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Factors shaping the mental health of healthcare workers during the COVID-19 pandemic: a qualitative study in Ghana

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Abstract

Introduction The COVID-19 pandemic negatively impacted the working conditions and mental health of healthcare workers (HCWs) across the globe. Little is understood of the factors influencing the mental health of HCWs in low-and middle-income countries like Ghana, which faced significant challenges from the COVID-19 pandemic due to their overburdened healthcare systems. Our study qualitatively examined the multilevel factors influencing HCWs' mental health in response to the pandemic in Ghana, as well as coping strategies.

Methods Utilizing an exploratory, descriptive qualitative research design, we purposively sampled and interviewed HCWs ($n=26$) and administrators ($n=3$) across 13 regions in Ghana from our parent study ($N=646$) between November 2020 and February 2021. Semi-structured interviews explored pandemic preparedness, experiences responding to the pandemic, the impact of the pandemic on life, work, quality of care, and mental health; challenges and facilitators of the COVID-19 response; and coping strategies. Transcripts were coded through a group-based collaborative approach in the Dedoose software and analyzed thematically guided by the socio-ecological framework.

Results HCWs reported experiencing fear, anxiety, stress, and depression due to the COVID-19 pandemic and cited several individual, interpersonal, institutional, and societal factors that adversely impacted their mental health. Individual-level factors included low knowledge of COVID-19 risk and sequelae and contraction of COVID-19. Interpersonal factors included being a parent/caregiver, risk posed to family/household as frontline workers, and social isolation. Institutional factors included inadequate health system capacity (i.e., low staffing capacity) and pandemic preparedness (i.e., inadequate COVID-19 training), and frontline working conditions (i.e., long work hours; higher COVID-19 infection risk). Societal factors were COVID-19-related stigma against HCWs, COVID-19 social conspiracies, and sociocultural beliefs about mental health in Ghana. Despite the negative impact of the pandemic on HCWs' lives, most reported not receiving adequate support from their workplace or the government to mitigate mental health distress. However, HCWs identified several protective factors and coping strategies, including prayer/

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spirituality, spiritual and emotional support from family and colleagues, and, although limited, work-based or government incentives and appreciation.

Conclusion The COVID-19 pandemic has adversely impacted the mental health of HCWs in Ghana, who have inadequate resources to address these distresses. Investing in healthcare infrastructure, including expanding workforce and facility capacity and providing workplace mental health wellness services, can help mitigate the mental health impact of health crises like the COVID-19 pandemic on the healthcare workforce and subsequently maximize the capacity of the health system to respond to future pandemics.

Keywords Healthcare workers, Mental health, COVID-19, COVID-19 preparedness

Introduction

COVID-19 has emerged as a significant public health crisis in our generation. As of September 1, 2024, the COVID-19 virus had afflicted over 776 million individuals [1] and claimed the lives of over 7 million [2]. Africa alone has registered an estimated 9.6 million COVID-19 cases [1] and over 175,000 deaths [2]. The surge of cases during the early stages of the pandemic burdened health systems and healthcare workers (HCWs), revealing HCWs' inadequate preparedness to manage patients while simultaneously protecting their health successfully. Many HCWs were especially vulnerable to COVID-19; the World Health Organization (WHO) reported that HCW infections accounted for more than 10% of all global cases [3], and an estimated 80,000–180,000 HCWs died as a result between January 2020 and June 2021 [4].

Although the pandemic started later and spread relatively slowly throughout Africa, concerns about its impact grew, given the continent's under-resourced health infrastructure [5, 6]. The impact of public health emergencies depends on global health security, including the structural capacity of resource-limited countries to contain emerging pandemics such as COVID-19. The pandemic, however, has placed an unparalleled strain on Africa's already overburdened health systems. For instance, 150,000 COVID-19 cases were reported among HCWs in Africa by 2021—about 2.6% of all HCWs in the region—with Ghana, Kenya, South Africa, and Zimbabwe accounting for over 70% of these cases [7]. Studies have documented other institutional challenges in Africa's pandemic response that have resulted in the high prevalence of HCW COVID-19 cases, including inadequate training on infection prevention and control (IPC), unclear response protocols, insufficient personal protective equipment (PPE), fragile health systems, and slow national responses [6, 8–13]. Other studies in the region have also reported multilevel factors such as a lack of designated areas for managing or isolating suspected COVID-19 cases, limited medical supplies, fear of infection, and stressful working conditions brought on by a lack of PPE and other equipment such as ventilators [6, 12, 14].

The shortage of HCWs on the continent adds to these multilevel challenges—Africa has 2.3 HCWs per 1,000 people, compared to 24.8 in the Americas [15, 16]. In Ghana, despite considerable labor-force initiatives that have improved the density of doctors, nurses, and midwives to 2.65 per 1,000 inhabitants, the country still has a dearth of HCWs and an inefficient distribution of those workers [17]. This pre-existing HCW shortage on the continent and loss of frontline HCWs owing to the pandemic has severely impacted service delivery, highlighting the under-preparedness of health systems to respond to the pandemic and placing HCWs and health systems under precarious conditions [7].

Previous studies have shown that structural factors, along with individual, interpersonal, and societal level factors such as perceived personal risks, fear of COVID-19 infection, the scale and rapid spread of COVID-19, and social isolation have a significant impact on HCWs' mental health [18–20]. According to a systematic review of HCW mental health globally during the pandemic, approximately 20–37%, 23–46%, and 41–52% of HCWs reported depressive symptoms, anxiety, and burnout, respectively [21]. Research in Africa has explicitly documented stress, burnout, insomnia, anxiety, and depression among HCWs [14]. In Ghana, a cross-sectional study evaluating the psychological impact of COVID-19 on HCWs found that over 40% of respondents reported feeling afraid. In comparison, 21.1%, 27.8%, and 82% of respondents experienced depression, anxiety, and stress, respectively [22]. In the parent quantitative study of which our study is a part, over two-thirds of HCWs reported moderate to high stress and some degree of burnout due to the pandemic [8, 23, 24]. While there are no known qualitative studies on COVID-19 and HCW mental health in Ghana, qualitative research from Uganda and South Africa found that HCWs reported experiences of stress and anxiety due to the pandemic, their working conditions, and the risk of COVID-19 [25, 26].

A rapid review of the impact of the pandemic on HCWs' mental health identified 24 studies indicating that the COVID-19 pandemic has had a considerable impact on the psychological well-being of frontline workers

and is associated with adverse mental health outcomes [27]. Research has also shown that applying IPC procedures, PPE availability and knowledge of proper use, and adequate information on COVID-19 transmission can help minimize COVID-19-related stress among HCWs and improve their capacity to cope [18, 19, 28, 29]. Our quantitative investigation into the relationship between stress and burnout and HCWs' perceived preparedness in Ghana revealed that higher levels of stress and burnout were linked to lower levels of perceived preparedness [8].

