Relationship between Demographic, Socioeconomic Factors, and Psychological Responses of Health Care Providers during COVID–19 Pandemic, Kenya

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ABSTRACT

Context: Corona Virus Disease of 2019 (COVID-19), an infectious disease caused by Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2), spread across the globe, causing distress among various populations, including healthcare providers. This disease has had an unparalleled effect on the world's economic situation, livelihood, and mental and physical well-being across the globe.

Aim: To assess the healthcare providers' psychological responses and related demographic and socioeconomic factors during the COVID-19 pandemic at Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH).

Methods: This was a hospital-based descriptive cross-sectional study at Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu County, Kenya. A stratified sampling method was used in the selection of 202 healthcare providers. The questionnaire used consisted of four components: demographic and socioeconomic factors. Standardized questionnaires measured the symptoms of depression and anxiety, the 9–item Patient Health Questionnaire (PHQ - 9) and the 7–item Generalized Anxiety Disorder Scale (GAD - 7), respectively.

Results: Among 202 healthcare providers, the overall prevalence of depressive and anxiety symptoms was 57.4% and 59.9%, respectively. After using Pearson Chi-square for the relationship of GAD with demographic characteristics, it was revealed that age (OR 0.1, p = <0.001), gender (OR 0.4, p = 0.002), and marital status (OR 4.2, p = <0.001) were significantly associated. Also, the relationship of GAD with socioeconomic factors revealed that the level of education (OR 0.5, p = 0.019), income level (OR 4.6, p = <0.001), living alone (OR 0.4, p = 0.004), living with partner and children (OR 2.4, p = 0.002), living with parent (OR 2.7, p = 0.001) and employment terms (OR 3.3, p = <0.001), were related with symptoms of anxiety. Concerning depressive symptoms and demographic characteristics, age (OR 0.5, p = 0.006) and marital status (OR 3.2, p = <0.001) were significantly associated. Also, the relationship of depression with socioeconomic factors revealed that living alone (OR 0.4, p = 0.002), living with a partner (OR 4, p = 0.007), living with a partner and children (OR 1.7, p = 0.045), living with parent (OR 2.5, p = 0.001) and having a chronic medical condition (OR 0.5, p = 0.048) were related with depressive symptoms.

***Conclusion*:** There was a relatively high prevalence of anxiety and depression among JOOTRH healthcare providers during the pandemic. Those with a partner and children, those living without parents, high-income level, level of education undergraduate and above, were married, above 30 years, female, and being on permanent employment were significantly related to anxiety. Those living with someone else, without a chronic medical condition, being over 30 years and married were more likely to have depression than their counterparts. The study recommends providing psychological support to healthcare providers to enhance their psychological resilience during pandemics.

Keywords: Health care provider, psychological responses, demographic, socioeconomic factors, COVID-19

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1. Introduction

Corona Virus Disease of 2019 (COVID-19) is the sixth global public health crisis *(Dhama et al., 2020).* It is caused by Severe Acute Respiratory Syndrome coronavirus 2 (SARS – CoV - 2), first identified in December 2019 in Wuhan, China *(Adnan et al., 2020).* The pandemic has created a global, regional, and local crisis, and the World Health Organization (WHO), on January 30, 2020, designated it a Public Health Emergency of International Concern (PHEIC) and later a pandemic on March 11, 2020 *(WHO, 2020a,b).* It was later confirmed to have spread to Africa on February 14, 2020, with the first confirmed case announced in Egypt *(Ministry of Health and Population Egypt [MOHP], 2020).* The Ministry of Health (MoH) confirmed the first case in Kenya on March 13, 2020 *(Ministry of Health [MoH], 2020).*

Multiple recent studies conducted in Asia, Europe, and the United States of America have demonstrated high rates of stress, depression, anxiety, and burnout among healthcare workers (HCWs) during the COVID–19 pandemic *(Pappa et al., 2020; Chew et al., 2020; Shechter et al., 2020; Martínez et al., 2020; Wang et al., 2021; Preti et al., 2020; Lai et al., 2020; Si et al., 2020).*

A global study across 31 countries between April and May 2020 at the initial stages of COVID – 19 pandemic conducted to assess mental health outcomes revealed an overall prevalence of 60% anxiety and depression at 53%. The findings from the study highlighted a substantial burden on mental health among healthcare providers, which warranted effective mental health support measures *(Htay et al., 2020).*

The susceptibility during public health emergencies and pandemics among healthcare providers is specifically related to fear of contracting the virus as a healthcare provider, fear of spreading to family members, increased stressors in the workplace, and making key life-saving measures *(Xiang et al., 2020).* Similarly increasing number of confirmed and suspected cases of COVID-19, deaths, overwhelming workload, depletion of personal protective equipment, extensive media coverage, lack of specific medications, and inadequate support can have major impacts on the psychological well-being of healthcare providers *(Lai et al., 2020; Zhang et al., 2020).*

The situation is worse and more severe among healthcare providers in Low- and Middle-Income (LMIC) Countries. This situation is related to challenges of chronic underfunding, unstable political contexts, high disease burden, inadequate Human Resources for Health (HRH), and inadequate allocation to the health sector *(Jenkins et al., 2011).* Consequently, healthcare workers may work long hours in stressful environments *(Jenkins et al., 2011)*.

