Journal of Medicine and Biomedical Research. 22 (2) 26 - 37
https://dx.doi.org/10.4314/jmbr.v22i2.5

ORIGINAL ARTICLE

Profile and Predictors of Psychological Manifestations of COVID-19 among Adults in Selected Communities of Southwest Nigeria

Durowade KA[1,2*], Musa OI[3], Salaudeen AG[3], Adeniyi MA[4], Sanni TA[1,2], Omuemu VO[5]

[1]Department of Community Medicine, Afe Babalola University, Ado-Ekiti, Nigeria
[2]Department of Community Medicine, Federal Teaching Hospital, Ido-Ekiti, Nigeria
[3]Department of Epidemiology and Community Health, University of Ilorin, Ilorin, Nigeria
[4]Department of Community Medicine, Federal Medical Centre, Abeokuta, Nigeria
[5]Department of Public Health and Community Medicine, University of Benin, Benin-city, Nigeria

ABSTRACT

Background: The Corona Virus Disease-2019 caused by the virus, Severe Acute Respiratory Syndrome-Corona Virus - 2 resulted in a global public health problem. Various strategies and interventions were implemented to contain the spread around the world. Despite this, the pandemic persisted with fear and anxiety leading to worsening psychological state. Therefore, the aim of this study was to assess the profile and predictors of psychological manifestations of COVID-19 among adults in Ekiti State, Nigeria.

Methods: This was a community-based cross-sectional study. Multi-stage sampling technique was used to select adults aged 18 years and above. A pre-tested, structured, interviewer-administered questionnaire was used to collect data. Statistical Package for the Social Sciences version 23 was used for data analysis and spatial mapping. Level of statistical significance was set at $p<0.05$.

Results: More than a tenth (15.3%) of the respondents had experienced severe psychological manifestations due to COVID-19. Younger age ($p<0.001$), higher level of education ($p<0.001$), higher monthly income ($p=0.013$), smaller household size ($p=0.001$), working in the hospital environment ($p=0.001$), and rural residence ($p=0.005$) were significantly associated with psychological manifestations due to COVID-19. Younger age ($p=0.030$), tertiary education ($p=0.020$), rural location ($p<0.001$) and working in the hospital environment ($p=0.021$) were significant predictors of severe psychological manifestations due to COVID-19.

Conclusion: Psychological manifestations due to COVID-19 was high among the study population and this cuts across socio-demographic and socio-economic groups. Awareness campaigns by the Ekiti State government and other relevant stakeholders could help to reduce this in the population

Keywords COVID-19; Profile; Predictors; Psychological manifestations; Nigeria.

INTRODUCTION

Corona Virus disease-2019 (COVID-19), caused by the virus, Severe Acute Respiratory Syndrome-Corona Virus- 2 (SARS-COV-2) resulted in a global public health problem following its debut in Wuhan, China in December, 2019 and its declaration as a pandemic by the World Health Organization (WHO) in March 2020.[1] COVID-19 affects both sexes and all ages and an infected person can transmit the disease to a susceptible person. The pandemic caused significant burden on human health and health systems in the face of constrained resources thereby worsening the situations in several parts of the world.[2]
Some infected persons who remain asymptomatic are fuelling the transmission cycle while the disease progresses swiftly resulting in deaths.[3] The thought of possible contracting the disease leads to attendant psychological effects with fear, anxiety among others. Also, the fear of an unknown disease, let alone a pandemic, is usually characterized by fear and anxiety in the minds of the people and COVID-19 presents same scenario from studies done to assess its psychological effect.
In a study, which used the Impact of Event Scale-Revised (IES-R), among 3,055 adults respondents in Spain, about a third (30.4%) of them showed severe psychological effect.[4] In a review study done in India, the author also stated that the psychological cost of COVID-19 pandemic includes fear which could lead to defensive reactions, new psychiatric symptoms can also develop in individuals without prior mental illness. This, therefore, makes the conditions of those with prior mental illness more vulnerable and cause distress to the

Corresponding Author:
Kabir A. Durowade, durowadeka@abuad.edu.ng

caregivers of affected persons. Major mental health morbidities include symptoms of depression, anxiety, panic attacks and Post Traumatic Stress Disorders (PTSD) which are more common in younger adults.[5] In an online Philippine survey, which sampled 1879 respondents using the Depression, Anxiety and Stress Scale-21 (DASS-21), 16.3% of respondents rated the psychological impact of the COVID-19 outbreak as moderate-to-severe; 16.9% reported moderate-to-severe depressive symptoms; 28.8% had moderate-to-severe anxiety levels; and 13.4% had moderate-to-severe stress levels.[6]

A web-based study conducted among 1041 Norwegian population was able to identify factors associated with psychological worries of COVID-19. It also found that poor socioeconomic conditions like living alone and prior economic challenges, and prior history of mental health vulnerabilities, including recent exposure to violence and past history of mental health problems, were associated with a higher level of psychological distress and a lower level of life satisfaction.[7]

The Southwest geopolitical zone of Nigeria remains the region with the highest number of cases with Lagos State, being the epi-centre.[8] An online cross-sectional study among residents of the six states of the region (Lagos, Ondo, Oyo, Ogun, Osun and Ekiti States), showed that majority (83.9%) have severe psychological effect sequel to the COVID-19 pandemic while more than three-quarter (78.2%) have their family income affected in the midst of the huge burden of cost of care.[9]

