Psychological impact of COVID-19 on health workers in Ghana: A multicentre, cross-sectional study

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Abstract

Introduction: The COVID-19 pandemic has exacted an appreciable burden on health systems globally including adverse psychological impacts on health workers. This study sought to assess COVID-19-related fear, depression, anxiety and stress among hospital staff, potential factors that may help reduce its psychological effects and their personal coping strategies. The study will help to highlight the psychological impact of COVID-19 on Ghanaian health workers and indirectly serve as a needs assessment survey for input to support affected staff and the broader health system.

Methods: A cross-sectional survey was conducted among health workers in three hospitals in the Ashanti Region of Ghana from 11 July 2020 to 12 August 2020. Demographic data and scores from the validated DASS-21 and Fear of COVID-19 scales and two other scales developed de novo were entered from 272 self-administered questionnaires and analyzed for means, frequencies and proportions. Fisher's exact test analysis was done to ascertain associations between selected independent variables and depression, anxiety, stress and fear. Parametric and non-parametric tests were used to compare the mean and median scores of the outcome variables across the three study hospitals.

Results and conclusion: Over 40% of respondents had fear while 21.1%, 27.8% and 8.2% had depression, anxiety and stress, respectively. Positive attitudes from colleagues and the government's tax-free salary relief were some factors said to reduce the psychological effects while over half of participants indicated praying more often as a coping strategy. There is a need for the health system to recognize the presence of these adverse psychological effects in health workers and take pragmatic steps to address them.

Keywords

COVID-19, health workers, fear, depression, psychological effects, Ghana

Introduction

The outbreak of the novel 2019 corona virus disease (COVID-19) in Wuhan in the Hubei Province of China in December 2019[1] has since spread rapidly across the world. The total confirmed cases globally, as of 14 June 2020, stood at 7,670,816 with 427,097 deaths.[2] Africa accounts for 2.18% of the global cases.[2] Aside the strain of health infrastructure, human resource and equipment deficits it places on health systems, it has been shown that COVID-19 and other infectious disease outbreaks underlie psychological issues such as anxiety that affects the population's general health and well-being.[3,4] Health workers are usually at the forefront in these epidemic crises and constitute a vulnerable population with an increased risk of infection, stress, depression and fear.[5–8]

Recent studies including systematic reviews have reported up to 46%, 71%, 50.4% and 39% prevalence of anxiety, stress, depression and insomnia among health workers in relation to the COVID-19 pandemic and with a preponderance in

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females.[5,8–13] These psychological effects must be identified and addressed as they have the potential of impairing cognitive functioning and possibly work performance.[14,15]

Health workers directly involved in the care of COVID-19 patients have been reported to have higher risks of depression, anxiety and stress compared to those with more indirect roles.[11,16–18] Factors such as improper use of personal protective equipment (PPE), infected family members and inadequate facilities for handwashing were noted to affect adversely health workers' mental health[10] while provision of adequate information on COVID-19 transmission, availability and trained use of PPEs, practicing response roles, implementing infection prevention and control (IPC) measures and movement restrictions, the safety of family members and positive attitudes of work colleagues among others helped to reduce COVID-19-related stress among health workers and enabled better coping.[19–21]

The first case of COVID-19 in Ghana was reported on 12 March 2020 and this was an imported case. Following this, the government instituted measures to limit importation and local spread of the virus, provide adequate care for the sick and mitigate the socioeconomic impact of the disease.[22] Despite measures to curb transmission, the infection burden increased exponentially from a cumulative 13,203 confirmed cases with 70 deaths and 4,548 recoveries as of 19 June 2020 when this survey was being planned to 46,153 confirmed cases with 299 deaths as of 24 September 2020.[23] By the end of June 2020, 779 health workers had contracted COVID-19 with up to 10 deaths and many more were unable to work as they were in isolation waiting for their test results, having been exposed to infected cases.[24] To help alleviate the burden of the pandemic, possibly including adverse psychological effects on the health work force specifically, the government granted a 3-month tax-free salary relief. In addition, payment of 50% of their basic salary as allowance was promised to frontline health workers and a life insurance cover was also instituted for health staff who would get infected or die from COVID-19.