HCWs working in African settings have experienced high workloads and emotionally taxing conditions when demand surpasses capacity due to staffing shortages and inadequate preparedness [30, 31]. Yet, only a few studies, including our parent study, have quantitatively examined HCWs' mental health experiences and outcomes, particularly focusing on the psychological impact of their preparedness to respond to the pandemic in Africa [8, 22, 32]. Even fewer have qualitatively examined African HCWs' mental health distress due to the pandemic, and no study has examined this in Ghana. Ghana is among the top five nations in Africa for HCWs reporting COVID-19 infections [7], suggesting that there may be an even higher burden of adverse mental health outcomes.

Guided by the socio-ecological model, our study helps address this literature gap by contributing qualitative data on the multilevel risk and protective factors influencing HCWs' mental health in response to the pandemic in Ghana and HCWs' coping strategies. The socio-ecological framework is a widely used conceptual model in sociomedical sciences that refers to the interaction between a population, group, or an individual with their environment [33, 34]. The framework guides researchers in mapping out the relationship between the individual, their social conditions, and health outcomes, particularly how determinants on the individual, interpersonal, community, institutional, and environmental levels impact a person's health. We apply the socioecological framework to our analysis to offer a comprehensive understanding of the multiple levels of determinants shaping the mental health of HCWs in the context of the COVID-19 pandemic.

Methods

Study setting

Ghana, a West African country with a population of 31.9 million, reported its first two COVID-19 cases on March 12, 2020. As of September 1, 2024, Ghana ranked 17th in Africa in COVID-19 cases [35] and 24th in vaccination rates, with 172,077 cases, 1,462 deaths, and 35% of the population fully vaccinated [35–37], despite being the first African country to receive COVID-19 vaccines under the COVAX program [38]. The majority of healthcare in Ghana is delivered by the government, primarily

through the Ministry of Health and the Ghana Health Service, which manages about two-thirds of all health facilities in the country [39, 40]. While 70% of Ghana's population is enrolled in either the National Health Insurance Scheme or private health insurance plans, the availability of healthcare services varies across the country. In urban regions, 34% of residents have access to private and public hospitals, whereas this access is limited to just 2% in rural areas [41]. With fewer than one hospital bed per 1,000 population, an estimated 42 nurses and midwives, and 1.8 medical doctors per 10,000 population [42–45], Ghana's healthcare system is resource-limited.

Study design

Primary study

This qualitative study is embedded within a larger cross-sectional and concurrent mixed-methods study [46] of HCWs (i.e., nurses, physicians, and allied health workers) in Ghana, conducted from April 17th, 2020, to March 8th, 2021, across all 16 regions of the country. Therefore, most of the data was collected in the early stages of the pandemic before vaccinations were accessible in the country. The quantitative phase of the study sought to assess factors and outcomes associated with HCWs' perceived preparedness to identify and manage COVID-19 cases, including mental health outcomes like stress and burnout, and recommendations for improving the pandemic response through a national online survey. The methods for the parent study are described in detail in prior manuscripts with the quantitative results [8, 23, 24].

Qualitative study

The qualitative study employed an exploratory, descriptive research design [47, 48] to further explore constructs in the quantitative phase among a subset of the survey participants. Topics explored included HCW preparedness to respond to the COVID-19 pandemic and factors shaping preparedness; experiences responding to the pandemic; and the impact of the pandemic on life, work, quality of care, and mental health.

Sample and sampling techniques

We generated a random sub-sample ($n=44$) of HCWs from the quantitative sample ($N=646$) who provided an email address or phone number for future contact; the sample was balanced by age, gender, years of experience, geographic region, and levels of preparedness, stress, and burnout. In addition, we purposefully sampled facility and health system administrators since they played an essential role in the COVID-19 response. Participants were contacted by phone, and the study purpose and procedures were described. Interviews were arranged at a time that suited the respondents. The providers from the list were asked in sequence to participate in

the interviews; those who were unavailable or no longer interested were skipped, and the process continued until data saturation was reached. Twenty-six HCWs and three administrators across 13 regions (all regions except Ahafo, Savannah, and Western North) were interviewed in total.

Study variables

We report demographic and work-related indicators—age, gender, family background, provider type, years of service, facility type, and region; COVID-19 preparedness level; and stress and burnout data for the qualitative participants (Table 1). The methods for these measures are described in detail in prior publications [8, 23, 24].

Data collection methods

Interviews were conducted between November 2020 and February 2021. Two interview guides were developed for the study [Refer to Additional File 1]: one for HCW staff and one for health professional key informants (KIs) who hold administrative roles. HCWs were asked about perceptions of and factors shaping HCW COVID-19 preparedness, challenges and facilitators of the COVID-19 response, and the impact of COVID-19 on clinical care and experiences, as well as their lives and psychological well-being. KIs were asked about the health system, the COVID-19 response, policies for health facilities and workers, and the challenges and facilitators of the response. Both groups were asked to provide recommendations for the country's COVID-19 response. After providing informed consent, participants who agreed to participate were interviewed over the phone by a trained research staff member (FA). Interviews were conducted in English and lasted about 45 to 60 min. Participants were given fifty Ghana cedis (USD 8.57) for their time.

Data analysis

Interviews were audio recorded, transcribed, and reviewed by study team members. The data were analyzed using thematic analysis [49]. We developed an initial codebook of a priori codes based on themes from the interview guides. A team of four analysts (AOG, OJO, CY, and FA) separately coded and reviewed three transcripts in Dedoose qualitative analysis software [50] to ensure the reliability of the analysis and findings. Analysts compared and discussed coding in detail and revised the codebook accordingly. The remaining transcripts were then divided between three analysts (OJO, CY, and FA) to code independently. We further analyzed the “mental health and wellbeing” and “mental health support” coded data segments for emergent themes and patterns. Guided by the socioecological framework, analytic summaries of the two codes were organized on a thematic table to generate themes on factors shaping HCWs' mental health

