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Perceived sources of occupational burn-out and embitterment among front-line health workers for COVID-19 control in Gyeonggi province, South Korea: a qualitative study

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ABSTRACT

Objectives Front-line health workers (FHWs) for COVID-19 control in South Korea have implemented a labour-intensive contact tracing programme, which places them at high risk for mental health problems. However, a few studies have examined mental health conditions in this population. We employed a qualitative approach to understand the factors perceived as causes of burn-out and embitterment among temporary FHWs to provide recommendations for supporting the workforce.

Methods We recruited 20 FHWs to participate in semistructured focus group interviews through purposive sampling. The sample size was determined on the basis of data saturation. We collected data from October to November 2020, audiorecording and transcribing the interviews. Data analysis was conducted manually, applying the principles of grounded theory.

Results Five levels of perceived sources of occupational burn-out and embitterment emerged. FHWs showed considerable mistrust of patients and faced ethical dilemmas in accessing and disclosing personal information. Poor collaboration with community health centre workers and interested parties as well as inadequate organisational support aggravated their conditions. Lack of social recognition and employment instability also presented challenges for FHWs' mental health.

Conclusions The current pandemic response system imposes great moral and emotional burdens on the workforce, prompting the need for initiatives to safeguard the values and needs of those who represent the backbone of the system. This study suggests that multilevel strategies, including providing organisational support and establishing contingency plans for workforce management and resource distribution, may improve FHWs' mental health outcomes as well as the health system for emergency preparedness.

INTRODUCTION

While the COVID-19 outbreak has continued unabated, exceeding health system capacity, a prompt response to the pandemic has led to relatively low morbidity and mortality rates in South Korea.¹ This outcome stems primarily from front-line health workers (FHWs) who have implemented a nationwide infectious disease control programme that includes field investigation and novel methods

Key messages

What is already known about this subject?

- ▶ Prior studies have found that health workers serving during pandemics experienced severe mental health problems due to heavy workloads and hazardous working conditions, but few have focused on the mental health of health workers conducting epidemiological investigations for pandemic control.

What are the new findings?

- ▶ As the number of COVID-19 cases continued to rise in South Korea, temporary front-line health workers have been urgently deployed to implement a pandemic control programme, but they have not received proper training or institutional support.
- ▶ Perceived sources of occupational burn-out and embitterment emerged at individual, interpersonal, organisational, social and structural levels, providing insight into the development of a multilevel approach to addressing these mental health issues.

How might this impact on policy or clinical practice in the foreseeable future?

- ▶ Data propose to strengthen epidemic control capacity by integrating contingency plans tailored for temporary health workers and establishing adequate organisational support systems, ultimately to reduce burn-out and embitterment in this population, protect their rights and ensure emergency preparedness.

using information technology to identify and manage contacts.²⁻⁵ FHWs in South Korea comprise 'regular' employees (epidemiologists and physicians in central and local governments)⁶ and those serving in 'temporary' roles, including public health doctors working in community health centres during mandatory military service and Epidemiological Intelligence Service officers.⁵ The temporary FHW workforce was urgently recruited to meet COVID-19 demands, causing them to lose the opportunity to complete formal training in epidemiological investigation. Alternatively, most of them completed a brief course designed around the



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COVID-19 response or undertook over-the-shoulder learning in the field.

The Korea Disease Control and Prevention Agency has developed standardised protocols for pandemic control that require all FHWs to take the following steps: (1) investigating cases via in-person or phone interviews, (2) collecting digital data, including closed-circuit television and the global positioning system, (3) conducting field investigation for large clusters, (4) analysing synthesised data to assess risks and (5) making epidemiological decisions (eg, ordering quarantine).³ The purpose of interviewing patients is to discover their movements and subsequently to identify close contacts. During the interview, FHWs have been obliged to obtain patients' socio-demographics, including religious affiliation, to assess whether their social groups are identified as the source of infection. Such procedures may raise ethical issues in that some patients are forced to provide personal information; furthermore, FHWs constantly face ethical distress by pressuring patients and suffer from the ensuing public backlash.

