiety (OR: 1.76; $p=0.013$) or depression (OR: 1.88; $p=0.006$).

Conclusion: The prevalence of stress, anxiety and depression appear to be high among HCWs, particularly in those that are young, female and single. Therefore, it is essential that even though, mental health and psychosocial support services should be accessible to all HCWs, priority services should be made available, accessible, and timely to those that are young, female and single.

Key Words: Psychological Effects, Sociodemographic Patterns, HCWs, COVID-19, Nigeria

Introduction

COVID-19 pandemic, an unprecedented global public health event has created an environment with significantly increased but varying levels of physical and psychological pressures affecting especially the health care systems across the globe [1]. Already, the health care services are generally recognized as demanding and stressful on the healthcare worker (HCW), particularly in socio-economically challenged environments with multiple stressors from the commencement of training to the provision of service as a trained HCW [2,3]. So, the risk of exposure to COVID-19 or any

infectious deadly disease within this environment is a potential precipitating factor of psychological distress. Therefore, HCWs especially doctors who are continually faced with increased pressure; professional and personal responsibilities could succumb to the psychological challenges of anxiety and depression as a result of stress; which is a processed response to pressure [2,4]. A study in Canada reported that HCWs suffered significant psychological effects such as emotional and post-traumatic stress; anxiety and depression during and after an infectious disease outbreak [5].

Globally, despite the availability of vaccines and awareness of preventive protocols, the COVID-19 virus is still spreading and having a significant impact on society. This may be a result of the significant disparities in global vaccination coverage, the evolution of mutations and vaccine hesitancy [6]. This unabating infection with the challenges of control, gives the impression that the infection is here with us for the long haul and as a consequence, the burden of a range of mental health outcomes including but not limited to stress, fear and anxiety, depression, anger, exhaustion and sleep dysfunction becomes an increasing concern [2,7]. Several studies have shown that multiple stressors as a result of the COVID-19 pandemic could induce this range of mental health outcomes [8-10].

The pandemic has significantly affected the socio-cultural and economic lives of people with the reduction and change in the pattern of usual social, cultural and family activities. In certain cultures, hugs and kisses are ways of interaction and also a source of emotional support and this, was affected during the pandemic as a consequence of the protocol of social distancing. Similarly, personal finances were affected by reduced and, in some cases, lost earnings due to job loss or inability to conduct business activities that require physical presence. These effects could lead or increase symptoms of anxiety and depression which appear to be the most common mental health outcomes that could occur either singly or together resulting in varying degrees of presentation that may interfere with the quality of patient care [7,11-15].

Adverse psychological presentation could result when HCWs are plagued with such concerns as fear and uncertainty of infection, worrying about taking the virus home and infecting family, conflicting media information, inadequate and in some instances non-availability of personal protective equipment, the need to help others and at the same time protect self and also, not being supported or protected by the institution or Government [16].

In sub-Saharan Africa, the psychological impact of COVID-19 could be devastating on HCWs due to the existing, poor socio-economic structures with associated weak mental health care systems and low service uptake. These poor socio-economic structures are the result of an environment plagued with poor infrastructural development rooted in structural, systemic and socio-political lapses [17]. The challenges of inconsistent and in some cases, complete disruption of electric power and water supply, poor road networks and local transportation difficulties are the stark realities of our environment [17,18]. Furthermore, the health sector is not spared with a lack of appropriate and functional health facilities, several months of salaries being owed to some health care workers and associated poor welfare services [19]. All these challenges could lead to psychological effects on health care workers which could also worsen from knowing that it would be an even greater challenge to pay for treatment in the event they are infected with COVID-19 virus. This is compounded by the reality that the payment for health services is out-of-pocket; the health insurance schemes for HCW

are poorly functioning or non-existent and the general doctors' attitude of reluctance in seeking medical attention as mild cases of psychological effects could worsen without treatment [20,21]. A qualitative study of frontline HCWs during the earlier stages of the COVID-19 pandemic in Nigeria gave insights such as the psychological trauma experienced as a result of exhaustion from long hours of work and wearing personal protective equipment; frustration from being quarantined or isolated and kept away from loved ones; fear of being infected as you see colleagues getting infected; lack of support from the Government with no health insurance to pay for care when infected; and stigmatization from colleagues, friends and family [22].