Generally, the psychological symptoms of fear, anxiety, stress and paranoia about attendance and socializing at public events have been observed in populations.[10] Additionally, the imposition of lockdown and quarantine also have effect on the mental health and overall wellbeing at personal and population levels.[11] Mass lock down/quarantine imposed nationally can produce mass hysteria, anxiety and psychological distress and generally the psychological impact of lock down can vary from immediate effects like irritability, fear of contracting the disease, anger, frustration, loneliness, anxiety, depression, insomnia, despair and even suicidal ideation, as an extreme consequence.[11] Specifically, suspected cases on isolation may suffer from anxiety due to fear of unknown about their health status and could come down with obsessive-compulsive symptoms, such as repeated temperature checks, hand washing and sanitization.[12] Negative effects such as posttraumatic stress disorder (PTSD) have been reported, symptoms of which have been linked with the duration of quarantine.[13] Post-quarantine psychological effects may include significant socioeconomic distress and psychological symptoms due to financial losses. Another very important aspect for suspected cases following isolation is stigmatization and societal rejection in forms of discrimination, suspicion and avoidance by neighborhood.[11] Therefore, this study aimed to assess the psychological manifestations of COVID-19 and associated predictors among adults in selected communities of Ekiti State, Southwest Nigeria.

METHODOLOGY

Ekiti State is in southwest region of Nigeria. It has three senatorial districts (Ekiti South, Ekiti central and Ekiti North) and 16 Local Government Areas. The indigenous people of Ekiti State speak a dialect of Yoruba language known as Ekiti. Ekiti State also has a poverty gap index of 6.16 and a GINI co-efficient of 29.70 suggesting income inequality.[14] With three television stations, six radio stations and a vast access to the print media, access to information, particularly health education information might not pose a problem to the people. With an estimated adult literacy rate of more than 90%, education is one of the most viable industry in Ekiti State.[15] As part of mitigation efforts, the Ekiti state Government sets aside a health facility (Oba Adejulugbe General Hospital), in the capital city of Ado-Ekiti, to serve as isolation centre for the treatment of cases of COVID-19. This is in addition to the isolation and treatment/referral centre for COVID-19 located at the Federal Teaching Hospital, Ido-Ekiti and the enforcement of lockdowns.

This was a community-based cross-sectional study among adults aged 18 years and above in Ekiti State, Nigeria. The minimum sample size for the study was determined as stated below using Fisher's formula for population greater than 10,000.[16] With the use of design or cluster effect.[17,18] With Z=2.58; p=83.9%[9]; q=0.161;d=0.05, a minimum sample size of approximately 400 was arrived at after applying 10% non-response rate. A design effect of 1.5 was factored in and the sample size became 600.

A multi-stage sampling technique involving six stages was used to select respondents. Using simple random sampling by balloting, there were selections of (I) six (6) local government areas, (II) 24 political wards, (III) 120 settlements, (IV) 1200 houses and (V) 1200 households. In the final stage, (VI), systematic sampling with a sampling interval of 2 was used to select 600 respondents from the selected households which cuts across rural and urban areas.

For data collection, a structured interviewer-administered questionnaire was used in this study. This questionnaire was adapted from previous similar studies and refocused along the objectives of this study. [4,9,19,20,21,22] The questionnaire elicited questions relating to

socio-demographic variables and psychological manifestations. For assessment of psychological manifestations, questions were adapted and tailored for this study from validated tools like the Impact of Event Scale-Revised (IES-R) and the Depression, Anxiety and Stress Scales (DASS-21).[4] The questionnaire was pre-tested and had good temporal stability (reliability co-efficient, r =0.75) following test-retest and good internal consistency (Cronbach's Alpha (α) value of 0.8) using split-half technique. Face and content validities were also ensured.

Data analysis was done using IBM/SPSS (International Business Machines/Statistical Package for the Social Sciences) version 23. In line with the objectives of this study, a progressive multi-level data analysis which involved univariate, bivariate and multivariate analyses was conducted, with results presented in sections in line with the objectives using prose, tables and charts. Level of statistical significance was predetermined at a p-value of < 0.05.

The psychological manifestations due to COVID-19 among the respondents was assessed using 20 questions adapted from literatures using a four-point Likert scale: 0-never; 1-rarely; 2-sometimes and 3-always.[23] The summative interpretation of the Likert scale was also ensured through reclassification into three categories: mild, moderate and severe as adapted from the Impact of Event Scale-Revised (IES-R) and the Depression, Anxiety and Stress Scales (DASS-21).[4,9] A score of 0-20 was classified as mild, 21-40 as moderate and 41-60 as severe psychological manifestations.[4.]

Ethical approval (reference number ERC/2021/03/02/489A) for this study was obtained from the Ethical committee of the Federal Teaching Hospital, Ido-Ekiti, Ekiti State. Permission to conduct the study was also obtained from relevant authorities. Written informed consent, was obtained from all subjects and confidentiality of findings was maintained. Participation was voluntary and the financial cost of the research was borne by the researchers.

RESULTS

A total of 600 respondents participated in this study giving a response rate of 100%. Table 1 showed that the mean age of the respondents was 40.6±14.5 years and the highest proportion, 164 (27.3%), were in the age group 30-39 years. Three hundred and twenty-five (54.2%) of the respondents were females and 302 (51.0%), had tertiary education.

In Table 2, about a quarter, 142 (23.7%), of the respondents always think about the COVID-19 pandemic as psychological manifestation. Also, about a quarter (23.7%) of the respondents always think about the COVID-19 pandemic while about a tenth, 66 (11.0%), always felt affected by the information on the pandemic. More than a tenth, 68 (11.3%), were paranoid about contracting COVID-19. A third (33.0%) of the respondents always felt the need to constantly wash hands while 35 (5.8%) of the respondents had difficulty sleeping. About a quarter, 164 (23.7%), never had fear about socializing and partying. Also, almost a tenth (9.3%) never feel motivated to go to work. In

Table 3, the scores on psychological manifestations due to COVID-19 showed that 92 (15.3%) of the respondents had severe psychological manifestations. The mean psychological manifestation score was found to be 23.7±15.1.