In Africa, many parts continue to struggle with the rising cases of the pandemic amidst the limited medical resources and infrastructure, inadequate healthcare workforce, minimal Intensive Care Unit (ICU) beds, and lack of critical resources to adequately address the COVID–19 pandemic *(Chersich et al., 2020).*

2. Significance of the study

Kenya faces similar effects of COVID – 19 pandemic to other countries globally and perhaps severe due to other challenges such as inadequate budgetary allocation to healthcare services, out-of-pocket spending for healthcare services, inadequacies in healthcare infrastructure, and systemic challenges due to challenges in the implementation of key policies set by the government *(Onchonga et al., 2020; MoH, 2015).*

During the early stages of the pandemic, evidence from the WHO in Kenya demonstrated there were 0.2 physicians and 1.2 nurses per 1000 people below the WHO recommended ratio of 1 and 2.5, respectively. Moreover, Kenya has approximately 14 hospital beds per 10000 people, with 537 ICU beds and 256 ventilators serving the country's population of close to 50 million people. On the mental health resources in the country as of 2016, there were 0.18 psychiatrists and 0.002 psychologists per 10000 people *(Jaguga & Kwobah, 2020; WHO 2020c).* This status will worsen because Kenya has no formal mental health response plan within the large COVID–19 strategic responses *(Jaguga & Kwobah, 2020).*

Kisumu County faces diverse economic challenges and limited medical resources to safeguard the physical and mental well-being of the residents during the pandemic. The County's Integrated Development Plan (CIDP) registers that health worker-to-population ratios are on adverse and continue to a worsening trajectory occasioned by the pandemic and its attendant austerity measures *(Ministry of Health in Kenya, 2015).*

The health workforce is severely stretched in number, capacity, and mental resilience. The problem is further compounded by a high prevalence of infectious and non-communicable diseases and the fact that the county has no well-laid formal mental health care plan for the caregivers within the COVID–19 response strategy *(National AIDS Control Council & National AIDS Control Council (NACC), 2018; Ministry of Health in Kenya, 2015).*

Health emergencies such as pandemics can lead to detrimental and prolonged psychosocial consequences due to disease – misinformation over social media and elsewhere *(Dong & Bouey, 2020)*. Evidence from other regions demonstrates that during public health emergencies, healthcare providers are at risk of numerous psychological effects, which can manifest as anxiety, depression, fear, and panic, especially in highly impactful outbreaks such as COVID-19 disease *(Mo et al., 2021; Lai et al., 2020).* The effects may be a forerunner to mental, physical, and emotional exhaustion. The high levels of psychological responses have been shown to lower staff morale, increase workplace absenteeism, presenteeism, and decrease job satisfaction and the quality of care offered *(Brooks et al., 2018).*

The current study, therefore, was to gather more evidence on psychological responses and related demographic and socioeconomic factors among healthcare providers during the COVID–19 pandemic at a regional teaching and referral hospital in Western Kenya. Results from this study will identify recommendations for tailored psychological interventions to reduce the risk of adverse psychological outcomes and foster post-pandemic resilience within healthcare organizations that may be affected by pandemics or emerging public health emergencies.

3. Aim of the study

To assess the healthcare providers' psychological responses and related demographic and socioeconomic factors during the COVID-19 pandemic at JOOTRH.

3.1. Research question

- What is the level of psychological responses during the COVID–19 pandemic at JOOTRH?
- What is the relationship between demographic, socioeconomic, and healthcare providers' psychological responses during the COVID–19 pandemic at JOOTRH?

4. Subjects & Methods

4.1. Research Design

This study used a descriptive cross-sectional design. A cross-sectional study design is one of the observational study designs where the investigator measures the exposure and outcome at the same time *(Levin, 2006).* They are useful for establishing preliminary evidence by explaining population

features to aid in planning future advanced studies. They are easy to conduct, can be conducted relatively faster, and they are inexpensive. However, it is difficult to derive causal relationships between the study variables from a cross-sectional research design *(Wang & Cheng, 2020).* The study participants in cross-sectional studies are selected based on the inclusion and exclusion criteria set.

4.2. Study setting

This study was conducted at the Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH) in Kisumu County. The county is in western Kenya, about 320 km northwest of the capital city of Nairobi. It lies within longitudes 33° 20'E and 35° 20'E and latitudes 0° 20'South and 0° 50'South. The county is one of the 47 counties created through the devolved system of governance. Jaramogi Oginga Odinga Teaching and Referral Hospital is a level 5 facility in Kisumu County located about 3 kilometers from Kisumu town center on Lake Victoria shores. Since its inception, it has grown from a small hospital to a regional referral hospital. More than ten counties in the western region of Kenya depend on the hospital, including the county, sub-county hospitals, and private hospitals.

The hospital has an inpatient bed capacity of 467, serving an estimated population of over 5 million with a total of 880 staff, consisting of 492 regular staff, 107 from partners, 140 casual or contract, and 141 outsourced services. The annual workload (2020) includes 197,200 outpatients and 21,000 inpatients. The hospital provides curative, preventive, promotive, diagnostic, and rehabilitative services. It provides various specialized services and is also a center for regional research activities. It serves as a key training facility for several universities and colleges in the county and its environs. The hospital was selected for this study in Kisumu City, which is strategically located as a gateway for Kenya into the African Great Lakes region and is the main commercial and transport hub. The hospital was the main referral hospital handling COVID-19 patients in Kisumu County and the regional epicenter around Lake Victoria.