The African infrastructure development index that indicates the status of infrastructure development across the African continent reported in 2020 that Ghana with 30.13 had a higher infrastructure index when compared to Nigeria with 23.27 and Ethiopia with 10.49 [23]. Furthermore, a study in Ghana among HCWs observed a lower level of mild to severe stress, anxiety and depression during the pandemic of 8.2%, 27.8% and 21% respectively when compared to the study done among HCWs in Ethiopia where there was a higher prevalence of depression, anxiety, and stress of 58.2%, 64.7%, and 63.7%, respectively [24,25]. These studies used the same psychological screening tool and were conducted during similar periods and they probably highlight a possible relationship of infrastructure development and psychological effects during the COVID-19 pandemic.

In Nigeria, as of 31st October 2021 according to the Nigerian Centre for Disease Control, the total number of confirmed cases was 211,961 (110 cases per 100,000) and the total number of death cases was 2894. In Imo State, the South-Eastern part of Nigeria, the total number of confirmed cases was 2,078 (38 cases per 100,000 persons) and the total number of death cases was 41 [26]. It would appear that the impact of the pandemic in Imo State was not as significant when compared to communities in parts of Southwestern Nigeria like Lagos State, where the total number of confirmed cases was 77,808 (620 cases per 100,000 persons) and the total number of death cases was 752. Probably, the low level of impact of COVID-19 in Imo State could be due to inadequate testing, misclassification of deaths or the level of natural immunity.

This may explain why there is a less than optimal uptake of the COVID-19 vaccines in the State among HCWs [27]. However, this does not preclude the fear and anxiety associated with being infected or the anticipation of being mandated to take the vaccine as a vaccine-hesitant HCW. In as much as fear is a driver for psychological effects, the presence of psychological resilience may influence the likelihood of its occurrence [28]. Imo State is a socioeconomically challenged environment plagued with poor social amenities, health, social, economic and personal insecurities. These constitute multiple stressors and their persistent effect over time could have resulted in the development of HCWs with a resilient mindset, attitude and behaviour. These components of

psychological resilience enhance adaptive stress reactions and invariably could affect levels of anxiety and depression [29].

Therefore, this study's objective was to assess the prevalence, sociodemographic patterns and predictors of stress, anxiety and depression during the COVID-19 Pandemic among Health Care Workers in a socioeconomically challenged environment.

Methods

Study Area

The study area is Imo State, located in the South-Eastern part of Nigeria which occupies a surface area of 5289 square kilometres with a total population of 3.93 million (2.03 million males and 1.9 million females) according to the 2006 census and an annual growth rate of 3.2% [30]. The State is delineated into three senatorial geopolitical zones; Owerri, Orlu and Okigwe. The study was carried out at Imo State University Teaching Hospital located in Orlu geopolitical zone and in both the Federal Medical Centre and Specialist Hospital Umuguma located in Owerri geopolitical zone. The State is multicultural at different levels of social and economic development.

Study Population/Study design/Selection Criteria

The Health Care Workers in Imo State University Teaching Hospital, Federal Medical Centre and Specialist Hospital Umuguma constitute the study population. The study, a cross-sectional analytical design included all Health Care Workers with no exclusion criteria.

Sample Size Estimation

The Cochran formula was used to calculate the minimum sample size [31]. The prevalence of psychological effects among HCWs was assumed to be 50% with a tolerable margin of error of 5% and a standard normal deviate at a 5% level of 1.96. The minimum sample size (n) was calculated as 384 but the questionnaire link was distributed to 386 participants.

Sampling Technique

Imo State University Teaching Hospital, Federal Medical Centre and Specialist Hospital Umuguma were purposively selected for the study and the HCWs were selected using convenience and snowballing sampling techniques. The participants were individually met and after informed consent, they were enrolled and the questionnaire link was sent to their WhatsApp platform or email address.

Data Collection Tool and Analysis

A structured, online self-administered questionnaire was developed using the Survey Heart online questionnaire and poll platform. The Survey Heart online questionnaire link was distributed to participants and the data was collected from 2nd to 27th October 2021. The questionnaire comprises 4 sections. Section A; Socio-demographic Characteristics, Section B; Level of Stress adopted from the Perceived Stress Scale, Section C; Mental Wellbeing

(Anxiety) adopted from Zung Self Rating Anxiety Scale and Section D; Mental Wellbeing (Depression) adopted from Zung Self Rating Depression Scale. See the questionnaire in the supplementary file.

Stress was assessed using the Perceived Stress Scale 10 (PSS-10) developed by S. Cohen et al [32]. The scale has been widely evaluated to have significant valid and acceptable psychometric properties [33]. The scale uses 10 Likert-type questions scored on 5 levels, which measures the degree to which life situations during the last month are judged to be stressful through feelings and thoughts. The scores range from 0 for 'never' to 4 for 'very often'. For questions with a positive outlook (4, 5, 7, 8), the scoring started from 0 for 'very often' to 4 for 'never'. The score for each respondent was summed up and the levels of stress were assessed using the following scale; 0-13 = Low stress, 14-26 = Moderate Stress, 27-40 = High Stress.