Acknowledging a need to identify and address adverse psychological effects, the present study aimed at filling existing gaps in knowledge relating to the potential presence and degree of COVID-19-related fear, depression, anxiety and stress among Ghanaian health workers as these effects are more commonly occurring. The study also sought to assess whether the provision of PPEs, implementation of practice response plans and IPC protocols among others have helped to reduce the psychological effects of COVID-19 and served as useful coping strategies among the health workers.

Materials and methods

Study design and site description

This was an analytical cross-sectional study conducted among health workers of St. Martin's Catholic Hospital, Agroyesum (SMHA) in the Amansie South district, St. Michael's Catholic Hospital, Pramso (SMHP) in the Bosomtwe district and Ashanti Mampong Government Hospital (MGH)) in the Ashanti Mampong municipality, respectively, in the Ashanti Region of Ghana from 11 July 2020 to 12 August 2020. The facilities were selected to reflect a balance between full government and faith-based organization (quasi-government) ownership.

As a quasi-government hospital, SMHA serves as the district hospital for the Amansie South and West districts. It has a staff population of 300 made up of 225 clinical (doctors, paramedics, nurses) and 75 non-clinical (administration, accounts, estate, health information) staff. The Amansie South district with a 2020 projected population of about 75,000[25] had recorded 79 cases of COVID-19 making it the fifth district with the highest number of cases in the Ashanti Region as of mid-June 2020. By 12 August 2020, 12 staff members had tested positive and 38 positive patients had been seen at the hospital.

St. Michael's Hospital is the major referral facility in the Bosomtwe district and serves the surrounding district of Bosome Freho and parts of Bekwai municipality and Kumasi. The staff strength is 379 (268 clinical staff and 111 non-clinical staff). The 2020 district population is projected to be about 116, 400[25] and by mid-August 2020, the hospital had recorded 20 confirmed cases. Eight of these were patients and the remaining 12 health staff. No health worker died of COVID-19 in any of the study facilities.

Study population and procedures

The study population comprised all health staff at the study hospitals. Health staff was defined to include non-permanent workers such as rotational nurses and other interns working in the hospitals at the time the study was conducted. They were included because their work schedules placed them at similar risks as permanent staff. For inclusion, one had to be a staff at any of the three study hospitals and willing to give consent. Staff who declined to give consent were excluded.

At each facility, study participants were conveniently selected. An investigator and a research assistant went to all wards/units in the hospitals and explained the study objectives to the staff present at the time. Those consenting to participate were given self-administered questionnaires to fill and return. This was done until the assigned facility sample sizes were reached. Participants were not given any benefit or incentive for taking part in the study.

Sample size determination

The sample size was estimated using the Cochran's formula $N = Z^2pq/d^2$, where Z is the reliability coefficient, 1.96 at 95% confidence interval, p is the proportion of health workers with psychological effects such as depression from the outbreak of COVID-19, q is $(1 - p)$ and d is the desired precision.

Assuming a 46% prevalence of depression among health workers from a previous study[5] and a precision of 5%, a sample size of 381 was estimated. This was adjusted to 274 for a finite population of 961 (which is the total population of health workers at the three study sites). With an upward adjustment of 5% for losses, a sample size of 300 was obtained and distributed equally among the three study facilities. To have a representative sample from the clinical and non-clinical staff, two-thirds of the allocated sample size for each study facility was drawn from clinical staff and one-third drawn from the non-clinical staff. This decision was based on the observation that clinical staff outnumber non-clinical staff.