4.3. Subjects

This study used a stratified sampling method to select the sample for the study. The sampling method divides a population into groups to make sampling more practical. First, different cadres of healthcare providers were used as the stratum. The questionnaire was sent to the different strata. From each stratum, data was collected through random sampling until the number of required healthcare providers was reached.

Inclusion criteria

Health care providers aged at least 18 years old, those employed to work in the hospital on permanent and pensionable terms or contract terms to include doctors, nurses, clinical officers, dentists, laboratory officers, and pharmacists. Healthcare providers who provided consent to participate in the study.

Exclusion criteria

Excluded are the healthcare providers who, in the past two weeks, have been engaged in some psychological support and those who might have experienced a traumatic event in the past month, like the loss of a loved one.

This study targeted 352 healthcare providers (206 nurses, 77 doctors, 32 clinical officers, 20 laboratory technicians, 12 pharmacists, and five dentists). This group of healthcare providers was targeted because they have been actively treating and caring for patients during the pandemic.

The population of healthcare providers (doctors, nurses, clinical officers, pharmacists, laboratory technicians, and dentists) at JOOTRH is 352. The studied sample was calculated using *Fisher et al. (1991).* That is $n = Z^2pq/d2$, where n is the desired sample size (when the study target population is over 10,000), Z is the standard normal deviate = 1.96 (corresponding to 95% Confidence Interval), p is the proportion of the target population estimated to have a particular characteristic. If there is no reasonable estimate, then use 50 percent; therefore, p = 0.50, q = 1.0-p, d = Degree of accuracy desired usually set as 0.05, q = 1-p = 1-0.5 = 0.5. Hence the desired sample size (n) was calculated as $n = Z^2pq/d^2$, $n = 1.96^2 \times 0.5 \times 0.5/ (0.05)^2$, n =384.16. Since the target population is less than 10,000, the sample size is adjusted using the formula nf = n/1+ (n/N), where nf = desired sample size when the population is finite and less than 10,000, n = the desired sample size when the population is more than 10,000. N = estimated population size, nf = 384/1+ (384/352), nf = 184, 10% was added to take care of spoilt questionnaires and the non-responses; 10% of 184=18 thus 184+18=202. Therefore 202 healthcare providers were involved in this study.

4.4. Tools of data collection

4.4.1. Kobo Toolbox-Based Questionnaire

The study used a Kobo toolbox-based questionnaire during the COVID–19 pandemic. The questionnaire was developed by academic experts in nursing, public health, psychology, mental health, and psychiatry from Masinde Muliro University of Science and Technology (MMUST). The first section (A) of the questionnaire for health care providers had the demographic characteristics; age, gender, religion, and marital status. The next section (B) included socioeconomic factors; Level of education, income level, breadwinner, living arrangements like; living alone, living with a partner, living with a partner and children, living with a parent, employment terms, unhealthy habits, and having a chronic medical condition.

The study also adopted two validated tools to measure healthcare providers' psychological responses. The 7–item Generalized Anxiety Disorder Scale (GAD - 7) and the 9-item Patient Health Questionnaire (PHQ - 9) are the frequently used tools to assess and screen for the presence and extent of depression and anxiety, respectively.

4.4.2. Generalized Anxiety Disorder Scale (GAD-7)

The GAD–7 is a self-reported anxiety questionnaire including seven items. The items on the scale are feelings of Feeling nervous, anxious, or on edge, not able to stop or control worrying, worrying too much about different things, having trouble relaxing, being so restless that it is hard to sit

still, becoming easily annoyed or irritable, and feeling afraid as if something awful might happen.

Scoring system

Each item assigned scores of 0, 1, 2, and 3, representing not at all, several days, over half the days, and nearly every day, respectively. A total score of 21 was generated from the tool with score ranges of 0 – 4, 5 – 9, 10 – 14, and 15 – 21, representing mild, moderate, moderately severe, and severe anxiety, respectively *(Spitzer et al., 2006).* GAD – 7 has proved valid with high reliability (Cronbach's $\alpha = 0.89$). A computed score of 10 or more represents a practical cutoff point for recognizing cases of generalized anxiety disorder (GAD) *(Spitzer et al., 2006; Plummer et al., 2016).*

4.4.2. Patient Health Questionnaire-9 (PHQ – 9)

The nine items assessed over the past two weeks are; Little interest or pleasure in doing things; feeling down, depressed, or hopeless; trouble falling or staying asleep or sleeping too much, feeling tired or having little energy; poor appetite or overeating, Feeling bad about self, e.g., failure or let down by self or family, trouble concentrating, Moving or speaking noticeably slowly or fidgety or restless or moving around a lot more than usual, and Having suicidal thoughts or self-harm *(Kroenke et al., 2001).*

The tool has been validated for primary care, with aspects of its construct validity documented in studies in the general population and medical settings. In different medical settings, the validated PHQ – 9 was reported with good reliability (Cronbach's $\alpha = 0.86 – 0.89$) *(Pouralizadeh et al., 2020; Doan et al., 2022).*

Scoring system

The Patient Health Questionnaire (PHQ - 9) has nine items, each assigned scores of 0, 1, 2, and 3, representing not at all, several days, more than half the days, and nearly every day, respectively. The total score generated from the tool is 27, with score ranges of 1 – 4 denoting minimal depression, 5 – 9 mild depression, 10 – 14 moderate depression, 15 – 19 moderately severe depression, and 20 – 27 representing severe depression.