From Figure 1, the respondent scores on psychological manifestations due to COVID-19 demonstrated a fairly symmetrical curve (skew statistic= 0.300). The positive skew statistic and a little tail on the right suggested that most of the respondents' psychological manifestations' scores fell on the left and as seen, majority of the respondents had mild and moderate psychological manifestations.

In Table 4, older respondents (≥60 years old) had the least proportion, 5 (7.0%), of those with severe psychological manifestations as a result of COVID-19 compared with the younger respondents aged <20 years who had the highest proportion, 6 (26.1%), p<0.001. The lower the level of education, the lesser the psychological manifestations as those with tertiary/postgraduate education, 63 (20.9%) had the highest proportion of those with severe psychological manifestations due to COVID-19 compared with those with no formal education 2 (4.6%) or primary education 3 (4.8%), p<0.001.

Table 5 showed that respondents who earn ≥30,000 Naira in a month, 67 (16.3%) had a higher proportion of those with severe psychological manifestations due to COVID-19 compared with those who earn less than 30,000 Naira, 25 (13.1%), p=0.013.

A significantly higher proportion of respondents working in the hospital environment had severe psychological manifestations due to COVID-19 compared with the other respondents in other work places (p=0.001). Severe psychological manifestations due to COVID-19 was also significantly associated with living in households with fewer number of inhabitants (p=0.001) and living in the rural areas (p=0.005).

In Table 6, those with tertiary/postgraduate education were 2.5 times more likely to have psychological manifestations due to COVID-19 than those with no formal education [(aOR=2.540 (1.157-5.575); p=0.020)].

Table 1: Socio-demographic Characteristics of Respondents

Variable	Frequency (%)	
Age (years)		
<20	23	(3.8)
20-29	123	(20.5)
30-39	164	(27.3)
40-49	144	(24.0)
50-59	73	(12.2)
≥60	73	(12.2)
Sex		
Female	325	(54.2)
Male	275	(45.8)
Highest Level of Education		
No formal education	44	(7.0)
Primary	62	(10.0)
Secondary	192	(32.0)
Tertiary /Postgraduate	302	(51.0)
Occupation		
Business	170	(28.3)
Farming	105	(17.5)
Skilled manual worker	93	(15.5)
Unemployed	82	(13.7)
Government employee (non-health professional)	76	(12.7)
Healthcare professional	74	(12.3)
Religion		
Christianity	507	(84.5)
Islam	81	(13.5)
Traditional	12	(2.0)
Marital status		
Married	400	(66.7)
Single	116	(19.3)
Widowed	56	(9.3)
Cohabitation	23	(3.8)
Divorced / Separated	5	(0.9)
Household location/community category		
Rural	300	(50.0)
Urban	300	(50.0)

n=600
Mean age = 40.6±14.5 years

Respondents who were living in the rural area also had 2.6 times likelihood of developing psychological manifestations due to COVID-19 than the urban respondents [(aOR=2.617 (1.534-4.465); p<0.001)]. Respondents who were working in the hospital environment were about 3 times more likely to have psychological manifestations due to COVID-19 than those who were working at home and this was found to be significantly predictive [(aOR=3.192 (1.192-8.542); p=0.021)]. Those with higher monthly income ≥30,000 Naira were about 1.2 times [(aOR=1.190 (0.608-2.331); p=0.612)] more likely than those who earned below 30,000 Naira to have psychological manifestations. Monthly income was, however, not significantly predictive of psychological manifestations due to COVID-19.

DISCUSSION

While more than half (54.2%) of the participants in this study are females, 45.8% are males giving M: F ratio of 1:1.2. Females tend to be more health conscious and fearful than the males and the rapid rise of COVID-19 with the attendant fear might be responsible for this higher proportion of female participants observed in this study. This was obtained in similar cross-sectional studies in Egypt[24], Iran[26], Saudi Arabia[27], Cameroon[28], Ethiopia[29] and Nigeria[30] where the female participants are also more than the males.

The COVID-19 pandemic took the global centre stage and created a lot of fear and anxiety in the minds of the people, thereby triggering varying degrees of psychological manifestations. With a mean psychological manifestations score of 23.7±15.1 (out of maximum 60), this study found that more than one-tenth of the respondents have severe psychological manifestations as a result of COVID-19. Also, while more than one third had moderate psychological manifestations, less than half of them (46.2%) have mild psychological manifestations.

Table 2: Profile of Psychological Manifestations due to COVID-19 among Respondents