Table 1 Background characteristics of healthcare workers and administrators

Participant characteristics	N = 29	%
Provider type		
Doctor	10	34.5
Nurse/medical or physician assistant	16	55.2
Administrator	3	10.3
Gender		
Female	15	51.7
Male	14	48.3
Age (y)		
Less than 30	11	37.9
30 to 39	14	48.3
40 to 73	4	10.3
Family composition		
Married with one or two children	9	31
Married with three to six children	6	20.7
Single with one or two children	2	6.9
Single with no children	11	37.9
Missing/unknown	1	3.4
Years of experience		
5 or less	15	51.7
6 to 10	9	31
More than 10	5	17.2
Region		
Greater Accra	2	6.9
Northern	7	24.1
Oti	2	6.9
Upper East	5	17.2
Upper West	2	6.9
Volta	3	10.3
Western	2	6.9
Other (e.g., Ashanti, Bono East, Central, Eastern, North East)	5	17.2
Unknown/preferred not to answer	1	3.4
Facility type		
Government facility	17	58.6
Private/mission facility	5	17.2
Teaching hospital	6	20.7
Missing/unknown	1	3.4
Preparedness*		
Not at all prepared	9	31
A little prepared	10	34.5
Prepared	8	27.6
Unknown/preferred not to answer	2	6.9
Stress*		
Low stress	7	24.1
Moderate stress	18	62
High stress	2	6.9
Unknown/preferred not to answer	2	6.9
Burnout*		
No burnout	12	41.4
Low burnout	12	41.4

Table 1 (continued)

Participant characteristics	N = 29	%
High burnout	3	10.3
Unknown/preferred not to answer	2	6.9

*Not at all prepared (< 15), somewhat prepared (15 to 29), prepared (≥ 30)

#Low stress (0–13), moderate stress (14–26), high stress (27–40)

+High burnout (≥ 3.75), Low burnout (2.1 to 3.75), No burnout (≤ 2.0)

and well-being that we grouped under the individual, interpersonal, institutional, and societal levels (Fig. 1). These factors were further organized under the following broad thematic categories: 1) forms of mental health distress; 2) factors shaping adverse mental health outcomes; and 3) mental health support (i.e., sources of support, coping strategies, gaps/challenges in support).

Ethical approval

Ethical approval for the study was attained from the Institutional Review Boards of the University of California San Francisco (#20–30656) and the Navrongo Health Research Centre, Ghana (#NHRCIRB374). Study procedures and methods were conducted in accordance with the Declaration of Helsinki guidelines. All participants were provided electronic consent language and confirmed consent by taking the survey. Additional verbal consent was obtained before the qualitative interviews.

Results

Participant characteristics

A total of 26 HCWs and three health administrators were included in our analysis. About half of the participants (51.7%) identified as female, 41.4% were 30 years old or younger, 48.3% were between 30 and 39 years old, and 10.3% were 40 years old or older. Regarding family status, 51.7% were married with children, 41.4% were single with no children, and 7% were single with children. Participants were evenly located across various regions in Ghana and facility types (teaching hospitals, other government facilities, and private/mission hospitals). See Table 1 for more details on participant characteristics.

Themes and sub-themes

We organize the qualitative results under three main themes: 1) forms of mental health distress; 2) factors shaping adverse mental health outcomes; and 3) mental health support, with several multilevel sub-themes for the three themes.

Forms of mental health distress

Overall, HCWs reported fear, anxiety, stress, and depression as psychological distress experienced due to the COVID-19 pandemic. Fear and anxiety were the most reported mental health issues, especially during the early stages of the pandemic when little was known about the

virus. Stress was also commonly reported by HCWs primarily due to their working conditions. Less reported was depression, which was mainly attributed to the social isolation experienced by HCWs as frontline workers. Notably, when asked about depression, many participants shared that they did not feel or become depressed because of the COVID-19 pandemic. Some shared that this was because they are “strong” or because symptoms they identified with depression did not last long, as one male nurse explained:

“I was stressed and fatigued, but you know, depression...to make that definition, it has to take, like, about two weeks before you can classify it as depression.”— HCW 26, a little prepared, moderate stress, no burnout.

In addition to these mental health issues, less frequently reported issues included feelings of abandonment, pressure, and alarm due to the pandemic and news coverage of it; cynicism; difficulty feeling at peace; worry about family’s wellbeing; and impaired cognition and paranoia due to stress and exhaustion. As an Emergency Room (ER) doctor explained,

“As human as we are, we became so tired and when you’re tired your mind plays tricks on you like, ‘Am I having COVID?’ Then we start feeling symptoms of COVID, but when we test, it is negative. So, we knew it was just the stress.”—HCW 4, prepared, moderate stress, low burnout

Multilevel factors shaping adverse mental health outcomes

HCWs shared various adverse and protective multilevel factors that shaped mental health outcomes. Guided by the socioecological framework, these factors were thematically organized on the individual, interpersonal, institutional, and societal levels (Fig. 1). Individual-level factors that shaped poor mental health outcomes included low knowledge of COVID-19 and infection with COVID-19. In contrast, protective factors included one’s spirituality/religiosity and prior experience working in high-stress clinical environments. Adverse interpersonal level factors included being a parent/caregiver, proximity and risk to family/household, and social isolation, while protective factors included colleague, social, and spiritual support. The most impactful set of factors shaping HCWs’ mental health were on the institutional level, particularly inadequate health system capacity (i.e., low staffing capacity), pandemic preparedness (i.e., inadequate COVID-19 training), and frontline working conditions (i.e., long work hours; higher COVID-19 infection risk). Protective factors on the institutional level included

Individual	Interpersonal	Institutional	Societal
<ul style="list-style-type: none"> • COVID-19 infection (-) • Low knowledge of COVID-19 (-) • Spirituality/religiosity (+) • Prior experience in high-stress clinical settings (+) 	<ul style="list-style-type: none"> • A parent/caregiver (-) • Proximity and risk to family/household (-) • Social isolation (-) • Colleague support (+) • Social/Family support (+) • Spiritual support (+) 	<ul style="list-style-type: none"> • Inadequate pandemic preparedness [<i>Lack of PPE/COVID-19 training</i>] (-) • Inadequate health system capacity [<i>staffing capacity</i>] (-) • Frontline working conditions [<i>Higher risk of COVID-19, increased workload/hours</i>] (-) • Workplace adjustments & support (+/-) • Work/government incentives (+/-) 	<ul style="list-style-type: none"> • COVID-19-related social stigma against HCWs (-) • Social conspiracies about COVID-19 [<i>virus a political gimmick</i>] (-) • Sociocultural beliefs about mental health (-) • Public praise/appreciation (+)

Fig. 1 Multilevel factors shaping the mental health of HCWs during the COVID-19 pandemic. (+) indicates protective impact, (-) indicates negative impact, and (+/-) indicates both protective and negative impact

workplace changes and incentives that improved morale and working conditions. Societal factors that adversely impacted mental health included COVID-19-related social stigma against HCWs and social beliefs about COVID-19 and mental illness. Positive factors included public praise and appreciation. Despite the distressing impact of the pandemic on their lives, working conditions, and mental health, most HCWs reported that their workplace administration or local/national government did not provide adequate psychological or other support to help mitigate the mental health impact of the pandemic. The sections below describe in detail these emergent themes, and Table 2 provides additional excerpts of the outlined themes.