4.5. Procedures

Data collection is the process of gathering and measuring information on the variables of interest for the researcher in a systematic, established way that enables one to respond to the stated research questions. The study used face and content validity to test the accuracy of the data-collecting instrument in order to increase the validity strength of the questionnaire. In face validity, experts looked at the items in the questionnaire and agreed that the test is a valid measure of the concept being measured at the face of it. Content validity is the accuracy with which an instrument measures the constructs of interest under study. Content validity helped ensure the questions elicited the intended information *(Taherdoost, 2018).* The health care providers questionnaire was given to the supervisors and experts in mental health, public health, and psychology to see whether the tool was likely to collect the intended information and give suggestions on improving the tool. They provided feedback on what needed to be improved before proceeding to the field for final data collection.

Ethical consideration for this study was stringently adhered to before the data collection process began. The administrative approval was given by the Chief Executive Officer (CEO) of Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH). The study was approved by Masinde Muliro University of Science and Technology Institutional Scientific and Ethics Review Committee (MMUST - ISERC) approval number MMUST/IERC/062/2022 and Jaramogi Oginga Odinga Teaching and Referral Hospital Institutional Scientific Ethical Committee (JOOTRH - ISERC) approval number IERC/JOOTRH/619/22. All the respondents provided informed consent before participating in the study. The information about the study was given as a KOBO collect note before starting the questionnaire. Those who clicked "yes" to consent to participate were allowed to proceed. Those who clicked "no" were thanked and exited from the questionnaire. After the study's conclusion, a score for generalized anxiety disorder and depression was computed. If the score indicated clinically significant GAD and depression, they were directed for further evaluation and assistance.

The developed questionnaire was piloted on 10% of the sample size (n = 202), which equals a sample of 20 respondents, to test its validity *(Doody & Doody, 2015).* The results were then reviewed for any variations in the data captured, omissions, and typographical errors, ensuring that the study was feasible, questions were objective, relevant, and clear to the respondents, and an acceptable and reasonable amount of time was allocated for administering the questionnaire. The final analysis did not include data from the pilot study.

Data for this study were collected for two months, in July and August 2022, when 202 healthcare providers were expected to complete an electronic web-based questionnaire. The online questionnaire was used to curb the spread of COVID – 19 which was surging during the data collection period. The electronic questionnaire was used to collect healthcare providers' demographic and socioeconomic factors data. Validated tools, patient health questionnaire – 9 (PHQ – 9), and the generalized anxiety disorder – 7 (GAD – 7) were also incorporated to measure depression and anxiety, respectively. The questionnaire and the validated tool– were sent to the healthcare providers through an online –platform such as the WhatsApp application. Also, those who had e-mail were sent the questionnaire. The questionnaires were sent to the health care providers' virtual groups through the various unit in charge at JOOTRH after teaching them.

4.6. Limitations of the study

This study has several limitations. First, we used an online survey that posed an increased non-response risk. This risk was minimized by sending constant reminders and follow-ups to the respondents.

Second, this study was an online study which may have selection bias whereby non-respondent healthcare providers

who were old or lacked internet access may have had different characteristics than those who responded.

Third, the study design used is a cross-sectional design. Cross-sectional data from the study can identify associations but not evidence of the causal relationship. With consideration, a longitudinal study should be done to ascertain the causal relationship.

4.7. Data analysis

Data was exported from Kobo collect platform in Excel format, cleaned, and exported to Statistical Package for Social Sciences (SPSS) version 28 for analysis. Descriptive analysis, such as frequencies, proportions, means, and standard deviation, were used to summarize the data. The bivariate analysis had been contemplated, and thus, most of the variables were converted to binary variables to enable Chi-square statistics and measurement of association strength. The chi-square test was thus used to determine if there was homogeneity in proportions at $p \leq 0.05$ and to establish the strength of association; OR and 95% CI were used between the demographic, socioeconomic aspects, and the psychological responses (anxiety and depression).

5. Results

Table 1 demonstrates the demographic characteristics of healthcare providers. This subsection has demographic aspects, including age, gender, religion, and marital status. The mean age of the sampled population was 34.4±8.7 years, with 51.5% being over 30 years. Age was regrouped into binary groups, with the median (30) being the grouping criteria. From the table, 58.9% of the respondents were males, 96 % were Christians, and 70.8% were married, as illustrated.

Table 2 shows the frequency and percentage distribution of anxiety-related aspects, with most of the respondents, 89(44.1%), having trouble relaxing for several days, while only 8(4%) did not feel nervous, anxious, or on edge.

The level of anxiety illustrated by Figure 1 is minimal anxiety among the respondents at 5%, mild anxiety at 35.1%, moderate anxiety at 39.6%, and severe anxiety at 20.3%. The overall prevalence of anxiety symptoms was 59.9% (Severe and moderate anxiety representing anxiety of clinical significance, giving a prevalence of 59.9%).