Variable	Always Freq. (%)	Sometimes Freq. (%)	Rarely Freq. (%)	Never Freq. (%)
Fearful that you or your family might have COVID-19	137 (22.8)	229 (38.2)	95 (15.8)	139 (23.2)
Anxious about compensation if infected with COVID-19	63 (10.5)	132 (22.0)	109 (18.2)	296 (49.3)
Hesitation to go to work due to fear of contracting COVID-19	52 (8.7)	147 (24.5)	96 (16.0)	305 (50.8)
Feel being avoided by others due to COVID-19	78 (13.0)	116 (9.3)	90 (15.0)	316 (52.7)
Physical exhaustion due to the pandemic	60 (10.0)	110 (18.3)	94 (15.7)	336 (56.0)
Mental exhaustion due to the pandemic	48 (8.0)	111 (18.5)	81 (13.5)	360 (60.0)
Difficulty sleeping due to the pandemic	35 (5.8)	64 (10.7)	90 (15.0)	411 (68.5)
Mood changes due to the pandemic	50 (8.3)	98 (16.3)	73 (12.2)	379 (63.2)
Feeling isolated due to the pandemic	58 (9.7)	88 (14.7)	87 (14.5)	367 (61.2)
Not motivated to work due to the pandemic	56 (9.3)	134 (22.3)	115 (19.2)	295 (49.2)
Thinking about the COVID-19 pandemic	142 (23.7)	304 (50.7)	87 (14.5)	67 (11.2)
Paranoid of contracting COVID-19	68 (11.3)	126 (21.0)	96 (16.0)	310 (51.7)
Discuss with friends about the Coronavirus pandemic	175 (29.2)	287 (47.8)	66 (11.0)	72 (12.0)
Feel affected by information on the pandemic	66 (11.0)	201 (33.5)	118 (19.7)	215 (35.8)
Feel afraid if a close person gets sick or symptomatic	116 (19.4)	212 (35.3)	93 (15.5)	179 (29.8)
Feel the need to use sanitizer or hand gloves	172 (28.7)	161 (26.8)	77 (12.8)	190 (31.7)
Feel the need to constantly wash hands	199 (33.0)	145 (24.0)	66 (11.0)	190 (32.0)
Feel worry about self and close ones about spread of COVID-19	135 (22.5)	210 (35.0)	88 (14.7)	167 (27.8)
Fear of large social gathering/meeting due to the pandemic	142 (23.0)	220 (37.0)	85 (14.0)	153 (26.0)
Fear of all social contacts and partying	129 (21.5)	208 (34.7)	99 (16.5)	164(23.7)

n=600

Table 3: Respondents' Scores on psychological manifestations due to COVID-19

Variable	Freq. (%)
Psychological Manifestations score	
0-20 (Mild)	277 (46.2)
21-40 (Moderate)	231 (38.5)
41-60 (Severe)	92 (15.3)
Mean Psychological Manifestations Score	23.7±15.1

n=600

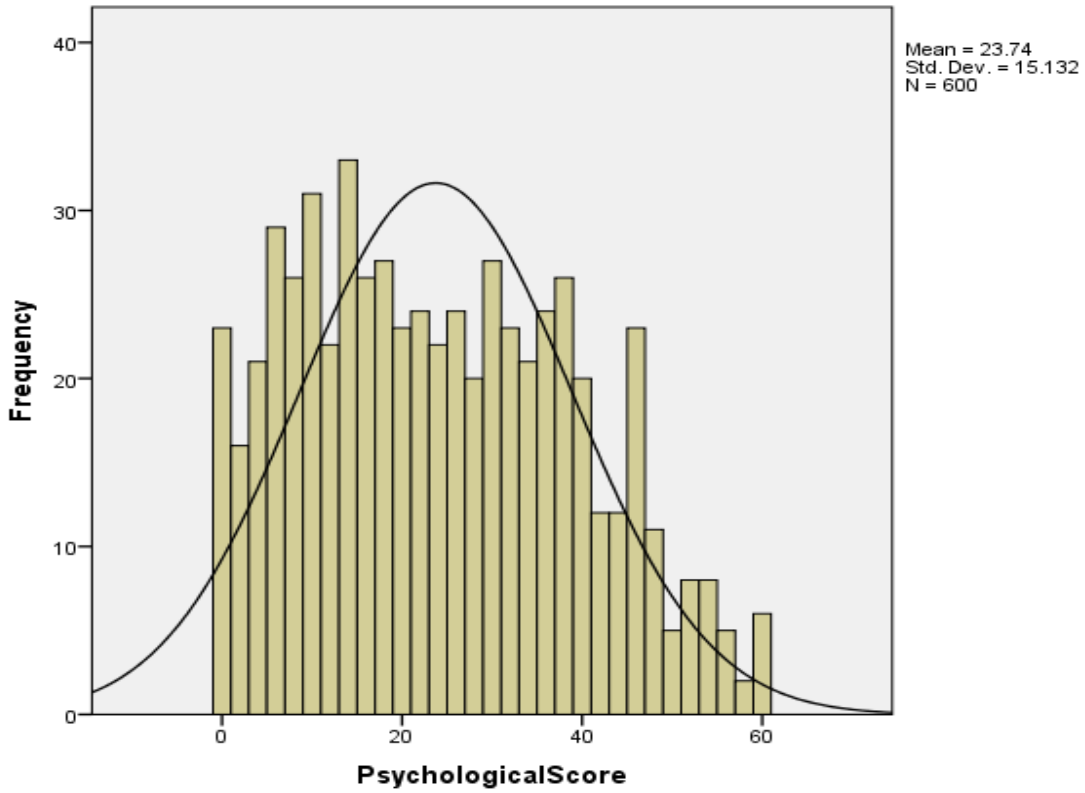

Figure 1: Gaussian Curve Showing Respondents' Scores on Psychological Manifestations due to COVID-19

This suggests that the respondents had psychological manifestations which could be due to the fear of contracting the disease and the attendant socio-economic effect occasioned by the pandemic. This is buttressed as more than a quarter (29.2%) of the respondents always discuss the pandemic with friends and more than a tenth always feel paranoid of contracting the disease. In a study in Spain[4], about one third (30.4%) of the respondents, showed severe psychological effect, which is about twice (15.3%) of those with severe psychological manifestations in this study. This high proportion of those with severe psychological manifestations may be traceable to the difference in study settings. This study is in Nigeria, Africa, where there seems to be a much lower rate in the COVID-19 morbidity and mortality than what was obtained in the early part of the pandemic in European countries like Spain which is one of the countries with a high burden of COVID-19. Indeed, the study in Spain was conducted in the early part of the pandemic which witnessed surge in cases and high number of mortalities. Just like what was obtained in this study, a cross-sectional study among university students in the United States to assess the psychological impact of COVID-19 found that 45%, 40% and 14% had high, moderate and low levels of psychological impact suggesting that the psychological effect of the pandemic affected all categories of individual[31]