Individual factors

COVID-19 infection and limited COVID-19 knowledge Two key individual-level factors were identified by many HCWs as negatively impacting their mental health: being infected with COVID-19 and inadequate knowledge of how the virus spreads and its health effects. Participants particularly reported experiencing fear and

anxiety about contracting or dying from COVID-19 and about “the unknown because you don’t know what will really happen (HCW 26)” after an infection. This fear and anxiety regarding the unknown were related to HCWs’ low knowledge of COVID-19 and the limited scientific information available on the virology, epidemiology, and prevention of the virus at the start of the epidemic. One female nurse at a government facility described this fear:

“[COVID-19] affected me emotionally and mentally, and there was this fear that, if I get it, then does it mean that I’m just going to suffer? I don’t survive? What is going to happen? So, all those images were there. When you listen to the news, it was so alarming.”—HCW 17, not at all prepared, moderate stress, low burnout

Interpersonal factors

On the interpersonal level, HCWs reported three key factors—their responsibilities as parents/caregivers, proximity and risk to family and household, and social isolation—as sources of fear, anxiety, and worry.

Table 2 Key themes and corresponding quotes on the impact of the COVID-19 pandemic on HCWs' mental health

Mental Health Outcomes	Factors
Fear	<p>Individual level: Insufficient knowledge</p> <p>"I know the disease can affect the lungs, and through that, you can lose your life. So, I was scared about that. Is this disease going to go down, like what is happening to me?... What about the signs and symptoms I am feeling? Is it going down, or do I have more? Because if you feel like going into the signs and symptoms of it and searching for it and then I was always looking out; will I be experiencing this or that? If then, I have to search for it to know whatever it is."—HCW 15, female nurse, government facility, not at all prepared, moderate stress, no burnout</p> <p>Interpersonal factors: Risk to family/household</p> <p>"I was always scared because I was thinking about my family and if it should happen to any of my family members. You know, one of them is my uncle or my grandfather, not my direct grandfather, but he was infected by the virus."—HCW 11, female nurse, government facility, prepared, moderate stress, low burnout</p> <p>Institutional factors: Frontline working conditions</p> <p>"We were actually scared, because if they are saying [COVID-19] is deadly and I am sitting in the middle, anybody can walk, and I don't know who is walking through my door at that particular time, and I cannot just see you and tell you to go away because it's the COVID era. I cannot attend to you. So, we are actually scared. We are also doing our best and praying [to] God to save us."—HCW 25, female nurse, not at all prepared, high stress, low burnout</p>
Anxiety	<p>Interpersonal factors: Risk posed to family/household</p> <p>"I was very anxious and afraid of affecting my family, also stressed out because of the workload."—HCW 14, male nurse, government facility, a little prepared, low stress, no burnout.</p>
Stress	<p>Institutional factors: Frontline working conditions</p> <p>"Then the stress of wearing PPEs, and going in and doing procedures and all that overstayed our time because of what you are doing, so if you go in [ER] for about 15 minutes and all of a sudden someone collapses, you have to start doing additional interventions, so it was stressful working in an environment. You are not too sure whether you are exposed, and you are not too sure whether your family is affected, so it is crazy and a very confusing moment and challenging. And if you look back, it was interesting that no matter how small your effort was, you were actually part of the national process fighting this pandemic, thus why I said it was scary at times."—HCW 4, male doctor, government facility, prepared, moderate stress, low burnout.</p> <p>Institutional factors: Frontline working conditions</p> <p>"At a point in time, I was stressed. The work was becoming overwhelming, getting up as early as 4 a.m. to work almost all the time and going around educating people, especially during their market days, to ensure that everything was fine, visiting some of the churches to educate them on the importance of obeying the protocols."—HCW 22, male nurse, government facility, prepared, moderate stress, no burnout</p>
Depression	<p>Societal factors: Social stigma</p> <p>"People died as a result of depression when you are being tagged as a health worker who got it. I know the nurses that died as a result of depression, because at the end of the day, if you contract this, people will be like, Ah, you are a nurse, and then you contract COVID again. You don't want that issue, so if you contract it, the next option is to get depressed and finally give up."—HCW 18, male nurse, government facility, somewhat prepared, moderate stress, no burnout</p>
Protective factors	<p>Interpersonal factors: Social support</p> <p>"Oh, my family, they will always call you in the morning, 'Eeeii, are you at work? Be careful, oh, wear your mask, wash your hands. You people directly come into contact with patients, so you have to be careful. You will be talking every day; every day they will be calling you in the morning and in the evening, and oh, they were good.'—HCW 11, government facility, female nurse, prepared, moderate stress, low burnout</p> <p>Institutional factors: Workplace support</p> <p>"The health workers who became infected, we treat them almost like the general population—people in the general population who got infected. What we did was give them excuse duty for the period that they had the infection. We give them that psychological support; basically, that was what we did."—HCW 1, female doctor/administrator, teaching hospital, unreported preparedness, stress, and burnout levels</p> <p>Institutional factors: Government incentives</p> <p>"It was just the government's tax waiver, and then the 50% [additional salary] that came in that in a way, motivated staff to put in their best. You know, as nurses and health workers, the money is not enough, and we always feel like we don't get paid for the services we provide. When you want to value the services that we provide for the value we receive, it is not worth it; it doesn't tally. So, when the tax waiver and this thing came in, the staff was happy. We realized that when the tax waiver ended in September, the president said he had reinstituted it up to December, and all the nurses and the rest were all happy. So, that is also the little [thing] motivating us to stay focused."—HCW 12, male nurse, teaching hospital, prepared, moderate stress, no burnout.</p> <p>Institutional factors: Facility adjustments and incentives</p> <p>"Ok, they started with quality now, where today you come to work and the next day you rest. That was what they implemented, but you will come and do more hours; instead of closing at two, you can close around 4 and then somebody will come and take over [...] They were also giving breakfast and lunch, and they will take you home and bring you back, and then there were some allowances they were giving."—HCW 23, private facility, not at all prepared, moderate stress, low burnout</p>

Table 2 (continued)

Mental Health Outcomes	Factors
Gaps and challenges in support	<p>Institutional factors: Workplace support</p> <p>"We have only one clinical psychologist, only one clinical psychologist in the municipality who works at the university campus [...] These are very few people, and looking at the numbers that we were recording, it got to a time where we thought that it was impossible to provide support to each and every one."—HCW 1, female doctor/administrator, teaching hospital, unreported preparedness, stress, and burnout levels</p>