Generalized Anxiety Disorder (GAD) was reclassified into a binary variable with moderate and severe anxiety representing GAD of clinical significance. Bivariate analysis is represented in Table 3. More than half of the demographic aspects demonstrated a significant relationship with GAD. These aspects were age, gender, and marital status, those respondents aged less than 30 years and males were less likely to suffer GAD than their older counterparts and females (OR: 0.1, P<0.001; OR: 0.4, P=0.002), respectively. Those who were married (OR: 4.2) had a four times risk of GAD than their counterparts.

Table 4 illustrates the frequency and percentage distribution of depression-related aspects, with the majority, 137(67.8%), reporting having had no suicidal thoughts or thoughts of self-harm. Only 11(5.4%) had suicidal thoughts or thoughts of self-harm.

Figure 2 illustrates the frequency and percentage distribution of the levels of depression. The level of depression is classified into five categories based on the summation of the scores for the nine aspects. The level of minimum depression among the respondents was 19.3%, mild depression was 23.3%, moderate depression was 39.1%, moderately severe depression was 9.9%, and severe depression was 8.4%. The overall prevalence of depressive symptoms is 57.4% (Severe, moderately severe, and moderate depression representing depression of clinical significance, giving a prevalence of 57.4%).

Table 5 demonstrates the relationship between depression and demographic characteristics. Depression was reclassified into a binary variable with moderate depression, moderately severe depression, and severe depression representing depression of clinical significance. Bivariate analysis is represented in Table 5. Half of the demographic aspects that demonstrated a significant relationship with depression were age and marital status. Those that were less than 30 years were less likely to be depressed (OR: 0.5; 95% CI: 0.3-0.8; P=0.006), and those who were married were more likely to be depressed (OR: 3.2; 95% CI: 1.7–6.1; P<0.001) respectively.

Table 6 demonstrates the relationship between GAD and socioeconomic factors. Respondents' level of education, income level, living arrangements (living alone, living with a partner and children, and living with parents), and employment status were analyzed as aspects correlated to socioeconomic status. Those earning more than KES 50,000 (OR: 4.6), living with partners and children (OR: 2.4), and being employed permanently (OR: 3.3) portrayed a higher preponderance for GAD. Those with lower qualifications (up to higher diploma) and those that lived alone had a lower risk of GAD (OR: 0.5; 95% CI: 0.3 - 0.9; P=0.019) and (OR: 0.4; 95% CI: 0.2 - 0.8; P=0.004), respectively as illustrated in table 6.

Table 7 demonstrates the relationship between depression and socioeconomic aspects. Those who lived with a partner (OR: 4; 95% CI: 1.3-12.3; P= 0.007) and or with children (OR: 1.7; 95% CI: 1–3; P=0.045) and those that lived without parents (OR: 2.5; 95% CI: 2.1–3; P=0.001) were more at risk of being depressed than their counterparts. These findings are also corroborated by the fact that those who live alone have a lower risk of depression than their counterparts (OR: 0.4; 95% CI: 0.2-0.7; P=0.002). As much as those who earned highly had permanent jobs, and those who engaged in unhealthy habits had higher proportions of depression, with no significant difference in risk status with their counterparts, as demonstrated in table 7 below.

Table (1): Frequency and percentage distribution of demographic characteristics (n=202).

Sociodemographic Characteristic	Frequency	%
Age (Years)		
≤30	98	48.5
>30	104	51.5
Mean±SD	34.4±8.7	
Gender		
Male	119	58.9
Female	83	41.1
Religion		
Christian	194	96.0
Muslim	8	4.0
Marital status		
Married	143	70.8
Not Married	59	29.2

Table (2): Frequency and percentage distribution of anxiety-related aspects on the GAD scale (n=202).

General anxiety variables on the GAD scale	Not at all		Several days		More than half the days		Nearly everyday	
	No.	%	No.	%	No.	%	No.	%
Feeling nervous, anxious, or on edge	8	4	62	30.7	52	25.7	80	39.6
Not able to stop or control worrying	20	9.9	80	39.6	56	27.7	46	22.8
Worrying too much about different things	18	8.9	76	37.6	77	38.1	31	15.3
Trouble relaxing	30	14.9	89	44.1	53	26.2	30	14.9
Being so restless that it is hard to sit still	43	21.3	84	41.6	45	22.3	30	14.9
Becoming easily annoyed or irritable	40	19.8	68	33.7	73	36.1	21	10.4
Feeling afraid as if something awful might happen	18	8.9	67	33.2	74	36.6	43	21.3

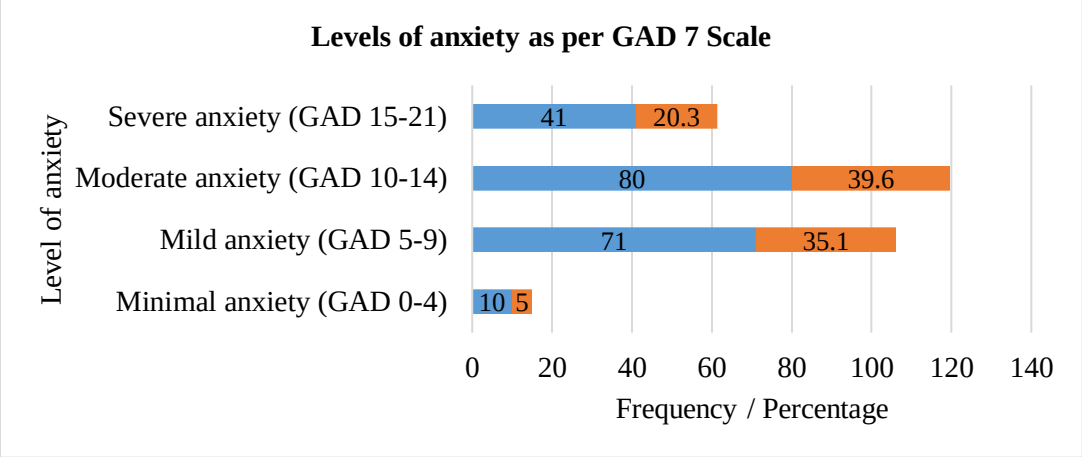

Figure (1): Percentage distribution of levels of GAD among the respondents as per GAD – 7 scale (n=202).