This study also identified factors that were associated with psychological manifestations. Younger age, tertiary education, single status and being a health worker were significantly associated with severe psychological manifestations of COVID-19. This is similar to a study in the Philippines, where the authors also found that female gender, single status, age, among others, were negative prognostic factors associated with greater psychological impact.[6] Younger age is associated with reduced stress coping mechanism and might be responsible for the severe psychological manifestations. Women generally are fearful even outside the pandemic; however, with the pandemic, there is a heightened fear and anxiety which might be the precipitant for the severe psychological manifestations. This is also similar to an online study conducted in Nigeria where more females were found to exhibit post-traumatic stress disorder as a result of COVID-19 than the males.[32] Educated respondents and healthcare workers, who were knowledgeable about the effect of COVID-19 and its associated possible outcome, are likely to have severe psychological manifestations and this might explain the findings obtained in this study. Single, unmarried respondents are unlikely to get support from a partner unlike the married respondents with psychosocial spousal support.

Table 4: Socio-demographic variables and Psychological Manifestations due to COVID-19 among Respondents

Variables	Psychological Manifestations of COVID-19				
	Mild Freq. (%)	Moderate Freq. (%)	Severe Freq.(%)	x2	p value
Age (years)				39.36	**<0.001**
<20	15 (65.2)	2 (8.7)	6 (26.1)		
20-29	50 (41.0)	50 (41.0)	23 (18.0)		
30-39	64 (39.0)	75 (46.0)	25 (15.0)		
40-49	56 (39.0)	62 (43.0)	26 (18.0)		
50-59	40 (54.8)	26 (35.6)	7 (9.6)		
≥60	52 (71.0)	16 (22.0)	5 (7.0)		
Sex				0.82	0.665
Female	155 (47.7)	120 (36.9)	50 (15.4)		
Male	122 (44.4)	111 (40.4)	42 (15.2)		
Level of Education				83.64	**<0.001**
No formal education	36 (81.8)	6 (13.6)	2 (4.6)		
Primary	45 (72.6)	14 (22.6)	3 (4.8)		
Secondary	108 (56.0)	60 (31.0)	24 (13.0)		
Tertiary/Postgraduate	88 (29.1)	151 (50.0)	63 (20.9)		
Occupation				61.33	**<0.001**
Business	4 (49.4)	68 (40.0)	18 (10.6)		
Farming	59 (56.2)	37 (35.2)	9 (8.6)		
Healthcare workers	8 (10.8)	43 (58.1)	23 (31.1)		
Skilled manual worker	43 (46.2)	36 (38.7)	14 (15.1)		
Government employee (non-health)	31 (40.8)	29 (38.2)	16 (21.0)		
Unemployed	52 (63.4)	18 (22.0	12 (14.6)		
Religion				1.31	0.859
Christianity	239 (47.1)	191 (37.7)	77 (15.2)		
Islam	33 (40.7)	35 (43.2)	13 (16.1)		
Traditional	5 (41.7)	5 (41.7)	2 (16.6)		
Marital status					
Married	178 (44.5)	163 (40.8)	59 (14.7)	30.9	**<0.001**
Single	44 (38.0)	44 (38.0)	28 (24.0)		
Widowed	42 (75.0)	10 (17.9)	4 (7.1)		
Divorced/Separated	11 (47.8)	11 (47.8)	1 (4.4)		
Cohabiting	2 (40.0)	3 (60.0)	0 (0.0)		
Family setting				17.25	**0.002**
Monogamy	195 (43.3)	188 (41.8)	67 (14.9)		
Polygamy	68 (61.8)	27 (24.6)	15 (13.6)		
Single parent	14 (35.0)	16 (40.0)	10 (25.0)		

Table 5: Socio-economic variables and Psychological Manifestations due to COVID-19 among Respondents

Variables	Psychological Manifestations of COVID-19				
	Mild Freq. (%)	Moderate Freq. (%)	Severe Freq.(%)	x2	p value
Income (Naira)				8.76	**0.013**
<30,000	105 (55.0)	61 (31.9)	25 (13.1)		
≥30,000	172 (42.1)	170 (41.6)	67 (16.3)		
Number in Household				21.53	**0.001**
<6	182 (47.9)	124 (32.6)	74 (19.5)		
≥6	95 (43.2)	107 (48.6)	18 (8.2)		
Nature of Work Environment				48.82	**0.001**
Home	32 (49.2)	23 (35.4)	10 (15.4)		
Face-face clients interaction	116 (49.8)	88 (37.8)	29 (12.4)		
Hospital Environment	23 (21.1)	57 (52.3)	29 (26.6)		
Office setting	33 (41.8)	30 (38.0)	16 (20.2)		
Outdoor	73 (64.0	33 (29.0)	8 (7.0)		
Location of Residence				10.54	**0.005**
Rural	120 (40.0)	124 (41.3)	56 (18.7)		
Urban	157 (52.3)	107 (35.7)	36 (12.0)		

In another similar study in the United States, certain factors that were found to be associated with higher psychological impact of COVID-19 and these were being a woman, fair /poor health, poor/average wealth or income or knew someone infected with COVID-19 which was similar to the findings of this study. Multivariate modeling showed that being a woman, having fair/ poor general health status, younger age (18 to 24 years old), and knowing someone infected predicted higher levels of psychological impact.[31]

Just like this study which found that socio-economic status is associated with psychological manifestations of COVID-19, a web-based study conducted among a Norwegian population also found that poor socioeconomic conditions like living alone and prior economic challenges, and prior history of mental health vulnerabilities, including recent exposure to violence and past history of mental health problems, were associated with a higher level of psychological distress and a lower level of life satisfaction seen in the COVID-19 pandemic.[7] Though, this study was not conducted at the same time with that in Norway, the cumulative effect of the economic hardship and the existing bad state of the economy prior to the pandemic might explain the finding obtained in this study.