Parental/caregiver role and risk to family/household Due to their higher risk of contracting COVID-19 as frontline workers, many participants expressed immense worry about infecting their family members and people living with them with the virus. As a male doctor (HCW 3) at a government facility with little preparedness, low stress, and low burnout shared, "[COVID-19] had affected me mentally, emotionally, and psychologically. It's not about myself per se, but anytime I'm coming home, I don't feel comfortable those days. I see myself like a vehicle that can carry infection to the house." This fear was heightened for those who were parents and caregivers. These HCWs were especially afraid of infecting more vulnerable family members, such as children and aging parents they live with and care for. Some isolated themselves from their family members for extended periods and avoided physical contact or intimacy because of this fear. As a female doctor at a government facility shared,

"I have been scared; I have been afraid. I'm a mother of two, so I have been afraid, especially for my children. At some point, I had to send them to my mother so that I can go to work and come without being scared of affecting them, but as for my husband, he is an adult, so we are cool. The fear has been emotional. I was scared from the beginning because there was no cure, and we all didn't know what to do, and we all didn't know where we were going, especially when we had contact [with COVID-19] and [...] We didn't have anywhere to go but to quarantine ourselves with our children and our family. We were all in the same space. My son is very young, and he is only over 8 years old, so it's been a challenging moment."—HCW 10, not at all prepared, moderate stress, high burnout

Social isolation Another key interpersonal factor was the social isolation many HCWs experienced due to the nature of their work and the risk it posed to people in their lives. Some participants shared that they felt depressed from being socially isolated from family members or their community and from quarantining after contracting or being exposed to COVID-19. One female nurse at a private facility described her symptoms of depression after isolating post-exposure to COVID-19:

"When I came into contact with my client, and I had to be isolated, I was sad and dull, and because of that, for a whole year, I couldn't come home [...] I was depressed, but I was stressed."—HCW 21, not at all prepared, high stress, high burnout

Institutional factors

The most reported adverse factors by HCWs shaping their mental health were on the institutional level. The three key themes on this level were low health system capacity, inadequate pandemic preparedness, and front-line working conditions.

Inadequate pandemic preparedness and health system capacity

A major source of HCWs' fears and anxieties was their belief that they, along with the healthcare system, were inadequately prepared to respond to the pandemic, which exacerbated their fears of being infected by the virus at work. For example, many HCWs reported not being adequately trained or lacking sufficient PPEs to respond to COVID-19. A female doctor at a government facility highlighted the general mood of HCWs in the face of no training, insufficient protection, and rising COVID-19 cases at the beginning of the pandemic:

"In the initial response, there was a lot of anxiety and fear because we didn't have anything. It was COVID-19, and the number of cases we were recording [...] in the country, and it was sounding like there were PPEs available, that the country was prepared, but there was nothing, and we didn't receive the training till, like, over a month."—HCW 5, somewhat prepared, moderate stress, high burnout

The lack of PPE and other preparedness issues, such as unclear quarantine protocols and insufficient medical supplies, especially caused fear among HCWs who had to engage with patients without knowing their COVID-19 status. One male doctor at a teaching hospital explained his experience with patients and with a co-worker who tested positive for COVID-19:

"I feel scared to attend to cases, and more importantly, I know I have to wear certain things to prevent you from getting infected. I don't have them, but I still need to because of what I need to do for

the patient. I need to get close to the patient, who is suspected [of having COVID-19] but not yet confirmed, and when it comes out and is confirmed, I'm in trouble because I did not wear the PPEs. So those were some of the issues. Mentally, you will not have hope. A doctor friend visited me on Friday, and the following week, I learned he tested positive. So, they started contact tracing and sample taking and all those things, so I felt scared.—HCW 2, somewhat prepared, moderate stress, low burnout

For other HCWs, the insufficient protections against COVID-19 were sources of stress, as noted by one female nurse at a private facility:

“Actually, [COVID-19] has really stressed me. We were actually not prepared for it. You have to read to know how to protect yourself. Even if you know how to protect yourself, the question is: are the things [PPE] there, and then when you come into contact with confirmed cases, and you are supposed to be quarantined, but they don't care what is happening to you? It was really scary to hear. But now that we are protecting ourselves, it's better.”—HCW 16, a little prepared, moderate stress, no burnout

Another health system issue related to inadequate preparedness that HCWs identified was the slow turnaround time for COVID-19 tests, which added to the anxieties participants experienced regarding the risk of contracting COVID-19. Some HCWs, like this female nurse (HCW 13) at a teaching hospital with no preparedness, moderate stress, and low burnout, reported feeling scared while awaiting test results and findings from contact tracing, “It did [affect me emotionally and psychologically] because when I did my test, the result wasn't coming and I was thinking about it, what is happening, and my results are delaying?”

In addition to these health system issues, HCWs reported was low staff capacity/labor shortages and low staff-to-patient ratios. One male nurse at a private facility with little preparedness, moderate stress, no burnout described the stress and tension they and their co-workers experienced due to low staffing capacity:

“There was tension on the few people, who were left to handle [things]. Just imagine I had to work, take care of the OPD [outpatient department] alone for three good weeks. No time off...It was actually stressful.”—HCW 26, a little prepared, moderate stress, no burnout

Frontline working conditions A majority of HCWs reported experiencing different sources and levels of

stress, anxiety, and fear related to their working conditions. In particular, HCWs' distress related to inadequate protections in their workplace was compounded by the fact that they worked under conditions that put them at significant risk of contracting a potentially lethal virus. A male doctor at a teaching hospital discussed the general anxiety he had owing to working in a clinical setting and witnessing his co-workers get infected with COVID-19:

“There is a little bit of anxiety if you are going to work because of the peak of the virus; nurses and doctors are getting the virus, and some die in this country, so there is a bit of anxiety.”—HCW 9, a little prepared, moderate stress, and no burnout

HCWs also discussed the fear they felt due to not knowing the COVID-19 status of people who visited their clinics. As a female nurse at a government facility explained:

“We were actually scared because if they are saying [COVID-19] is deadly and I am sitting in the middle, anybody can walk, and I don't know who is walking through my door at that particular time[...] So, we are actually scared. We are also doing our best and praying to God to save us.”—HCW 25, not at all prepared, high stress, and low burnout

HCWs also discussed the adverse effects of the pandemic, such as increased workload and longer workdays. Notably, one key source of stress among participants was that the pandemic increased their work demands and working hours. As one male nurse at a government facility shared:

“So much stress because you need to work overtime, and because we were divided into two groups, few staff and plenty of clients, so you close, and you are so stressed out that you have to be on duty the next day. It was not really easy. So, stress was actually the main thing.”—HCW 20, a little prepared, moderate stress, low burnout

Some HCWs not only worked in the clinical setting but also had to educate community members outside of their health facility, which added to their workload. Another male nurse who worked at a government facility described his overwhelming workload due to the pandemic,

“At a point in time, I was stressed. The work was becoming overwhelming, getting up as early as 4 a.m. to work almost all the time and going around educating people, especially during their market [shopping] days to ensure that everything is fine, visiting some of the churches to educate them on the

importance of obeying the protocols.”—HCW 22, prepared, moderate stress, no burnout.