Data collection and management

The questionnaire used was in five parts. The first part captured demographic characteristics including age, marital status, religion, number of dependents and job description. The second and third parts assessed psychological outcomes for staff using the Fear of COVID-19 scale[26] and the Depression, Anxiety and Stress Scale-21 (DASS-21).[27] The fourth and fifth parts were developed by the investigators based on the literature review and assessed factors that may help in reducing the psychological effects of COVID-19 as well as describing personal precautionary measures and coping strategies (see the Supplementary File). These included how well they agreed or disagreed that factors like availability of PPEs, IPC protocols, the government's offer of tax-free salaries and positive attitudes from work colleagues, among many others, contributed to reducing COVID-19 distress and whether it helped them cope better. Unlike the second and third parts of the questionnaire, the latter tools have not been validated against any known standard scale previously. To assess comprehension mainly, they were pretested among 15 individuals at SMHA who did not take part in the survey and appropriate changes made to their structure.

The Fear of COVID-19 scale is a validated 7-item unidimensional scale with good internal consistency and composite reliability.[26] However, the literature search did not show any published study in Ghana which used the tool. The total score on the scale is comparable across gender and age and is thus a good psychometric instrument in assessing and allaying fear of COVID-19 among individuals. Respondents indicate their level of agreement with statements on a five-item Likert-type scale. Responses to the questions include "strongly disagree," "disagree," "neither agree nor disagree," "agree," and "strongly agree." The minimum score possible for each question is 1 and the maximum score is 5. A total score is calculated by adding up each item score (ranging from 7 to 35). Unlike the DASS-21, the Fear of COVID-19 scale does not give score categories and the authors only mention that the higher the score, the greater the fear. For the purposes of this study, we assumed a score category for the Fear of COVID-19 scale as follows: no fear

(7–21), mild fear (22–26), moderate fear (27–31) and extreme fear (32–35).

The DASS-21 is a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress. It has been used in the Ghanaian population with reports of good reliability[28–31] although González-Rivera et al.[32] reported construct validity challenges with the tool in Hispanics. This 21-item scale has 3 sub-scales: Depression (DASS21-D), Anxiety (DASS21-A) and Stress (DASS21-S). Each subscale has seven items with responses graded to reflect the severity of each item. The response to each item is graded as 0 (did not apply to me at all), 1 (applied to me to some degree or some of the time), 2 (applied to me to a considerable degree or a good part of the time) and 3 (applied to me very much or most of the time). The score for each subscale is multiplied by 2 to calculate the final score which ranges from 0 to 42. The final score for DASS21-D is graded as normal (0–9), mild (10–13), moderate (14–20), severe (21–27) and extremely severe (28+), that for DASS21-A is graded as normal (0–7), mild (8–9), moderate (10–14), severe (15–19) and extremely severe (20+) and for DASS21-S as normal (0–14), mild (15–18), moderate (19–25), severe (26–33) and extremely severe (34+).

Statistical analysis

Data entry was done in SPSS version 20 (SPSS, IBM, USA) and analyzed using STATA 13 (Stata Corp, Texas, USA). Summary statistics including means, frequencies, proportions and percentages were presented. Fisher's exact test analysis was conducted for association between the categorical explanatory variables sex, age, marital status, number of dependents, job description, study hospital and religion and the categorical outcome variables of depression, anxiety, stress and fear of COVID-19 scores. Fisher's exact p-values were reported. Mean Fear of COVID-19 scores was compared across the three study sites/hospitals for difference using one-way analysis of variance as it was normally distributed. The Kruskal–Wallis test was used to test the null hypothesis of no difference in median depression, anxiety and stress scores among the three study sites since the scores for these attributes were not normally distributed. Associations between categorical variables were said to be significant if p-value $\leqslant 0.05$. Participant responses from the scale assessing mitigating factors and coping strategies were not presented as scores but as proportions and percentages.

Ethical approval

The study was approved by the institutional review board of the Komfo Anokye Teaching Hospital, Kumasi, Ghana with reference number KATH-IRB/AP/084/20. The management of all three study hospitals granted written permission for the conduct of the study in their facilities. Written informed consent was obtained from all eligible participants and

Table 1. Background characteristics of study participants.