A slightly higher proportion of males had more severe manifestation of COVID-19 than the females. Women generally are fearful even outside the pandemic; however, with the pandemic, there is a heightened fear and anxiety which might be the precipitant for the severe psychological manifestation. This is similar to an online study conducted in Nigeria where more females (29.3%) were found to exhibit post-traumatic stress disorder as a result of COVID-19 than the males (21.6%).[25]In a multinational study of university students across Asian countries of Pakistan, Malaysia, China, Bangladesh, India, Indonesia and Saudi Arabia, a significant proportion of the female compared with the male counterparts experienced significant higher levels of anxiety. Among the female students, 15.9% experienced severe to extreme level of anxiety compared to 10.6% among the males. The study has also buttressed that female suffer the psychological effect of COVID-19 more than the males just like what was obtained in this study.[33] In other studies[34,35] females were found to demonstrate more psychological manifestations similar to what was obtained in this study. Another web-based study conducted among students in an Italian university, factors identified as being associated with anxiety include being a female.[36]

In this study, single parenting is also significantly associated with having severe psychological manifestations than those in polygamous or monogamous marriage for the same reason of psychosocial support. In addition, households with fewer number of members, those working in hospital environment, wealthy and rural respondents were significantly associated with severe psychological distress due to COVID-19 in this

Table 6: Predictors of Psychological Manifestations of COVID-19 among Respondents

Variables	B	aOR	95%CI		p value
			Lower	Upper	
Age (years)					
<20 **Ref**	-	1.000	-	-	-
20-29	1.756	5.791	1.186	28.261	**0.030**
30-39	1.010	2.745	0.851	8.850	0.091
40-49	0.294	1.342	0.426	4.230	0.616
50-59	0.567	1.763	0.555	5.604	0.337
≥60	0.089	1.093	0.286	4.174	0.897
Level of Education					
No formal education Ref	1.000				
Primary	-0.225	0.799	0.128	4.987	0.810
Secondary	0.187	1.206	0.251	5.805	0.815
Tertiary/Postgraduate	0.932	2.540	1.157	5.575	**0.020**
Occupation					
Business	0.006	1.006	0.388	2.605	0.991
Farming	-0.156	0.856	0.273	2.680	0.789
Healthcare worker	0.788	2.200	0.765	6.327	0.143
Skilled manual worker	0.452	1.572	0.578	4.279	0.376
Government employee*	0.452	1.572	0.530	4.660	0.415
Unemployed **Ref**	-	1.000	-	-	-
Residence Location					
Rural	0.962	2.617	1.534	4.465	**<0.001**
Urban **Ref**	**-**	1.000	-	-	-
Family setting					
Monogamy **Ref**	**-**	1.000	**-**	**-**	**-**
Polygamy	-0.456	0.634	0.257	1.565	0.323
Single parent	0.154	1.166	0.404	3.370	0.777
Income (Naira)					
<30,000Ref	-	1.000	-	-	-
≥30,000	0.174	1.190	0.608	2.331	0.612
Nature of work					
Home **Ref**	**-**	1.000	-	-	-
Face-face interaction	0.854	2.348	0.778	7.090	0.130
Hospital	1.161	3.192	1.192	8.542	**0.021**
Office	0.243	1.274	0.514	3.159	0.600
Outdoor	0.924	2.519	0.901	7.041	0.078

Model fitting coefficient, R^2= 0.218; = x2= 1.347; p=0.995; aOR=adjusted Odds Ratio; *non-health worker

study. A retrospective hospital-based study conducted in Port-Harcourt found a high level of fear and apprehension among the healthcare workers just like it was observed in this study.[37] In Ekiti State, Nigeria, it was also found that about three-quarters of the respondents said COVID-19 triggers fear in them and about 60% get depressed with the thought of the pandemic.[38]

In multivariate analysis, a number of independent predictors were identified in the regression model. Those with tertiary education, being a health worker, working in hospital environment and being a rural dweller had higher likelihoods of having psychological manifestations of COVID-19. Educational exposure might make one to be knowledgeable about the consequences of getting infected and that can trigger fear and anxiety. Healthcare workers are also in the know of the sequels of this disease precipitating fear and paranoia. In addition, they are at risk of infection in the course of duty which can also be a source of stress, anxiety and severe psychological manifestation. However, a multivariate modeling in a study in the United States of America showed that being a woman, having fair/ poor general health status, younger age (18 to 24 years old), and knowing someone infected were the predictors higher levels of psychological impact.[39]

Conclusion/Recommendation

This study has found a high level of psychological manifestations due to COVID-19 among the respondents. Younger age, higher level of education, higher monthly income, smaller household size, working in the hospital environment and rural residence were significantly associated with psychological distress due to COVID-19. The significant predictors of severe psychological manifestations due to COVID-19 included younger age, tertiary education, rural location and working in the hospital environment.

To reduce this, the Ekiti State Government and other relevant stakeholders in the state should put up robust interventions involving sustained adequate provision of protective gadgets and psychological counselling to motivate the health care workers and lessen the fear and psychological effect. The Ministry of Health needs to institute awareness measures to assure and reassure residents across all economic strata and in both rural and urban areas. The Village Health Committees in the respective communities can be identified, trained and empowered to drive this process at the respective communities.