Table (3): Relationship between GAD and demographic characteristics (n=202).

Sociodemographic characteristics	Generalized anxiety disorder				OR*	95% CI	P Value
	Yes		No				
	No.	%	No.	%			
Age							
≤30	36	36.7	62	63.3	0.1	0.1 - 0.2	<0.001
>30	85	81.7	19	18.3			
Gender							
Male	61	51.3	58	48.7	0.4	0.2 - 0.7	0.002
Female	60	72.3	23	27.7			
Religion							
Christian	117	60.3	77	39.7	1.5	0.4 - 6.3	0.407
Muslim	4	50	4	50			
Marital status							
Married	100	69.9	43	30.1	4.2	2.2 - 8	<0.001
Not Married	21	35.6	38	64.4			

**Significance was determined by Pearson Chi-square analysis. All the P values are 2-sided.*

Table (4): Frequency and percentage distribution of depression-related aspects on the PHQ-9 scale (n=202).

Variable on the PHQ-9 Scale	Not at all		Several days		More than half the days		Nearly everyday	
	No.	%	No.	%	No.	%	No.	%
Little interest or pleasure in doing things	53	26.2	55	27.2	73	36.1	21	10.4
Feeling down, depressed, or hopeless	43	21.3	105	52	25	12.4	29	14.4
Trouble falling or staying asleep or sleeping too much	55	27.2	66	32.7	64	31.7	17	8.4
Feeling tired or having little energy	19	9.4	78	38.6	78	38.6	27	13.4
Poor appetite or overeating	33	16.3	56	27.7	87	43.1	26	12.9
Feeling bad about self, e.g., failure or let down by self or family	58	28.7	106	52.5	17	8.4	21	10.4
Trouble concentrating	56	27.7	66	32.7	55	27.2	25	12.4
Moving or speaking noticeably slowly or fidgety or restless or moving around a lot more than usual	74	36.6	74	36.6	37	18.3	17	8.4
Having suicidal thoughts or self-harm	137	67.8	38	18.8	16	7.9	11	5.4

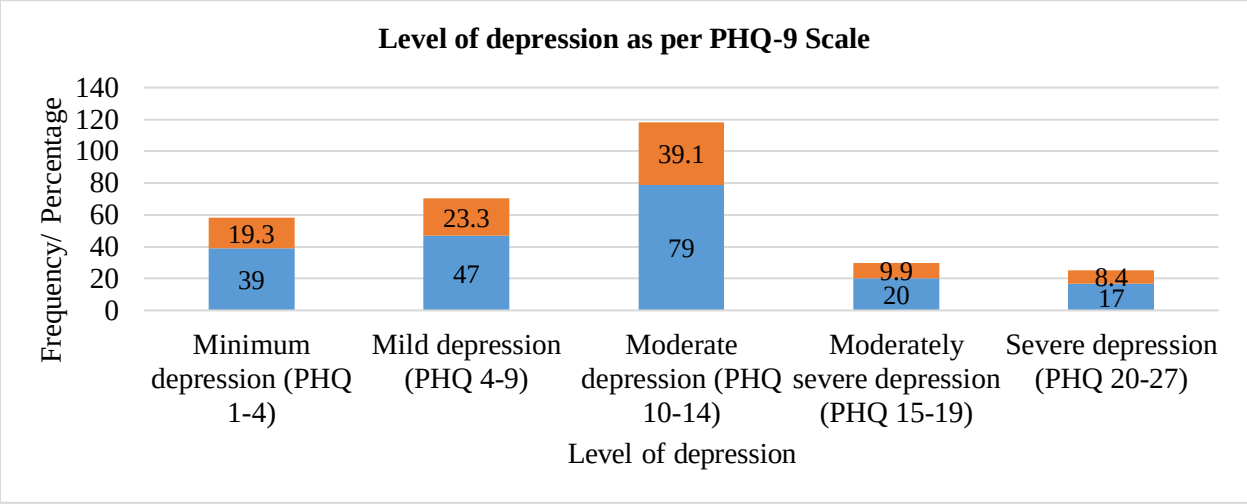

Figure (2): Percentage distribution of levels of depression as per PHQ-9 scale (n=202).

Table (5): Relationship between depression and demographic characteristics (n=202).