Variable	All respondents n (%)	St Martin's Hospital n (%)	St. Michael's Hospital n (%)	Mampong Gov't hospital n (%)
Sex (N = 236)				
Male	115 (48.73)	47 (58.02)	18 (38.30)	50 (46.30)
Female	121 (51.3)	34 (42.98)	29 (61.70)	58 (53.70)
Age in years (N = 231)				
20–29	124 (53.7)	43 (55.84)	43 (52.44)	38 (52.78)
30–39	94 (40.7)	30 (38.96)	31 (37.80)	33 (45.83)
40–49	7 (3.0)	1 (1.30)	6 (7.32)	0 (0.00)
50–59	6 (2.6)	3 (3.90)	2 (2.44)	1 (1.39)
Marital status (N = 270)				
Married	163 (60.4)	29 (35.80)	40 (48.79)	38 (35.51)
Single	107 (39.6)	52 (64.20)	42 (51.22)	69 (64.49)
Religion (N = 271)				
Christian	257 (94.8)	76 (93.83)	79 (96.34)	102 (94.44)
Muslim	13 (4.8)	5 (6.17)	3 (3.66)	5 (4.63)
Other[a]	1 (0.37)	0 (0.00)	0 (0.00)	1 (0.93)
No. of dependents (N = 268)				
No dependent	9 (29.5)	24 (30.00)	23 (28.40)	32 (29.91)
<3	104 (38.8)	32 (40.00)	29 (35.80)	43 (40.19)
>3	85 (31.72)	24 (30.00)	29 (35.80)	32 (29.91)
Job description[b] (N = 270)				
Clinical	224 (83)	63 (77.78)	62 (76.54)	99 (91.67)
Non-clinical	46 (17)	18 (22.22)	19 (23.46)	9 (8.33)

[a]This person did not identify with any religion at all.
[b]Clinical staff refer to those with direct engagements with patients, for example, nurses, doctors, physician assistants, laboratory and pharmacy staff, while non-clinical staff refer to accounts/administrative staff, conservative staff and so on.

confidentiality ensured by using identification numbers rather than names.

Results

Study participants

A total of 272 valid questionnaires were returned and analyzed out of a total of 300 respondents invited to partake in the study giving a response rate of 90.7%. About two-fifths (39.7%, 108/272) of the respondents were from MGH, 30.5% (83/272) from SMHP and 29.8% (81/272) from SMHA. More than half of the participants were females (51.3%, 121/236). The mean age of respondents was 30.2 (±5.2) with a range of 22–57 years. Majority of the respondents (60.4%, 163/270) were married and almost all of them were Christians. More than four-fifths of the surveyed population (83%, 224/270) were clinical staff and 29.5% (9/268) had no dependents. Table 1 shows the background characteristics of study respondents.

Psychological impact of COVID-19

The Fear of COVID-19 scale. Over 40% of health staff had mild-to-extreme fear (45.4%, 122/269). Specifically, close to one-third (30.48%, 82/269) showed mild fear, while 3.4% (9/269) had scores indicating extreme fear of COVID-19. The overall mean score (SD) was 20.2 (6.3) and there was no significant difference in the mean score across the three study hospitals (19.8 vs 19.4 vs 20.9; p = 0.266). Table 2 shows the scores for the fear of COVID-19.

Depression Anxiety Stress Scale-21. Majority of respondents had neither depression (78.9%, 214/271), anxiety (72.2%, 195/270) nor stress (91.8%, 246/268). Less than 2% (1.1%, 3/271) had scores indicating extreme degrees of depression, while 6.3% (17/270) and 1.5% (4/268) had scores pointing to extremely severe anxiety and stress; 43 (15.8%), 51 (18.9%) and 12 (4.5%) respondents had mild-to-moderate depression, anxiety and stress, respectively (see Table 3).

Of the independent variables assessed for association with fear, depression, anxiety and stress, only job description was significantly associated with anxiety (p = 0.012) and stress (p = 0.035) scores (see Supplementary Tables 1a–d for Fisher's exact test analysis output). The Kruskal–Wallis test showed no statistically significant difference in median stress scores (p = 0.393), median depression scores (p = 0.099) and median anxiety scores (p = 0.100) across the three study sites/hospitals. Median scores are not shown as non-parametric tests do not give effect size.