Anxiety and depression were assessed using self-assessment scales developed by W. Zung in 1971 and 1965 respectively [34, 35]. These scales have been evaluated and established to have acceptable psychometric properties [36,37]. Each scale assesses the frequency of symptoms of anxiety and depression in the past week using 20 Likert-type questions scored on 4 levels; 1 for a little bit of the time, 2 for some of the time, 3 for a good part of the time and 4 for most of the time. For positively connoted questions, the scoring started from 1 'for a little bit of the time' to 4 'for most of the time'. For a negatively connoted question, the scoring started from 1 'for most of the time' to 4 'for a little bit of the time'. In the Anxiety Scale, the following five questions are positively connoted 5, 9, 13, 17 and 19. In the Depression Scale, the following ten questions are positively connoted 2, 5, 6, 11, 12, 14, 16, 17, 18 and 20. The score for each respondent was summed up to get the total score which was translated to an index Score by multiplying by a factor of 1.25. The levels of anxiety were assessed using an index score scale. Less than 50= No Anxiety; 50-59= Mild Anxiety; 60-69= Moderate Anxiety; 70 and above= Severe Anxiety. The levels of depression were assessed using an index score scale. Less than 53= No Depression; 53-62= Mild Depression; 63-72= Moderate Depression; 73 and above= Severe Depression.

The database from the Survey Heart online questionnaire platform was downloaded in excel format. The data was validated and exported to the Software Package for Social Sciences (IBM-SPSS) version 22 and subsequently analysed. Frequency tables and summary indices were generated using the PSS scores and the index scores of anxiety and depression levels. Kruskal Wallis H test, posthoc pairwise comparisons with Bonferroni correction and Binary Logistic Regression analyses were done with the level of significance set at $p \leq 0.05$.

The regression model with the best data-model fit and a significant improvement from the null included the following sociodemographic variables; age, gender, marital status, educational level

and status of infection prevention control training in predicting stress, anxiety and depression.

Study Limitation

The assessment of stress, anxiety and depression is based on perception and self-assessment, and therefore, subject to bias. The structured nature of the questionnaire limits expressive thoughts and the assessments by their respective scales are not diagnostic.

Ethical Consideration

Ethical clearance was given by the ethical committee of Imo State

University and permission was sought from the management of the health care facilities participating in the study. Informed consent was given by the respondents. All authors hereby declare that the study was performed in accordance with international ethical standards.

Results

Three hundred and eighty-six participants received the questionnaire link and all returned a completely filled form with a response rate of 100%.

Table 1: Socio-demographic characteristics of HCWs in Imo State

Variable	Frequency (N=386)	Per cent
Age (Years)		
20-29	190	49.2
30-39	133	34.5
40 and above	63	16.3
Gender		
Male	227	58.8
Female	159	41.2
Marital Status		
Single	257	66.6
Married	129	33.4
Religion		
Catholic	177	45.9
Pentecostal	107	27.7
Anglican	90	23.3
*Other religion	12	3.1
Health Care Workers		
Doctor	166	43.0
Nurse/Midwife	67	17.4
Pharmacists	29	7.5
Lab Scientist	30	7.8
**Other HCWs	94	24.4
Educational level		
Up to Diploma	26	6.7
First degree	260	67.4
Postgraduate	100	25.9
Years at present work		
Less than 1 year	134	34.7
1-5 years	158	40.9
More than 5 years	94	24.4
Mode of usual transport to work		
Public transport	213	55.2
Private transport	173	44.8
Training in Infection Prevention Control (IPC)		
Yes	291	75.4
No	95	24.6

**Environmental officer, Hygiene officer, Community Health officers, Technicians, Technologist

*Islam, Traditional Religion

Table 1 shows that the majority of the respondents were male (58.8%), single (66.6%), within the ages of 20 to 29 years (49.2%), of the Catholic faith (45.9%) and with a first degree as the highest level of education (67.4%). More than three-quarters of the

respondents had been trained in infection prevention and control (75.4%) with a majority on the present job for about 1 to 5 years (40.9%) and using public transportation to get to work (55.2%).