Sociodemographic characteristics	Depression				OR	95% CI	P Value
	Yes		No				
Age	No.	%	No.	%			
≤30	47	48	51	52	0.5	0.3 - 0.8	0.006
>30	69	66.3	35	33.7			
Gender							
Male	67	56.3	52	43.7	0.9	0.5 - 1.6	0.405
Female	49	59	34	41			
Religion							
Christian	112	57.7	82	42.3	1.4	0.3 - 5.6	0.466
Muslim	4	50	4	50			
Marital status							
Married	94	65.7	49	34.3	3.2	1.7 - 6.1	<0.001
Not Married	22	37.3	37	62.7			

6. Discussion

Past research conducted during pandemics has shown that outbreaks, epidemics, and pandemics can cause severe and variable psychological effects on people. In the general population, this can lead to the development of new psychiatric symptoms and the worsening of pre-existing illnesses. The symptoms can vary from mild to severe psychological responses that might need medical attention, care, and even hospitalization *(Müller, 2014)*. The present study carried out during the COVID–19 pandemic at Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH), Kisumu County, Kenya, was able to assess the healthcare providers' psychological responses and related demographic and socioeconomic factors during the COVID-19 pandemic at JOOTRH.

The current study demonstrates the level of psychological responses toward COVID - 19 pandemic, with depression and anxiety having a high overall prevalence than most of the reviewed studies. Most reviewed studies during the COVID–19 pandemic demonstrated a lower prevalence of GAD and depression among health workers than the

Table (6): Relationship between socioeconomic factors and GAD (n=202).

Socioeconomic aspects	GAD				OR*	95% CI	P Value
	Yes		No				
	No.	%	No.	%			
Level of education							
Up to Higher diploma	38	50	38	50	0.5	0.3 - 0.9	0.019
Undergraduate & above	83	65.9	43	34.1			
Income level							
>50,000	95	72.5	36	27.5	4.6	2.5 - 8.5	<0.001
≤50,000	26	36.6	45	63.4			
Breadwinner							
Yes	92	58.2	66	41.8	0.7	0.4 - 1.5	0.229
No	29	65.9	15	34.1			
Lives alone							
Yes	22	43.1	29	56.9	0.4	0.2 - 0.8	0.004
No	99	65.6	52	34.4			
Lives with partner							
Yes	15	65.2	8	34.8	1.3	0.5 - 3.2	0.376
No	106	59.2	73	40.8			
Lives with partner and children							
Yes	80	69	36	31	2.4	1.4 - 4.3	0.002
No	41	47.7	45	52.3			
Lives with parent							
Yes	0	0	8	100	2.7	2.2 - 3.2	0.001
No	121	62.4	73	37.6			
Employment terms							
Permanent	92	69.7	40	30.3	3.3	1.8 - 5.9	<0.001
Temporary	29	41.4	41	58.6			
Unhealthy habit							
Yes	12	63.2	7	36.8	1.2	.4-3.1	0.482
No	109	59.6	74	40.4			
Having a chronic medical condition							
Yes	19	70.4	8	29.6	1.7	.7-4.1	0.163
No	102	58.3	73	41.7			

**Significance was determined by Pearson Chi-square analysis. All the P values are 2-sided. N=202*

current study findings. Most of these studies were from different settings, especially in East Asia and the USA *(Adibi et al., 2021).*This finding can be understood due to the long-term adaptive fight against COVID–19 which had started earlier in those settings as well as their advanced healthcare system. In a Nigerian study during the COVID–19 pandemic, the prevalence of GAD was 58.4% *(Agberotimi et al., 2020).* The findings were in accord with our findings, with GAD having a prevalence of 59.9%. A published systematic review elucidated that the prevalence of major depressive disorder and anxiety disorders during the COVID-19 pandemic among healthcare workers was associated with increased infection rates, uncertainty, and attendant control measures *(Santomauro et al., 2021).*

Our findings indicate that age was statistically significant with depression and anxiety. The younger health care providers (those aged below 30 years) had less occurrence of GAD and depression. Equally, this population was largely not married and was living alone. Age exhibited mixed findings concerning its effect on GAD in different studies. Some studies showed that younger respondents had higher GAD than their older counterparts *(Moghanibashi-Mansourieh, 2020).* Concerning depressive symptoms, studies have demonstrated contrasting findings with the current study. A recent systematic review has demonstrated that those from the younger age group (less than or equal to 40 years) presented with depressive symptoms (Xiong *et al*., 2020).

Similarly, in a study on the Egyptian population, age demonstrated a significantly negative correlation with depression during the COVID–19 pandemic *(Shehata et al., 2021).* Most younger respondents have more access to information and worry about future economic status than their older counterparts, making them more vulnerable to psychological responses *(Qiu et al., 2020)*. Studies by *Cai et al. (2020); Spoorthy et al. (2020)* established that older staff worried more about the consequences of COVID-19, while those who were married and or living with other members in the same household had fears of transmitting COVID-19 to loved ones.

The current study reveals that being a female health provider was associated with GAD. This finding aligns with previous studies conducted during the early stages of COVID–19 pandemic *(Lai et al., 2020); Liang et al., 2020; Nemati et al., 2020).*

This lobe-sided gendered risk can be associated with the caring roles and household responsibilities occasioned by school closures or family members becoming unwell that are more likely to fall on women, in turn, increasing female healthcare workers' risk of psychological response to COVID–19 as compared to male colleagues *(Santomauro et al., 2021).*

Table (7): Relationship between socioeconomic factors and depression (n=202).