Table 2. Fear of COVID-19 Scale scores.

Score	All respondents (N = 269)	Study hospital			p-value
		SMHA (n = 81)	SMHP (n = 80)	MGH (n = 108)	
Mean score[a] (SD)	20.2 (6.3)	19.8 (7.4)	19.5 (5.7)	20.9 (5.8)	0.266
Score categories					
No (7–21)	147 (54.6%)				
Mild (22–26)	82 (30.5%)				
Moderate (27–31)	31 (11.5%)				
Extreme (32–35)	9 (3.4%)				

SMHA: St. Martin's Catholic Hospital, Agroyesum; SMHP: St. Michael's Catholic Hospital, Pramso; MGH: Ashanti Mampong Government Hospital; SD: standard deviation.
[a]Mean scores were compared across hospitals using one-way analysis of variance with p-value provided. Number of respondents in each score category is provided with percentage in brackets.

Table 3. DASS-21 score of respondents.

DASS-21 score	No. of respondents, n (%)
Depression score (N = 271)	
No (0–9)	214 (79.0)
Mild (10–13)	31 (11.4)
Moderate (14–20)	12 (4.4)
Severe (21–27)	11 (4.1)
Extremely severe (28–42)	3 (1.1)
Anxiety score (N = 270)	
No (0–7)	195 (72.2)
Mild (8–9)	15 (5.6)
Moderate (10–14)	36 (13.3)
Severe (15–19)	7 (2.6)
Extremely severe (20–42)	17 (6.3)
Stress score (N = 268)	
No (0–14)	246 (91.8)
Mild (15–18)	8 (3.0)
Moderate (19–25)	4 (1.5)
Severe (26–33)	6 (2.2)
Extremely severe (34–42)	4 (1.5)

DASS-21: Depression, Anxiety and Stress Scale-21.

Factors that helped in reducing the psychological effects of COVID-19 on respondents

Table 4 shows participants' responses to factors that may have helped to reduce the psychological effects of COVID-19 on them. Majority of respondents either agreed or strongly agreed that positive attitudes from colleagues (72.12%, 194/269), joking and chatting with colleagues (65.44%, 178/272), believe in the screening procedures of the hospitals for early detection of cases (75.37%, 205/272), having seen or heard that most patients of COVID-19 recover (93.38%, 254/272), provision of clear guidelines on IPC by their hospitals (77.57%, 211/272), having no family member infected (83.46, 227/272) and the institution of tax-free salaries (75%, 204/272) have helped reduce the psychological effects of COVID-19 on them.

Less than half of respondents, however, indicated that the provision of the necessary PPE by their hospitals (42.28%,

105/272), the promise of 50% of basic salary as additional allowance by the government (29.78%, 81/272) and the provision of life insurance cover by the government if they get infected (39.71%, 108/272) have helped reduce the psychological effects of the infection on them.

Precautionary measures and coping strategies used by the participants

This part of the questionnaire sought to gain insight into various measures used by staff to help cope with the threat of the COVID-19 pandemic. Approximately 9 in 10 respondents either agreed or strongly agreed that they follow strict protective measures such as handwashing and wearing of face mask (92.5%, 250/271), observing social distancing protocols (92.62%, 251/271) and avoiding social gatherings (86.67%, 234/272) (see Table 5). Exercising regularly, taking zinc and vitamin C supplements, watching movies and reading for leisure were commonly reported ways of coping with the threat of the COVID-19 pandemic. Though more than half of respondents reported praying more often than they used to as a way of coping (54.62%, 148/271), less than one-third (26.94%, 73/271) have resorted to talking to their religious leaders more often than previously. About two-thirds either disagreed or strongly disagreed to seeking help from a psychologist and avoiding news about COVID-19 and related deaths as coping strategies.