Societal factors

On the societal level, three adverse factors participants described were COVID-19-related social stigma, social conspiracies about COVID-19, and sociocultural beliefs about mental health in Ghanaian society.

COVID-19-related social stigma

Another recurring theme was that HCWs experienced COVID-19-related stigma due to their role and risks as frontline workers. A female nurse (HCW 25) at a government facility who reported no preparedness, high stress, and low burnout shared, “The stigma is high; people don’t want to get close to you since you are a nurse.” A few HCWs who contracted the virus reported that people avoided them even after they recovered from the illness. Other HCWs reportedly had to relocate due to the stigma they experienced after getting sick with COVID-19. A female nurse at a government facility recalled the experience of three visiting nurses who contracted the virus,

“I think some three nurses got [COVID-19], and they were the first people to be infected...I think all the three people, they were all not from the town... and they were staying alone. Even it got to the point that one of them even had to relocate from the house because the landlady got to know she had COVID and a whole lot, the stigma came in there.”—HCW 15, female nurse, not at all prepared, moderate stress, no burnout

Social conspiracies about COVID-19

Another source of fear expressed by participants was the impact of the social belief that COVID-19 was a political gimmick by the government to line the government’s pockets with donor money. Such beliefs led some community members to be dismissive of the virus and its risk, fueling the spread of COVID-19. As one male nurse at a teaching hospital explained,

“When the [pandemic] started. I was scared, I was really scared. When we were listening to and looking at the cases from Italy, China, and those places, I was really scared. Yes, I was even scared to go to work, but I think now [...] My fear is that people outside, our people from the communities who still believe that it is a political gimmick for the government to get some money for their pockets and all the stuff.”—HCW 12, prepared, moderate stress, and low burnout

Sociocultural beliefs about mental health

A few HCWs also notably shared that mental health is “downplayed” in Ghana. Thus, psychological distress among HCWs can often go unrecognized or is not prioritized. As a male nurse (HCW 26) at a private facility with little preparedness, moderate stress, and no burnout shared, “In Ghana...that aspect [mental health support] is completely missing.” Another male nurse at a teaching hospital explained:

“Psychology in Ghana has been a little downplayed. We don’t see the essence of it to go and meet the psychologist and all those things, but as staff, we go through a lot, a lot of torture, because already you have your issues to deal with.”—HCW 12, prepared, moderate stress, no burnout

This HCW added that HCW nurses are pressured to ignore their mental health issues for the sake of the patient’s issues—a sentiment other HCWs insinuated. Such downplaying may have also affected HCWs’ ability to identify or discuss psychological distress when experiencing it.

Mental health support

Findings related to mental health support are organized under three sub-themes: 1) institutional support, 2) individual and interpersonal coping strategies and protective factors, and 3) gaps in mental health support.

Institutional support

Despite the mental health impacts of the COVID-19 pandemic on HCWs, a minority of participants reported receiving adequate support on the institutional level to address mental health needs. The availability and accessibility of mental health support in health facilities varied. A few HCWs shared that they were aware of the availability of mental health support resources and were encouraged to use them by management and administrative staff at their facilities. Some resources mentioned were an on-call clinical psychologist, workgroup support meetings, and virtual counseling services. As one female nurse (HCW 17) at a government facility with little preparedness, moderate stress, and low burnout shared, “We were told to visit our psychiatrist in case of any issue [...] if you have any problems, you alert them, and they attend to you.”

Other support HCWs described as helping address workload, stress, and morale included a restructured work schedule that allowed workers to “come to work, the next day rest”; government tax relief incentives; and workplace incentives such as facility-provided cash incentives and free transportation and meals.

In addition, to address the COVID-19-related stigma HCWs experienced, a few facilities reportedly provided education to the medical staff and organized ceremonial welcomes for the staff returning from sick leave to prevent discrimination and make them feel welcomed. One midwife/regional director described a ceremony held for recovering workers,

“For those who get infected, we had a clinical psychologist who was part of the treatment and was counseling them; that is one of the things. And then also...the early infection we had among health staff, when they recovered, to reduce stigma—because stigma was very high—one of the things that we did in the region was to organize a formal welcome to all of them. The press was there to interview some of them and after that we had lunch with them, sitting with them. And that really helped because to deal with stigma. In fact, at that ceremony, we actually lined up for all of them that had been infected, even giving them standing ovation.”—HCW 29, not at all prepared, moderate stress, no burnout

Among the participants who stated that they received or were aware of the availability of mental health support resources at their facilities, one notable caveat was that these resources were provided later in the pandemic, were inaccessible, and were inadequate for HCWs. A male doctor at a government facility explained,

“Yes, there was a protocol in place. We had a protocol that if some of the staff were not feeling too well, we should let them go home after treatment. So basically, there was something in place to take care of staff. That was after some time, not initially.”—HCW 4, prepared, moderate stress, low burnout

Although some HCWs received some support, others lamented that there was either no mental health support available or that it was simply not accessible to them. One female doctor shared her frustrations with receiving no support while balancing an increased workload with childcare,

“No support from anybody. There was no support; you just have to encourage yourself and know you have a duty to go and run. You don’t know whether you leave your kids and go [to work] to come back to your kids again.”—HCW 5, no preparedness, moderate stress, and high burnout.

HCWs addressed the gap in institutional support by training additional HCWs at their facilities to provide mental health support to the growing number of staff

and members of the public who required it. According to the doctor/administrator of a teaching hospital with one clinical psychologist on staff, their facility needed to train more HCWs to provide mental health support to meet the extensive needs of HCWs impacted by the pandemic. She explained:

“When we saw that it was not possible for the psychologist to speak to all of them [HCWs], what we did was we also trained the rapid response team to visit those homes and give the news to them.”—HCW 1, unreported preparedness, stress, and burnout levels

Interestingly, while most HCWs felt that there had been very little, if any, mental health support, it was suggested from the administrative perspective that healthcare workers had been prioritized in the delivery of mental health resources. As one doctor/administrator explained,

“We have only one clinical psychologist in the municipality who works at the university campus. And we brought him on board, and he was part of the team. Then, in our mental health unit, we also trained the mental health nurses to provide the needed psychological support. These are very few people, and looking at the numbers that we were recording, we realized that it was impossible to provide support to each and [every one of them]. So, for the health staff, because they are at the facility, they ensure that they give them that support.”—HCW 1, unreported preparedness, stress, and burnout levels

However, she conceded that no special mental health resources had been provided to support HCWs who had contracted COVID-19 but viewed relieving them of work duties as a source of psychological support.