Table 2: Prevalence of Psychological Effects among HCWs in Imo State

Psychological Effects	Frequency (N=386)	Per cent
Levels of Stress Symptoms		
Low Stress	90	23.3
Moderate Stress	268	69.4
High Stress	28	7.3
Median (IQR) = 18.0(7.0)		
Levels of Anxiety Symptoms		
No Anxiety	260	67.4
Mild Anxiety	79	20.5
Moderate Anxiety	38	9.8
Severe Anxiety	9	2.3
Median (IQR)= 43.8(14.0)		
Levels of Depression Symptoms		
No Depression	257	66.6
Mild Depression	90	23.3
Moderate Depression	34	8.8
Severe Depression	5	1.3
Median (IQR)= 45.6(20.0)		

Table 2 shows that the prevalence of stress, anxiety and depression symptoms among the HCWs were 76.7%, 32.6% and 33.4% respectively. Furthermore, the sample median levels of stress, anxiety and depression symptoms in the study were 18.0, 43.8 and 45.6 respectively.

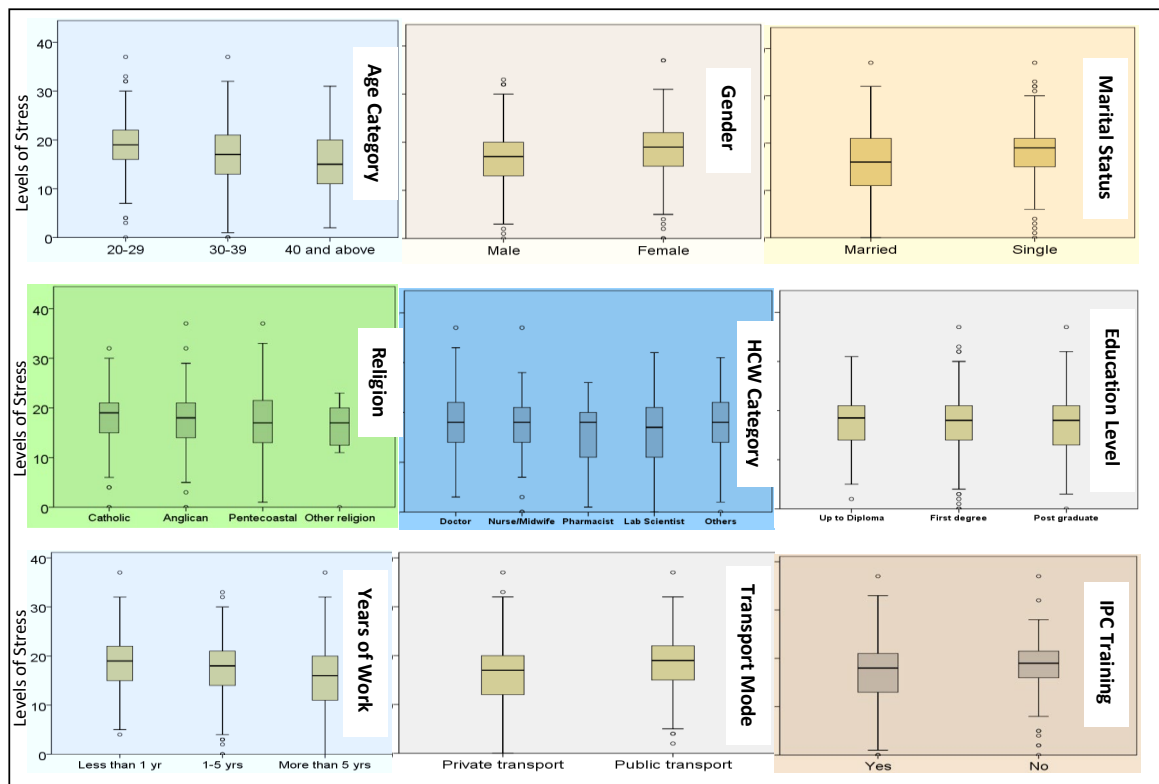


Figure 1: Patterns of Levels of Stress symptoms and Sociodemographic Characteristics of HCWs

Figure 1 shows the distribution of the levels of stress symptoms across the sociodemographic categories.

The distributions of stress levels within each category of age ($H\chi^2[2] = 24.598, p=0.000$), gender ($H\chi^2[1] = 15.601, p=0.000$), marital status ($H\chi^2[1] = 15.535, p=0.000$), number of years at present job ($H\chi^2[2] = 14.394, p=0.001$), mode of transport to work ($H\chi^2[1] = 10.265, p=0.001$) and status of IPC training ($H\chi^2[1] = 4.925, p=0.026$) appeared to be significantly different across their respective sub-categories.

Furthermore, the median stress levels of the subcategories; 20-29 years, female, single, less than 1 year on the job, public transportation and no IPC training were above the stress cut-off point of 13.9. However, the distributions of stress levels within each category of

religion, the cadre of HCWs and educational level did not appear to be significantly different across their respective sub-categories ($p>0.05$).