Discussion

Fear, depression, anxiety and stress are relevant elements of psychological well-being and their assessment in health workers is justified in infectious disease outbreaks for the purposes of identifying and providing support for those needing it. This enquiry sought to study the prevalence of these attributes in Ghanaian health workers in response to COVID-19. It also assessed factors perceived to reduce these COVID-19-related psychological effects and their personal coping strategies. To the best of our knowledge, this is the first assessment of the psychological impact of COVID-19

Table 4. Factors that helped in reducing psychological effects of COVID-19 on staff.

Mitigating factor	N	Strongly disagree n (%)	Disagree n (%)	Neutral[a] n (%)	Agree n (%)	Strongly agree n (%)
Positive attitudes form my colleagues	269	27 (10.0)	22 (8.2)	26 (9.7)	145 (53.9)	49 (18.2)
Joking and chatting with my friends	272	16 (5.9)	38 (14.0)	40 (14.7)	120 (44.1)	58 (21.3)
I believe in the screening procedures of the hospital for early detection of possible cases of COVID-19	272	26 (9.6)	19 (7.0)	22 (8.0)	99 (36.4)	106 (39.0)
I have seen or heard that most patients of COVID-19 recover	272	6 (2.2)	5 (1.8)	7 (2.6)	113 (41.5)	141 (51.9)
My hospital provides me with the necessary personal protective equipment	272	52 (19.1)	56 (20.6)	49 (18.0)	94 (34.6)	21 (7.7)
My hospital has provided clear guidelines on infection prevention and control	272	12 (4.4)	23 (8.5)	26 (9.5)	143 (52.6)	68 (25.0)
None of my family members is infected	272	23 (8.5)	10 (3.7)	11 (4.0)	77 (28.3)	151 (55.5)
My hospital will support me once I get infected	272	40 (14.7)	27 (9.9)	84 (30.9)	78 (28.7)	43 (15.8)
The government has given me 3 months of tax-free allowance.	272	35 (12.9)	13 (4.8)	20 (7.4)	70 (25.7)	134 (49.2)
The government has promised 50% of my basic salary as allowance	272	91 (33.5)	45 (16.5)	55 (20.2)	47 (17.3)	34 (12.5)
The government has provided me with life insurance cover if I get infected or die from COVID-19	272	56 (20.6)	37 (13.6)	71 (26.1)	74 (27.2)	34 (12.5)

[a]This group neither agrees nor disagrees.

Table 5. Precautionary measures and coping strategies used by the participants.

Precautionary measures and coping strategies	N	Strongly disagree n (%)	Disagree n (%)	Neutral[a] n (%)	Agree n (%)	Strongly agree n (%)
Handwashing/sanitizers/face mask and protective clothing	271	10(3.7)	4(1.5)	7(2.6)	92(33.9)	158(58.3)
I observe social distancing protocols	271	5(1.8)	4(1.5)	11(4.1)	139(51.3)	112(41.3)
I avoid going to social gatherings	272	8(3.0)	12(4.5)	16(5.9)	134(49.6)	100(37.0)
I exercise regularly	270	4(1.5)	29(10.7)	43(15.9)	137(50.8)	57(21.1)
I eat healthy diet to boost immunity	271	2(0.7)	4(1.5)	10(3.7)	142(52.4)	113(41.7)
Taking Zinc and Vitamin C supplements to boost immunity	271	12(4.4)	23(8.5)	28(10.3)	110(40.6)	98(36.2)
Leisure activities in my free time	271	0(0.0)	6(2.2)	11(4.1)	138(50.9)	116(42.8)
I talk to religious leaders more often than I used to	271	41(15.1)	92(34.0)	65(24.0)	54(19.9)	19(7.0)
I pray more often than I used to	271	24(8.7)	49(18.1)	50(18.5)	95(35.1)	53(19.6)
I seek help from a psychologist	271	84(31.0)	96(35.4)	47(17.3)	34(12.6)	10(3.7)
I avoid media news about COVID-19	271	71(26.2)	110(40.6)	35(12.9)	37(613.7)	18(6.6)

[a]This group neither agrees nor disagrees.

on health workers in Ghana. Over 40% of participants expressed fear while less than one-third had scores indicating depression and anxiety. Less than 1 in 10 participants had COVID-19-related stress.