Acknowledgement: The authors wish to acknowledge Mrs O.Y. Olubunmi, ADNS, Department of Community Medicine, Federal Teaching Hospital Ido-Ekiti, for her role during the mobilization and training of research assistants

Conflict of interest: None

Source of funding: Self

Authors' contributions: DKA: Conceptualization, study design, data collection and analysis, manuscript preparation; MOI: Study design, data collection, proof reading; SAG: Study design, data collection, proof reading; AMA: Field work, data collection; STA: Field work, data collection; OVO: Study design, manuscript review and proof reading. All authors proofread and approved the final version of the manuscript

REFERENCES

1. World Health Organization (WHO). Coronavirus Disease 2019 (COVID-2019). Situation Report-51. Available from http://www.who.int/docs/default-source/coronaviruse/ Last accessed 27/08/2020

2. Akande OW, Akande TM. COVID-19 pandemic: A global health burden. Niger Postgrad Med J. 2020; 27 (3): 147-155

3. Hassan Z, Hashim MJ, Khan G. Population risk factors for COVID-19 deaths in Nigeria at subnational level. PAMJ. 2020; 35 (Supp 2): 131-140

4. Rodriguez-Rey R, Garrido-Hernansaiz H, Collado S. Psychological impact and associated factors during the initial stage of the Coronavirus (COVID-19) pandemic among the general population in Spain. Front. Psychol. 2020; 11(1540): 1-23.

5. Bhat RH. The psychological cost of COVID-19 pandemic. Int. J. Psycho. Rehab. 2020; 24(7):10284-10289.

6. Tee ML, Tee CA, Anlacan JP, Aligam KJG, Reyes PWC, Kuruchittam V, *et al.* Psychological impact of COVID-19 pandemic in the Philippines. Journal of Affective Disorders 2020; 277: 379-391.

7. Blix I, Birkeland SM, Thoresen S. Worry and mental health in the COVID-19 pandemic: vulnerability factors in the general Norwegian population. BMC Public Health 2021; 21(928):1-10. https://doi.org/10.1186/s12889-021-10927-1

8. Nigeria Centre for Disease Control (NCDC). COVID-19 Nigeria. Available from http://www.covid19.ncdc.gov.ng/ Last accessed 06/01/2021

9. Durowade KA, Sanni TA, Adeniyi MA, Babalola SA, Popoola TA, Adebara IO *et al.* Psychological, socio-economic effects of COVID-19 pandemic and associated self-reported vulnerability factors among residents of Southwest Nigeria. Niger J Med 2020; 29(4): 566-574

10. Chekole YA, Menaye SY, Abate SM, Mekuriaw B. Perceived stress and its associated factors during COVID-19 among healthcare providers in Ethiopia: A cross-sectional study. Adances in Public Health 2020; 2020 (5036861):1-7. https://doi.org/10.115/2020/5036861

11. Dubey S, Biswas P, Ghosh R, Chatterjee S, Dubey MJ, Chatterjee S *et al.* Psychosocial impact of COVID-19. Diabetes and Metabolic Syndrome: Clinical Research and Reviews 2020; 14: 779-788

12. Li W, Yang Y, Liu ZH, Zhao YJ, Zhang Q, Zhang L *et al.* Progression of mental health services during the COVID-19 outbreak in China. Int J Biol sci 2020; 16: 1732-1738

13. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. Emerg Infect Dis 2004; 10: 1206-1212.

14. Knoema. Ekiti. Poverty head count rate, 2019. Available from https://www.knoema.com>NGPVIE2019. Last accessed 18/11/2021

15. Ibrahim MT. Development performance ranking of Nigerian States and monitoring of African countries. Cress Global Links Ltd, Abuja. pp 20-34. 2019. ISBN: 978-978-776-1

16. Araoye MO Subjects selection. In: Research Methodology with statistics for Health and Social sciences. Nigeria. Nathadex Publishers, 117-119. 2004.

17. Bolarinwa, OA. Sample size estimation for health and social science researchers: The principles and considerations for different study designs. Niger Postgrad. Med J 2020; 27(2): 67-75.

18. Hachiya M, Miyano S, Mori Y, Vynnycky E, Keungsaneth P, Vongphrachanh P, *et al.* Evaluation of nationwide supplementary immunization in Lao people's Democratic Republic: Population-based seroprevalence survey of anti-measles and anti-rubella IgG in children and adults, mathematical modelling and a stability testing of the vaccine. PLoS ONE 2018; 13(3):1-16. e0194931. https://doi.org/10.1371/journal.pone.0194931.

19. Bekele D, Tolossa T, Tsegaye R, Teshome W. The knowledge and practice towards COVID-19 pandemic prevention among residents of Ethiopia: An Online Cross-Sectional Study. PLoS ONE 2020; 16(1):1-13 e0234585. https://doi.org/10.1371/journal.pone.0234585

20. Oyeyemi O, Oladoyin V, Okunlola O, Mosobalaje A, Oyeyemi I, Adebimpe W, *et al.* COVID-19 pandemic: Nigerians' knowledge, perception and adherence to preventive measures. Research Square 2020; 1-19. DOI: https://doi.org/10.21203/rs.3.rs-49707/v1

21. Okoro J, Ekeroku A, Nweze B, Odionye T, Nkire J, Onuoha M. Attitude and preventive practices towards COVID-19 disease and the impact of awareness training on knowledge of the disease among correctional officers. Emerald Open Research. 2020; 2(51):1-14. https://doi.org/10.35241/emeraldopenres.13839.1

22. Ayeni GO. Assessment of urban poverty and service provision in Ekiti state, Nigeria. Saudi Journal of Humanities and Social Sciences 2017; 2 (3): 211-222.