Within the age category, the distribution of stress levels appeared to be significantly different between respondents aged 20 to 29 years and 40 years and above ($H\chi^2[1] = 70.329, *p=0.000$) and also between respondents aged 20 to 29 years and 30 to 39 years old ($H\chi^2[1] = 46.094, *p=0.001$). Similarly, the distribution of stress levels for respondents who had been in their present job for more than 5 years also appeared to be significantly different from those who had been on the job for less than 1 year ($H\chi^2[1] = 56.708, *p=0.000$). ($H\chi^2$ =Kruskal Wallis H Statistic, * p = Bonferroni adjusted p-value).

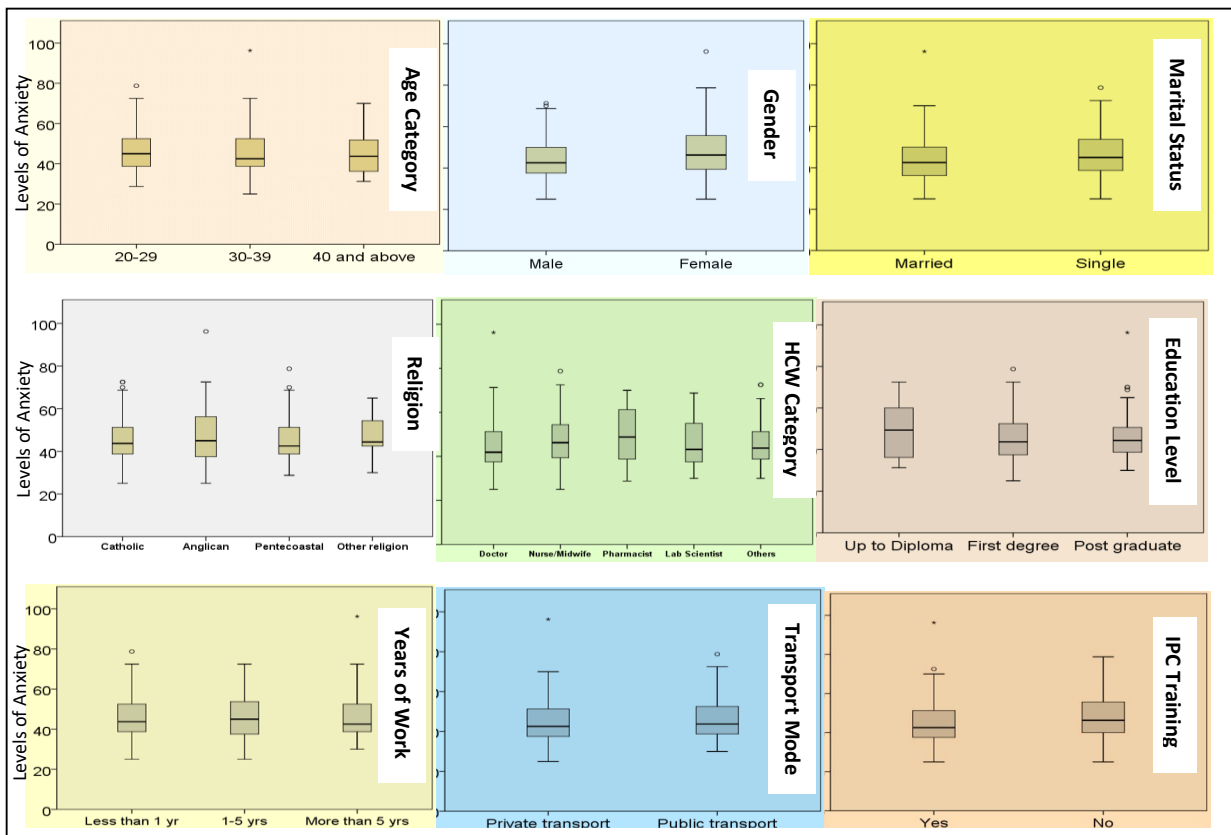


Figure 2: Patterns of Levels of Anxiety symptoms and Sociodemographic Characteristics of HCWS

Figure 2 shows the distribution of the levels of anxiety symptoms across the sociodemographic categories. The distributions of anxiety levels within each category of gender ($H\chi^2[1] = 7.396, p=0.007$) and status of IPC training ($H\chi^2[1] = 3.965, p=0.046$) appeared to be significantly different across the respective sub-categories. Furthermore, the median anxiety levels of the subcategories; female, and those with no IPC training were above the anxiety cut off point of 49.9.