This study observed a 45.4% prevalence of fear of COVID-19. Studies reporting varying degrees of the fear of COVID-19 and their prevalence among health workers solely are limited and make comparison challenging. Two such studies in Mexico[18] and Philippines[33] reported mean fear scores of 19.3 and 19.9, respectively, but not the proportions of participants who had varying degrees of fear as their analyses did not tow that line. The Fear of COVID-19 scale[26] does not categorize scores by default and assigns higher fear levels to higher scores. In the current study, however, fear

levels were categorized and may well be the first such analysis of fear of COVID-19 scores in health workers. The chosen method of analysis in this study contributes to the difficulty with comparing its findings with other studies.

The mean fear score in this study (20.2) was similar to that reported in the previous studies.[18,33] There was no association between fear of COVID-19 and respondents' sex and job category in contrast to findings from other studies and reviews that reported a higher risk of psychological effects in females and clinicians.[10,13,18,33] Majority of the health workers in the current study were nurses, doctors, medical assistants and laboratory personnel and their fear may emanate from their direct engagement with potentially infected patients visiting the hospital to access care for other

ailments. This sub-population will likely be better equipped with information on COVID-19 transmission and prevention and in light of this, it is reasonable to posit that the prevalence of 45.4% is rather high. Other studies[34,35] reported fear of COVID-19 prevalence of 45.2% in India and 39.1% in Australia but these were conducted among the general population which included health workers. The findings of these studies are thus of limited suitability for comparison.

The present enquiry showed 21.0%, 27.8% and 8.2% prevalence of depression, anxiety and stress, respectively. No studies in the African context were found and this makes comparison to other African health systems challenging. These prevalence measures are much lower than the ≥37% for depression and ≥41% for anxiety reported elsewhere.[9–11,17,36] The prevalence of depression and anxiety respectively fall within the ranges of 24.1%–67.6% and 12.1%–55.9% reported in a systematic review.[37] The occurrence of stress is, however, lower and compares favorably with that reported in other studies.[12,38] The disparity in findings between the current study and those of other studies may largely be due to differences in the time the studies were conducted relative to the outbreak of COVID-19 and differences in the measuring scales/tools used. While most of the studies referenced were conducted within or close to the peak of the pandemic, this study was conducted about 5 months after the first reported case of COVID-19 in Ghana. Over this time, a lot of interventions were put in place that may have assuaged whatever initial psychological toll health workers may have had. The interventions included making PPEs available, organizing training sessions on the transmission and prevention of the disease and making available testing kits among many others. However, this does not explain situations where our findings were higher than those reported in other studies also done earlier in the pandemic.[12,38]

It is also possible that the relatively lower numbers of infected cases and mortality burden recorded in Ghana (0.5%–0.8%) compared to the much heavier numbers/mortalities observed in Asia, Europe and North America[23,39] may have constituted less intense pressure and contributed to the lower prevalence of depression, anxiety and stress recorded in the current study. Also, the government of Ghana placed much emphasis on COVID-19 risk management communication and this may have helped to reduce the adverse psychological effects. Furthermore, the differences in findings could also stem from cultural differences in expression of anxiety and depression[40] as well as optimism grounded in religion. Ghanaians are very religious and this is expressed in more than half of the respondents indicating they pray more often than previously as a coping strategy.

Being a clinician or a non-clinician was significantly associated with stress and anxiety in our study and this compares favorably with other study reports.[8,16–18] There was no association between job description and depression and it is unclear why this is so. Furthermore, while many studies report a higher risk of psychological effects in females in an infectious disease crises,[8,11–13] our study did not find an association between sex and depression, stress, anxiety and fear of COVID-19. It is not clear why this is so. There was no difference in mean Fear of COVID-19 scores and median depression, stress and anxiety scores across the three study hospitals and this suggests similarities in the availability and distribution of factors such as PPEs that underlie these adverse psychological effects across the hospitals.