Socioeconomic aspects	Depression				OR	95% CI	P Value
	Yes		No				
	No.	%	No.	%			
Level of education							
Up to higher diploma	41	53.9	35	46.1	0.8	0.4 - 1.4	0.264
Undergraduate & above	75	59.5	51	40.5			
Income level							
>50,000	80	61.1	51	38.9	1.5	0.9 - 2.7	0.102
≤50,000	36	50.7	35	49.3			
Breadwinner							
Yes	86	54.4	72	45.6	0.6	0.3 - 1.1	0.071
No	30	68.2	14	31.8			
Lives alone							
Yes	20	39.2	31	60.8	0.4	0.2 - 0.7	0.002
No	96	63.6	55	36.4			
Lives with partner							
Yes	19	82.6	4	17.4	4	1.3- 12.3	0.007
No	97	54.2	82	45.8			
Lives with partner and children							
Yes	73	62.9	43	37.1	1.7	1 – 3	0.045
No	43	50	43	50			
Lives with parent							
Yes	0	0	8	100	2.5	2.1 – 3	0.001
No	116	59.8	78	40.2			
Having a chronic medical condition							
Yes	11	40.7	16	59.3	0.5	0.2 – 1	0.048
No	105	60	70	40			
Employment terms							
Permanent	81	61.4	51	38.6	1.6	0.9 - 2.9	0.080
Temporary	35	50	35	50			
Unhealthy habit							
Yes	12	63.2	7	36.8	1.3	0.5 - 3.5	0.391
No	104	56.8	79	43.2			

Significance was determined by Pearson Chi-square analysis. Values in bold are statistically significant at P≤0.05. All the P values are 2-sided. N=202

This study reveals that being married, living with others (partner, and partner and children), and having attained a higher level of education (undergraduate and above) significantly increased the risk of GAD. This finding is verified by other studies, which demonstrated that living with significant others, being married, and having higher education increased the risk of GAD *(Moghanibashi-Mansourieh, 2020).* Some explanatory studies established that personal fears regarding being a source of disease to family members and fear of household problems due to lockdown contributed to the psychological responses of married healthcare providers. Some studies proposed that assuring the safety of family members and instituting measures to reduce stigma could reduce the psychological burden that COVID-19 had on married healthcare providers *(Cai et al., 2020; Lai et al., 2020; Mohindra et al., 2020).*

Regarding the level of education, the current study shows higher anxiety levels among healthcare providers who were more highly educated. This finding is similar to other studies that showed a higher risk perception and the likelihood of developing fear among the highly educated compared to those who were not. In a general population study, a higher level of education meant more access to information and thus more self-awareness and risk perception *(Abdel Wahed et al., 2020; Arslanca et al., 2021; Enabulele & Esther, 2021; Qiu et al., 2020).* Other studies are not unanimous in their findings, with some showing that education was protective towards the health care providers from Severe Acute Respiratory Syndrome (SARS) related stress others showed no difference in risk based on educational level or that the general population without formal education had a higher risk of depression *(Chua et al., 2004; Cuiyan et al., 2020; De Kock et al., 2021).*

Qiu et al. (2020) posited that loss of anticipated income could lead to higher stress levels. This finding is comparable to the current study finding where the healthcare workers with higher income and those on permanent employment were more at risk of anxiety. Most of these were consultant medical practitioners; thus, there could be an anticipated loss of income due to COVID restrictions and low clientele turnout *(Qiu et al., 2020).* Most of the healthcare providers on permanent employment were those of advanced age, which could have made them more concerned about their health and well-being during the pandemic.

The current study has also demonstrated an increased risk for depression among healthcare providers without a chronic medical condition. Healthcare providers with chronic conditions in the current study site were exempted from working in COVID-19 centers and isolation sites caring for COVID–19 patients, which could have led to the current study findings. This finding contrasts with a study conducted among nurses in Iran, which showed high psychological

responses among nurses with chronic medical conditions *(Pouralizadeh et al., 2020).*

The current study has demonstrated the living arrangement as a key determinant of psychological response to COVID-19. This finding is similar to the findings of O'Neal et al., 2021 who showed that a greater proportion of healthcare providers who lived with a person with a higher risk of getting COVID-related complications reported worrying about spreading COVID-19 than those without household risk *(O'Neal et al., 2021).*

7. Conclusion

The study findings reveal a considerable proportion of anxiety and depression symptoms among health providers during the ongoing pandemic at JOOTRH. Those who lived with a partner and children, those who did not live with parents, had an income level of more than 50,000 Kenyan shillings, had a level of education of undergraduate and above, were married, above 30 years, female, and on permanent employment were significantly associated with anxiety. Those living with someone else, being over 30 years and married, were more likely to have depression than their counterparts.

8. Recommendations

Based on the results of the current study, the following recommendations are suggested;

- Healthcare providers should be provided with robust psychological support through increased psychological assessment and training in psychological skills to avoid high prevalence rates of psychological responses during pandemics. More specifically, the old, female, and married should be flagged as needing greater attention.
- Regular, systematic surveys are to be conducted to allow for monitoring of the mental health impact of COVID–19 among healthcare providers.
- Consideration of family status so that those who feel they have vulnerable relatives can be provided with more psychological care and reduced exposure time during posting or deployment during pandemics.
- A prospective, longitudinal study be conducted to adequately help explore the risk factors for psychological responses.
- A future similar study on multiple institutions using a larger sample size will be conducted to ascertain this study's findings.

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