However, the distributions of anxiety levels within each category of age, marital status, religion, the cadre of HCWs, educational level, number of years at present job and mode of transport did not appear to be significantly different across their respective sub-categories ($p>0.05$).

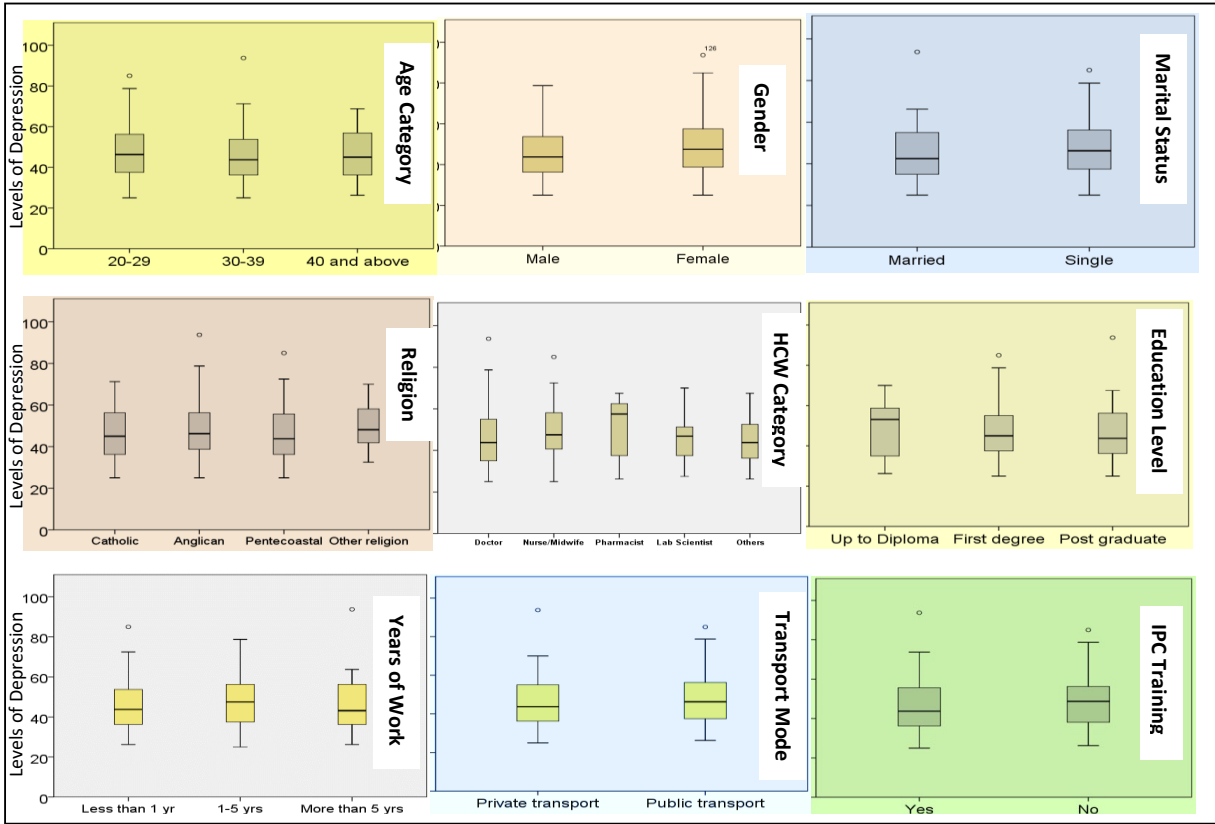


Figure 3: Patterns of Levels of Depression symptoms and Sociodemographic Characteristics of HCWS

Figure 3 shows the distribution of the levels of depression symptoms across the sociodemographic categories. The distributions of depression levels within each category of gender ($H\chi^2[1] = 6.215$, $p=0.013$), marital status ($H\chi^2[1] = 4.881$, $p=0.027$) and the cadre of HCWs ($H\chi^2[4] = 10.204$, $p=0.037$) appeared to be significantly different across their respective sub-categories. Furthermore, the median depression levels of the subcategories; female, single, nurses, pharmacists and laboratory scientists were above the depression cut-off point of 52.9.

However, the distributions of depression levels within each category of age, religion, the status of IPC training, educational level, number of years at present job and mode of transport to work did not appear to be significantly different across any of their respective sub-categories ($p>0.05$). Furthermore, it appeared that there was a significant difference between Doctors and Nurses and similarly, between Doctors and Pharmacists, however, after pairwise comparison and Bonferroni correction, the differences between these sub-groups appeared not to be significant ($p>0.05$).