23. Durowade KA, Salaudeen AG, Musa OI, Olokoba LB, Osinubi MO, Fasiku MM, *et al.* Knowledge of glaucoma and its socio-demographic determinants: A comparative study of selected rural and urban communities in Kwara state, North-central Nigeria. Savannah Journal of Medical Research and Practice 2017; 6(2), 18-30.

24. Abdelhafiz AS, Mohammed Z, Ibrahim ME, Ziady HH, Alorabi M, Ayyad M *et al.* Knowledge, perceptions, and attitude of Egyptians towards the Novel Coronavirus Disease (COVID-19). J. Comm Health. 2020; 45 (5): 881-890. doi: 10.1007/s10900-020-00827-7

25. Bondad-Reantaso MG, Mackinnon B, Bin H, Jie H, Tang-Nelson K, Surachetpong W *et al.* View point: SARS-CoV-2 (The cause of COVID-19 in humans) is not known to infect aquatic animals nor contaminate their products. Asian Fisheries Science 2020; 33: 74-78

26. Erfani A, Shahriarirad R, Ranjbar K, Mirahmadizadeh A, Moghadami M. Knowledge, Attitude and Practice toward the Novel Coronavirus (COVID-19) Outbreak: A Population-Based Survey in Iran. Bull. World Health Organ. E-pub: 2020; 1-23. doi: http://dx.doi.org/10.2471/BLT.20.256651.

27. Al-Hanawi MK, Angawi K, Alshareef N, Qattan AMN, Helmy HZ, Abudawood Y *et al.* Knowledge, attitude and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: a cross-sectional study. Front. Public Health 2020; 8: 217-226

28. Ngwewondo A, Nkengazong L, Ambe LA, Ebogo JT, Mba FM, Goni HO *et al.* Knowledge, attitudes, practices of/towards COVID-19 preventive measures and symptoms: A cross-sectional study during the exponential rise of the outbreak in Cameroon. PLos Negl Trop Dis 2020; 14(9):1-15.e0008700. https://doi.org/10.1371/journal.pntd.0008700

29. Akalu Y, Ayelign B, Molla MD. Knowledge, attitude and practice towards COVID-19 among chronic disease patients at Addis Zemen Hospital, Northwest Ethiopia. Infection and Drug Resistance 2020; 13: 1949-1960.

30. Ipinnimo TM, Sanni TA, Aladesuru TA, Adebayo OA, Omowaye MT, Adeniyi IO *et al.* Knowledge of COVID-19 and practice of preventive measures of among adult residents during ease of lockdown in Nigeria. Niger J. Med. 2021; 30: 464-469. DOI: 10.4103/NJM.NJM_42_21

31. Browning MHEM, Larson LR, Sharaievska I, Rigolon A, McAnirlin O, Mullenbach L, *et al.* Psychological impacts from COVID-19 among University students: Risk factors across seven states in the United States. PLoS ONE 2021; 16(1):1-27. e0245327. https://doi.org/10.1371/journal.pone.0245327

32. Olaseni AO, Akinsola OS, Agberotimi SF, Oguntayo R. Psychological distress experiences of Nigerians during COVID-19 pandemic; the gender difference. Social Sciences and Humanities Open 2020; 2(1):100052-100058.

33. Chinna K, Sundarasen S, Koshaim HB, Kamaludin K, Nurunnnabi M, Baloch GM, *et al.* Psychological impact of COVID-19 and lock down measures: An online cross-sectional multicounty study on Asian University students. PLoS ONE 2021; 16(8):1-12. e0253059. https://doi.org/10.1371/journal.pone.0253059

34. Jassim G, Jameel M, Brennan E, Yusuf M, Hassan N, Alwatani Y. Psychological impact of COVID-19, isolation, and Quarantine: A cross-sectional study. Neuropsychiatric Disease and Treatment 2021; 17: 1413-1421.

35. Passavanti M, Argentieri A, Barbieri DM, Lou B, Wijayaratna K, Mirhosseini ASF, *et al.* The psychological impact of COVID-19 and restrictive measures in the world. Journal of Affective Disorders 2021; 283(2021):36-51.

36. Villani L, Pastorino R, Molinari E, Aneli F, Ricciardi W, Graffigna G, *et al.* Impact of the COVID-19 pandemic on psychological well-being of students in an Italian University: a web-based cross-sectional survey. Globalization and Health 2021; 17(39):1-14. https://doi.org/10.1186/s12992-021-00680-w

37. Nkporbu AK, Stanley CN, Stanley PC. Psychological Implication of the coronavirus Pandemic: Early study and projections from Port Harcourt Nigeria. International journal of research studies in medical and health sciences.2020; 5(4): 31-39.

38. Oluwadiya KS, Amu E, Omotayo JA, Raimi TH, Dada SA, Fadeyi A *et al.* Ekiti State Government. Ekiti COVID-19 Surveys (EKCOVS) 2020 State-wide household survey of prevalence, risk perception, adoption of preventive measures and people's understanding of COVID-19 in Ekiti State, Nigeria. Technical Report. 2021; 1-65. DOI: 10.13140/RG.2.2.19269.37603.

39. Browning MHEM, Larson LR, Sharaievska I, Rigolon A, McAnirlin O, Mullenbach L, *et al.* Psychological impacts from COVID-19 among University students: Risk factors across seven states in the United States. PLoS ONE 2021; 16(1):1-27. e0245327. https://doi.org/10.1371/journal.pone.0245327