Individual and interpersonal coping strategies and protective factors

Given the inadequate support for HCWs, many participants discussed accessing various recourses and adopting specific coping strategies to deal with the mental health stressors and impact of the COVID-19 pandemic on the individual, interpersonal, and organizational levels. On the individual level, some HCWs used spirituality as a coping mechanism, such as reading religious passages, “praying to God to save us,” and having family members pray for them. A female doctor (HCW 10) at a government facility with no preparedness, moderate stress, and high burnout described the support HCWs received: “Maybe spiritual support, yes. We read the scriptures and are encouraged that nothing will happen to you apart from that...”

Additionally, a few HCWs who expressed little or no mental health distress shared that they were not as affected by the pandemic due to having prior extensive experience responding to infectious disease cases or working in high-stress environments like the emergency room. As one male ER doctor at a government facility shared, his past experiences working in the emergency room helped prepare him to navigate the COVID-19-related stresses at his facility:

I [work] in the emergency department, and our work is very challenging. We work under an emotionally challenging environment where we deal with angry relatives and all that, and I have been doing this since 2009, so I'm used to all those things, including pressure from relatives. For me, the only difference was that we were dealing with a virus that we knew very little of [...] But in terms of the work [...], it was similar to what I do on a daily basis. So, I wasn't troubled."—HCW 4, prepared, Moderate stress, low burnout.

Interpersonal strategies included seeking support from family, friends, and colleagues. A male nurse (HCW 19) with no preparedness, moderate stress, and low burnout shared, "...The only support you got was from a few colleague workers and then your family." Another male nurse (HCW 26) at a private facility with little preparedness, moderate stress, and no burnout shared his appreciation of his family's support, "My family did well because every day, they called me to see how I'm doing, and they also assured me of their prayers and other things."

Gaps and challenges in mental health support

The availability of the described mental health resources presented its challenges. For instance, on the institutional level, a restructured facility work schedule implemented to minimize COVID-19 transmission among staff was characterized as more stressful since it extended HCWs' work shifts. Additionally, the government-issued tax relief program intended to boost HCW morale was beleaguered with problems, such as long delays in its implementation and bureaucratic classifications of "frontlines." One female nurse at a private facility shared:

"...They were saying we were not frontliners; there was another name they gave us. Even though we were handling all these COVID cases, they said that we were not frontliner. They said physician assistants were not frontliners, but we were handling COVID cases."—HCW 23, not at all prepared, moderate stress, low burnout

A minority of HCWs recognized the importance of mental health resources. Still, it appeared to be less important to them than other tangible support, such as insurance coverage for professionals infected with COVID-19 while doing their jobs. A male doctor at a teaching hospital explained,

"Psychological support is necessary, and a part of that I know the government is doing its best, but generally, to me, the logistics are the most important thing, and when it happens you get COVID-19, what is there for you as a health professional? Yes, it is still a problem, and the insurance package was just mentioned, but no one has been able to assess it."—HCW 2, a little prepared, moderate stress, low burnout

The most obvious gap in mental health support was the lack of availability and accessibility of mental health services and resources. It appears that some HCWs were not made aware of any source of support and did not know where to go if the need arose. As a female doctor (HCW 10) at a government hospital with low preparedness, moderate stress, and high burnout disclosed, "I don't know who should have supported me." Relatedly, participants expressed their need for access to quality and timely mental health support, especially on how to cope with stress and stigma-related issues. A younger female nurse (HCW 25) at a government facility with no preparedness, high stress, and low burnout, for example, explained that "[HCWs] should be educated on how to overcome the stigma and emotional stress."

Furthermore, the mental health support interventions that were belatedly implemented have declined as the pandemic has progressed from an acute to a more chronic status. Some of these interventions have lost continuity, as one female nurse (HCW 23) at a private facility with no preparedness, moderate stress, and low burnout explained, "We used to have meetings, regular meetings; those times are not now. Now, it's not really a big deal like before."

Discussion

Our study characterized the multilevel factors that impacted the mental health of HCWs in Ghana responding to the COVID-19 pandemic, sources of mental health support, and HCWs' coping strategies. Overall, HCWs reported experiencing anxiety, stress, fear, and depression. The key drivers of these distresses were on the institutional level, particularly the inadequate capacity and preparedness of the healthcare system and HCWs to respond to the pandemic and its impact on workers' working conditions and COVID-19 risk. Despite the distressing impact of the pandemic on their work, personal lives, and health, most HCWs reported not receiving

needed psychological or other support from their workplace administration or government stakeholders that could help address the pandemic's mental health impact.

Our study found that fear and anxiety were the most reported psychological distresses experienced by HCWs, followed by stress and depression, which is consistent with findings from a cross-sectional survey on mental health among HCWs in Ghana during the COVID-19 pandemic [22]. In several global systematic reviews and meta-analyses on HCWs' mental health during the pandemic, insomnia was reported as the most commonly reported mental health issue [51–53], which was notably not reported in our study. This might be due to us not including probes specific to insomnia. Similar to our study, however, a systematic review and meta-analysis of the mental health impact of COVID-19 in Africa among the general adult population and HCWs found that fewer African adults reported insomnia compared to other countries. Although, unlike our study, they found that the prevalence of anxiety among Africans was lower as well [54]. Other reported distresses in the extant global literature include depression, anxiety, and stress, as well as post-traumatic stress disorders [19, 51–53, 55], which our study did not measure but might be a psychological outcome among Ghanaian HCWs worth researching in future studies.

In terms of factors shaping adverse mental health outcomes, we found that the most salient determinants were at the individual, interpersonal, institutional, and societal levels. On the individual and interpersonal levels, HCWs cited insufficient knowledge of COVID-19, contraction of COVID-19, their role as a parent/caregiver, and the COVID-19 transmission risk they pose to their family/household as sources of fear and anxiety—consistent with other studies in Africa and globally on factors shaping HCWs' mental health [52, 54–57]. Other factors reported include being a junior HCW, interacting with COVID-19-infected patients, being at high risk of COVID-19 infection, and being worried about poor disinfection or protection measures [52, 54–56].

Also, on the interpersonal level, some HCWs experienced depression as a result of the social isolation caused by their role as frontline workers, long work hours, and periods of quarantine while infected with COVID-19. HCWs' experiences of social isolation due to the pandemic are a common factor reported in other studies [56, 58]. For example, an Australian survey of HCWs' social interactions and mental well-being found that loneliness impacted four out of every 10 HCWs during COVID-19 and was associated with psychological distress [58].