Table 3: Predictors of Stress, Anxiety and Depression symptoms among HCWs in Imo State

Variable	Perceived Stress			Anxiety			Depression		
	Odds Ratio	95% CI	pvalue	Odds Ratio	95% CI	pvalue	Odds Ratio	95% CI	pvalue
Age (Yrs)									
20-29	2.770	1.163-6.600	0.021	0.546	0.238-1.249	0.152	0.544	0.239-1.236	0.146
30-39	1.382	0.680-2.808	0.371	0.744	0.359-1.543	0.427	0.552	0.269-1.135	0.106
40 and above	1.000	-----	-----	1.000	-----	-----	1.000	-----	-----
Gender									
Male	0.661	0.392-1.114	0.120	0.569	0.364-0.887	0.013	0.533	0.341-0.833	0.006
Female	1.000	-----	-----	1.000	-----	-----	1.000	-----	-----

Marital Status									
Married	0.572	0.304-1.077	0.084	0.544	0.297-0.998	0.049	0.555	0.341-0.833	0.060
Single	1.000	-----	-----	1.000	-----	-----	1.000	-----	-----
Educational level									
Up to Diploma	0.631	0.209-1.911	0.416	2.234	0.880-5.672	0.091	1.700	0.674-4.287	0.261
First degree	0.655	0.350-1.224	0.184	1.125	0.636-1.989	0.687	0.713	0.408-1.246	0.235
Postgraduate	1.000	-----	-----	1.000	-----	-----	1.000	-----	-----
IPC Trained									
Yes	0.575	0.301-1.099	0.094	0.767	0.462-1.273	0.304	0.687	0.414-1.139	0.146
No	1.000	-----	-----	1.000	-----	-----	1.000	-----	-----

Table 3 shows that respondents who were within the ages of 20 to 29 years compared to those who were aged 40 years and above were significantly more likely to experience stress symptoms (OR: 2.77; 1.1636.600, $p=0.021$).

Respondents who were female compared to males were significantly more likely to experience anxiety (OR: 1.76; 1.127-2.744, $p=0.013$) and depression symptoms (OR: 1.88; 1.200-2.929, $p=0.006$). Similarly, respondents who were single compared to those who were married were significantly more likely to experience anxiety symptoms (OR: 1.84; 1.002-3.369, $p=0.049$).

Discussion

This study assessed the prevalence, sociodemographic patterns and predictors of stress, anxiety and depression symptoms during the COVID-19 Pandemic among Health Care Workers in Imo State, Nigeria.

The prevalence of stress symptoms was 76.7%, with more than two-thirds of HCWs (69.4%) in this study experiencing moderate levels of stress and about 7.3% experiencing high levels of stress. This distribution of stress levels was similarly observed in a study done in Nepal among HCWs in a tertiary health care centre during the COVID-19 pandemic using the Perceived Stress Scale. The study reported the prevalence of moderate and high-stress levels to be 67.8% and 7.4% respectively [38]. In the present study, young HCWs aged 20-29 years within the age category appeared to have the highest median level of stress and this was probably due to the fact that a majority of them (58%) had been on the job for less than one year and therefore, were still adjusting to the various challenges of a new job coupled with the strain of COVID-19 on the health care system. Also, the study observed that HCWs who had been on the job for less than one year had a significantly higher median level of stress than those on the job for more than five years with about 80% of those that have been on the job for less than one year being within the ages of 20-29 years. Furthermore, the study revealed that HCWs between the ages of 20-29 years were significantly more likely than those aged 40 years and

above to experience stress and about 68% of those with high-stress levels were within the ages of 20 to 29 years. This highlights the possible lack of effective coping strategies among this age group. Also, HCWs within this age group had the highest proportion of those without training in infection prevention and control (IPC), as the study further observed that those without training had a higher median level of stress. These observations could probably account for why our study reported a high prevalence of stress as a majority of our respondents (49%) were between the ages of 20-29 years. Nevertheless, early stress counselling programs and IPC training need to be targeted at the young newly employed HCW.

On the other hand, although HCWs that are female or single had higher median levels of stress than their male or married counterparts, gender and marital status were not predictors of stress. However, of those that had high levels of stress, 64% were females and 75% were single. A study, done in Poland similarly reported a higher level of stress among female physicians and attributed it to women's empathic and self-responsible attitude [39]. This could also partly explain the high levels of stress among the female HCWs in our study. A study, done in Canada that focuses on stress coping strategies among physicians, observed that emotional exhaustion was positively correlated with keeping stress to oneself and that the more you talk to your spouse or partner, the fewer the episodes of emotional exhaustion [40]. This may partly explain why the single HCWs in our study had a higher median level of stress; as they may not have had a partner for dialogue of stressful events and emotional support.