Meanwhile, controlling a pandemic itself is inherently time-sensitive work, which may overburden the health emergency workforce and place them at high risk for mental health problems.⁷⁻⁹ Prior studies have found that during disease outbreaks, health workers have experienced severe psychological distress^{7,10} and post-traumatic stress¹¹⁻¹⁴ resulting from heavy workloads and hazardous working conditions. Research has also demonstrated that COVID-19 health workers have exhibited job stress and burn-out due to limited protective equipment¹⁵ and the inability to maintain a personal life.¹⁶ Recent surveys in South Korea have found that temporary FHWs are experiencing burn-out because of excessive workload¹⁷ and embitterment due to an unfair distribution of responsibilities and emotionally abusive complaints from the public.¹⁷ Given these results and potential ethical concerns embedded in the investigation procedure, many FHWs are likely suffering from burn-out and embitterment, which may harm their mental well-being and work performance.

Burn-out is conceptualised as 'a prolonged response to chronic emotional and interpersonal stressors' at work and characterised by the three dimensions of emotional exhaustion, cynicism and inefficacy.¹⁸ While burn-out highlights intrapersonal and interpersonal experiences particularly, it is necessary to explore individuals' attitudes toward institutions and systems to understand the multilayered nature of occupational mental health problems. Thus, we include the concept of embitterment, defined as 'a chronic mental condition experienced as unjust or hurtful' that involves feelings of injustice with the inability to fight back.¹⁹ Because FHWs must follow government protocols, it becomes imperative to explore whether and how these requirements have engendered embitterment among them to find limitations in the current system. Taken together, understanding the varied contexts of occupational burn-out and embitterment may call for organisational and structural changes.^{20,21}

Despite the pressing need to address the mental health problems among this population, prior studies have focused predominantly on medical personnel.⁹⁻¹⁶ Furthermore, many studies have examined mental health symptoms quantitatively, providing a narrow perspective on the dynamic contexts that underlie mental health outcomes and possible solutions that reflect the needs and circumstances of health workers.²²⁻²⁴ To respond to this research gap, this study employs a qualitative approach to understand perceived sources of burn-out and embitterment among FHWs responsible for epidemiological investigation and contact tracing tasks during the COVID-19

pandemic. We aim to provide recommendations for improving institutional and structural factors that may aggravate FHWs' mental health conditions.

METHODS

Data collection

We conducted semistructured focus-group interviews (FGIs) with 20 FHWs to explore their experiences of burn-out and embitterment and produce possible solutions to their conditions. We recruited temporary FHWs in Gyeonggi province, where the second-most cases have been reported. An FHW peer posted flyers online to recruit employees at the Gyeonggi Province Office (GPO) and the Gyeonggi-do Infectious Disease Control Center (GIDCC). All who volunteered to participate ultimately enrolled in the study, as they met the eligibility criteria: (1) having work experience as an FHW involving COVID-19 control and (2) working within Gyeonggi province. We included all 20 applicants to ensure data saturation so that no new themes would be discovered during analysis. In total, 15 GPO and 5 GIDCC employees provided written informed consent to participate.

The participants at GPO were fulfilling their compulsory military service by working as FHWs. The South Korean government selects military doctors (ie, public health doctors) from male citizens with medical licenses to allow them to practice medicine as an alternative to military duties. The other participants were professional epidemiologists at the GIDCC with or without medical licenses. All non-medical license holders in our sample were GIDCC workers with enough public health training to be eligible to conduct epidemiological investigation. Regardless of their affiliation or medical license, all participants were following the same protocol for pandemic control after they were assigned as FHWs. Under the protocol, their work routine begins with contacting patients based on a 'preliminary investigation report', which contains confirmed cases' personal information and presumed transmission routes.

Two female graduate researchers (coauthors) trained in qualitative methods conducted five FGIs from October to November 2020. As they had no prior relationships with participants, we did not expect this interpersonal factor to influence the results. All interviews occurred via Zoom, an online meeting platform service. Each FGI included four participants, one moderator, and one note taker. We created these focus groups of four to facilitate participants' sharing of mental health issues with less peer pressure or shame, as having less participants could encourage cohesion and openness, compared with typical focus groups of 6-12 individuals.²⁵ We assigned participants to groups depending on their availability.