On the institutional level, working conditions and health system capacity and preparedness, such as inadequate PPE, staff training, being understaffed, long work hours, and increased workload, contributed to HCWs'

fear, anxiety, and stress, similar to factors reported in other studies in Africa and globally [19, 55]. A qualitative study on HCW mental health in Uganda reported overlapping sources of psychological distress, particularly a lack of proper PPE and long work days, as well as inadequate sleep or exhaustion and the high COVID-19 mortality rate among patients under their care [25]. As we have previously published on the quantitative findings of our parent study, HCWs' perception of preparedness to respond to the pandemic, as well as their concerns about infection, were significant predictors of adverse mental health [8, 24]. Specifically, we found that fear of infection partially mediated the relationship between low perceived preparedness to respond to COVID-19 and HCW stress and burnout [8]. These findings have significant implications for workplace morale and productivity since we found that HCWs' fear of infection and stress and burnout were associated with lower job satisfaction, which was associated with high stress and burnout [24]. Therefore, our quantitative and qualitative findings suggest that improving health system preparedness through strengthening workplace and staff capacity and training can improve HCWs' mental well-being, as a South African study found [19].

On the societal level, we found that HCWs experienced COVID-19-related stigma due to their role as frontline workers, which caused them mental distress—a finding supported by several studies that identified COVID-19-related societal stigma as a risk factor for psychological distress among HCWs [55].

Despite experiencing pandemic-related mental health issues, most HCWs reported receiving insufficient psychological and other support from hospital administrators or the government. Other studies, which found that HCWs perceived a lack of organizational or employer support, echoed these sentiments [26, 55, 59]. A significant gap in mental health support was the lack of availability and accessibility of mental health services and resources, with HCWs saying that they were unaware of sources of mental support or where to go if they needed it. HCWs who reported receiving some support at their facility were more likely to work in private facilities, which may have a lower workload, higher salaries, and more resources than teaching or government facilities. Interestingly, administrators were more likely to assume HCWs had access to mental health support, while HCWs were more divided on the issue of support, suggesting that administrators are unaware of their staff's mental health needs. This may be due to inadequate communication between supervisors and staff, which has been reported in several studies on HCW mental health [59].

Another key finding is that in the absence of adequate mental health support, HCWs were resourceful in utilizing coping strategies at the individual, interpersonal, and

institutional levels. Coping methods and other protective factors included prayer, spiritual and emotional support from family, and in a few instances, mental health and workplace support from co-workers. HCWs also felt appreciated when their work was publicly acknowledged, or the government provided incentives for their frontline work. However, these acknowledgments and incentives needed to be more consistent. Several studies have found that practical and psychological support reduces psychological distress or helps HCWs mitigate stressors [25, 55].

Limitations

Our study has a few limitations. First, our sample of HCWs was selected from our quantitative sample, and a volunteer sample was selected from an online survey. Thus, our findings may not be generalizable to all HCWs in Ghana. We, however, addressed this limitation by recruiting from diverse social media platforms, including Facebook and WhatsApp pages for various HCW professional, regional, and graduating year groups. We also emailed survey links to Ghana Health Service directors and leaders of professional organizations for distribution to their members. These measures increased the diversity of our sample in terms of age, gender, years of experience, facility type, and region, as shown in Table 1, thus increasing the representativeness of the findings. Second, as some HCWs shared in our study, psychological health is under-discussed and may be “downplayed” in Ghana, raising the concern that HCWs may have underreported mental health distress due to the COVID-19 pandemic. Finally, as is common in qualitative research, social desirability bias is a potential limitation. This potential limitation was mitigated by wording interview questions as neutrally as possible and by informing participants of efforts taken to ensure privacy and confidentiality.

Implications and conclusions

Our findings suggest that structural determinants of psychological distress must be addressed as a necessary step to improve HCWs’ mental health. Particularly, health administrators and government stakeholders must invest more financial resources in strengthening Ghana’s healthcare system, particularly the public sector, which makes up 60% of health facilities [39]. In the first year of the COVID-19 pandemic, the government constructed the \$7.5 million Ghana Infectious Disease Centre (GIDC), a 100-bed health facility where infected patients could quarantine in the capital [60]. The government also pledged to build 88 district hospitals in the country’s 88 districts that did not have them at the onset of the pandemic [61]. Originally known as “Agenda 88,” the project has been renamed “Agenda 111” to reflect the additional 23 hospitals to be built. While the project has not been completed, updates indicate construction

is underway [62]. If completed, adding these hospitals will significantly increase the health system’s capacity in Ghana. However, additional changes, such as expanding the workforce through training and hiring, increasing medical supplies, and providing pandemic preparedness training that evolves with changing global health needs, are needed to prepare HCWs for epidemics better. Such changes would reduce the labor burden caused by epidemics and other health crises while also increasing HCWs’ confidence in their ability to respond to these crises.

Furthermore, high-quality protective equipment is needed in low-middle-income settings like Ghana to ensure HCWs are not anxious and fearful of a high risk of infection owing to inadequate protection. In addition to addressing the structural determinants of adverse mental health outcomes, as HCWs indicated in our study, additional resources are needed to provide workplace mental health resources and support. More clinical psychologists and therapists are needed on-site to care for HCWs who are psychologically distressed because of pandemics such as COVID-19. Workplace programs/interventions proposed by HCWs in our study and the extant literature, such as changes to organizational culture, consistent and meaningful incentives, mindfulness exercises, peer support groups, phone check-ins, improved staff-administrator communication, and mental health literacy, may also improve the psychological outcomes of HCWs [57, 63, 64].

Abbreviations

ER	Emergency room
HCW	Healthcare worker
IPC	Infection prevention and control
WHO	World Health Organization
GIDC	Ghana Infectious Disease Centre

Supplementary Information

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Supplementary Material 1.

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Authors’ contributions

AOG contributed to the design of the qualitative study, data analysis, and original draft, review, and editing of the manuscript. OJO and HH contributed to the data analysis and original draft, review, and editing of the manuscript. PAA, JJN, RAA, and JKA contributed to the conceptualization and design of the study, and review and editing of the manuscript. FA contributed to data collection, data analysis, and the review and editing of the manuscript. AC contributed to data analysis and the review of the manuscript. MG contributed to data analysis and the review and editing of the manuscript. HM contributed to the review and editing of the manuscript. All authors read and approved the final manuscript.

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Data availability

Data is provided within the manuscript. Requests for additional data may be sent to the lead author at her email address: akuagyam@buffalo.edu and to the senior author at her email address: Patience.Afulani@ucsf.edu.

Declarations

Ethics approval and consent to participate

Ethical approval for the study was attained from the Institutional Review Boards of the University of California San Francisco (#20–30656) and the Navrongo Health Research Centre, Ghana (#NHR CIRB374). Study procedures and methods were conducted in accordance with the Declaration of Helsinki guidelines. All participants were provided electronic consent language and confirmed consent by taking the survey.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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