In our environment, public transportation can be quite stressful, where in some cases you have to struggle to enter the vehicle and when you eventually enter, you are forced to sit uncomfortably in a very tight space. During the initial phase of the COVID-19 pandemic, public transportation became even more stressful as complete and partial lockdowns created their own challenges; such as difficulty in getting public transportation to work with its associated exorbitant fares; and when you eventually get and board, the fear of getting infected in the crowded vehicle preoccupies your

mind. All these, may also partly explain the higher median levels of stress among the HCWs that usually use public as opposed to private transportation to work. It was also observed that 61% of HCWs with high levels of stress in the present study usually use public transport to work, however, the mode of transport was not a predictor of stress.

The prevalence of anxiety was 32.6% with about one-fifth of HCWs (20.5%) in this study experiencing mild symptoms of anxiety and about 9.8% and 2.3% experiencing moderate and severe levels of anxiety symptoms respectively. A study by Xing et al using the same tool and scale for anxiety among HCWs during the COVID-19 pandemic reported similar findings especially in the levels of mild and severe anxiety; 20.1% and 2.3% respectively [41]. Furthermore, Xing et al noticed a significant relationship between age and levels of anxiety which was not observed in our study as it was seen that the distribution of anxiety levels across the subcategories of age were not significantly different.

The present study observed higher median levels of anxiety among the female HCWs who were more than one and a half times more likely to experience anxiety than their male counterparts. This relationship between gender and anxiety has been well documented in psychiatric epidemiology and it has also been reported that anxiety symptoms are not only more prevalent but also, more disabling in women [42]. Furthermore, our study observed that there was a higher proportion of women that were single (45.3%) compared to those, that were married (28.3%) who had anxiety; so being a single woman probably may contribute to an increased risk of developing anxiety. Although the present study showed that single HCWs had a higher median level of anxiety compared to the married HCW, the difference in their distributions of anxiety levels was not statistically significant. However, the regression model predicted that single HCWs compared to their married counterparts were significantly more likely to experience anxiety.

Generally, adequate training in a particular task results in preparedness and confidence in the performance of that task. However, in an infectious work environment, there is apprehension and fear of contracting an infection which can lead to anxiety; so, preparedness and confidence are more so required through adequate training to invariably reduce anxiety [43, 44]. This may probably explain to some extent the observation in our study where the median levels of anxiety were higher in HCWs without training compared to those with training in IPC and their distributions of anxiety levels were significantly different.

The prevalence of depression was 33.4% with close to one-fourth of HCWs in this study experiencing mild symptoms of depression and about 8.8% and 1.3% experiencing moderate and severe levels of depression respectively. Unlike the levels of anxiety as reported earlier, the findings by Xing et al with respect to levels of depression, were not similar to our study [41]. Also, Xing et al reported a high mean level of depression among HCWs and a significantly

higher level of depression in nurses compared to doctors. In the present study, the median level of depression appeared to be higher in nurses compared to doctors but on further analysis, the difference in their distributions of depression levels was not statistically significant. Also, the median levels of depression in our study were higher in female and single HCWs compared to their counterparts in their respective categories, furthermore, the differences in the distribution of depression levels between the subcategories within their respective categories were significantly different. Although marital status was not a predictor of depression, gender was; and it was observed that female HCWs were significantly more likely to experience depression.

Conclusion

During this COVID-19 pandemic, it would appear that the prevalence of stress, anxiety and depression symptoms was high among HCWs in Imo State; with observed sociodemographic patterns in age, gender, marital status and IPC training status. Despite the fact that our HCWs are operating within a socioeconomically challenged environment, it would appear anecdotally, that the COVID-19 pandemic still impacted the psychological well-being of our HCWs who are constantly working under socioeconomic stress. Unfortunately, there were no studies prior to the COVID-19 pandemic establishing the levels of stress, anxiety and depression among HCWs in Imo State. However, the levels of stress, anxiety and depression observed in this study are of concern and although more evidence is required, the impact on the psychological well-being could further interfere with the quality of patient care. Therefore, the provision of mental health and psychosocial support services is crucial and should in a timely manner be made available and accessible to all HCWs, particularly to those that are newly employed, young, female and single. Mental health care should be routine and also be part of the pandemic response. The importance of adequate, regular and mandatory training in infection, prevention and control for all HCWs cannot be overemphasized.

Abbreviations

COVID-19: Corona Virus Disease 2019
HCWs: Health Care Workers $H\chi^2$: Kruskal Wallis H Statistic
IPC: Infection Prevention and Control
OR: Odds Ratio

Competing interests

The authors declare that we have no competing interests

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