Institution of tax-free salaries, COVID-19 screening procedures at health facilities and IPC guidelines and the high recovery rates for infected patients appeared to be useful factors for reducing psychological effects of the pandemic as high proportions of respondents agreed with them. Health facilities made significant investments into IPC measures with provision of alcohol hand rubs and Veronica buckets for handwashing at many vantage points. However, judging from the lower proportions that agreed with them, it did not appear that provision of PPEs, government's institution of life insurance cover for health workers who would get infected or die from the disease and the promise of paying half of their basic salaries as allowances were seen as factors that effectively mitigated adverse psychological effects of COVID-19.

Availability of PPEs is expected to help reduce COVID-19-related adverse impacts on the mental health of healthcare workers.[19,20] It is possible that even though PPEs such as face masks and gloves were provided, they may not have been deemed adequate in terms of quantities. This may have marred the health workers' confidence in this particular factor's ability to reduce adverse psychological effects of COVID-19. Clarity regarding which group of health workers qualified to be paid 50% of their basic salaries as allowances was initially problematic. Eventually, this incentive was assigned to health workers at designated treatment centers which did not include any of the study hospitals. The limited usefulness of this incentive may have resulted from respondents possibly feeling "cheated" and thus not placing value on it as a mitigating factor.

Praying more often as a result of the COVID-19 pandemic is a form of religious coping strategy for the distress it poses. In agreement with our findings, previous studies including those in Ghana and the West African sub-region have noted that religion, through faith and prayer, serves as a foundation for resilience and a resource to mitigate stressors in health workers and also helps them to manage the emotional hazards of their duties.[41–45] It is useful to talk to confidants in distress situations. In the face of psychological effects noted in the study, the incongruence in the finding that only about one-third of respondents talk more often to their religious leaders or will agree to seek help from a psychologist needs investigation. It may be due to the fact that psychologists are typically not available at the level of district hospitals in Ghana. Instead, they are at the higher level regional and teaching hospitals. It may also be a matter of choice to engage in more prayer and deal with the adverse

situation of COVID-19 on a personal level without talking more often to their religious leaders. Adherence to social distancing measures, movement restrictions and handwashing protocols were useful coping strategies and agree with earlier reports.[19–21]

The strength of the study lies in the use of well-established psychological measures and the fact that it is from Africa where there is scarce data on COVID-19-related fear, depression, anxiety and stress. A major study limitation is that though it is multicenter, all three sites are in the Ashanti region. Health workers from other regions of Ghana may have different experiences and thus select different responses on the measure scales. Generalizability of the study findings is thus limited in some ways even though operational dynamics in most district hospitals across the country are similar. This does not, however, render the findings invalid. Another limitation is the absence of qualitative approaches like the use of focus group discussions and in-depth interviews that would have provided useful insights into the nuances of participant responses.

Only 17% (46/270) of the study respondents were non-clinical staff and this is lower than the 33.3% planned for the study. The low response rate from the non-clinical staff arises from an observed relative non-availability of the non-clinical staff compared to the clinical staff during the study. The low response rate from the non-clinical staff does not distort the validity of the study findings. Despite universal exposure risks, clinical staff are still believed to be at higher risks and expected to bear the brunt of any psychological impact.

Conclusion

Fear of COVID-19 appeared to be an appreciable concern among Ghanaian health workers though the study was conducted at a time when there was adequate information on the transmission dynamics of the virus to guide preventive measures. Depression, anxiety and stress were also observed but on a smaller scale. There is a need to address these adverse psychological effects related to the pandemic. The population of affected health workers may be significant if one projects the findings on a national perspective. Of equal importance is the finding that majority disagreed with speaking to a psychologist as a coping strategy. Health workers must be encouraged to come out with their mental health issues and seek care early. They need to be informed about the availability of mental health services. The Ghana Health Service can consider organizing virtual sessions on these psychological effects for staff. Future qualitative research is needed to explore healthcare workers' workplace experiences to fully appreciate this burden.

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