A semistructured interview guide was used to probe the experiences of occupational burn-out (eg, 'Have you experienced emotional exhaustion in the workplace, and what was your experience like?'; 'If you have felt cynicism or detachment at work, why did you have such feelings?') and embitterment (eg, 'Have you felt embittered at work due to unjust events, and what was your experience like?'). The guide also covered other topics, including coping strategies for the problems, the personal meaning attached to being an FHW, and thoughts on the South Korean pandemic control system. The interviewers conducted all FGIs in Korean, digitally recording and transcribing them afterward. Each FGI lasted approximately 120 min. On completion of each interview, memos written by a note taker were used for team brief sessions to discuss emerging themes and to improve subsequent data collection procedures. We sent a short survey to participants

after each interview to collect demographics and other work-related information. We stored the data securely with password protection.

Following the interviews, we compensated participants with 100 000 KRW (~US\$90).

Data analysis

We performed data analysis of transcripts and memos iteratively based on grounded theory principles.²⁶ During the initial phase of open coding, we coded two transcripts to generate a codebook based on emergent themes. The coauthors conceptualised and validated the codebook. One coauthor applied the codes to the remaining transcripts manually and refined the codebook until all themes reached data saturation. The research team discussed coded texts and emerging themes to further refine the codebook and recode texts when applicable. We identified 10 total domains and 39 subdomains. Among these, we have not reported domains and subdomains that were beyond the scope of this paper. Accordingly, we describe below 5 domains and 12 subdomains highlighting the perceived multilevel sources of mental health problems. All quotations included in the results were selected to capture the representativeness of the domains and translated into English. Ultimately, the research team identified five levels of perceived sources of FHW burn-out and embitterment.

RESULTS

Sample characteristics

Table 1 summarises participant characteristics. Fifteen participants were male. Approximately half (n=9) had been engaged in COVID-19 work for 6–8 months. Most participants (70%) worked 10 hours or more daily. We observed that over half of the participants took an hour (45%) or less (10%) to rest.

Perceived sources of occupational burn-out and embitterment

Individual level

Mistrust of patients with COVID-19

Considerable mistrust of patients with COVID-19 and contacts resulted in severe emotional exhaustion and cynicism among FHWs (table 2). FHWs reported that their mistrust stemmed from experiencing interviewees' lies repeatedly. They noted that patients frequently deceived them because they wanted to avoid quarantine orders or to hide unethical behaviours (eg, committing adultery). FHWs stated that patients lied to them despite their efforts, which led them to rely on objective evidence. Mistrust often manifested in FHWs' behaviours, treating patients as 'criminals' during interviews.

Moral dilemmas

FHWs reported facing moral dilemmas at work, juggling responsibilities and personal values, which aggravated their emotional burden and embitterment (table 2). Some FHWs felt discomfort while analysing personally identifiable data, as it could violate patients' privacy. Further, FHWs were under great psychological pressure because interviews often turned into forcing patients to answer questions. While most FHWs agreed that accessing personal information is effective in controlling the virus, they reported objections to the current system that allows local authorities (eg, the mayor) to disclose patient information to the public via government websites, citing the risk of stigmatising infected individuals.

Table 1 Characteristics of FHWs for COVID-19 control (n=20)

Characteristic	No (n=20)	%
Sex		
Male	15	75
Female*	5	25
Current affiliation		
Health centre†	2	10
Gyeonggi province office	13	65
Gyeonggi Infectious Disease Control Center	5	25
Type of occupation		
Epidemiologists	5	25
Public health doctor	15	75
Type of medical license		
Nursing	2	10
Dentistry	1	5
Medical doctor	2	10
Korean medical doctor‡	12	60
None	3	15
Months of work experience as FHW		
0–2	1	5
2–4	2	10
4–6	1	5
6–8	9	45
≥8	7	35
Average hours of work per day§		
<8	1	5
8–10	5	25
10–12	6	30
12–14	5	25
14–16	1	5
≥16	2	10
Average hours of rest per day¶		
0	2	10
1	9	45
2	2	10
3	6	30
N/A	1	5

*In 2019, approximately 26% and 22% were females among licensed physicians and Korean medical doctors, respectively.⁴⁰

†Two public health doctors reported their affiliation as a health centre. This may be because they are conducting investigations at the community health centre or they were previously affiliated with the health centre before the pandemic.

‡Individuals with Korean medical licence practice traditional Korean medicine, including herbal medicine and acupuncture.

§According to the labour law, healthcare workers must work up to 9 hours a day but can work longer under special circumstances.

¶Few hours of rest may indicate participants' standby status after leaving work. FHW, front-line health worker; N/A, not available.

Anxiety about the impact of decisions

Participants reported feeling anxious about the consequences of their decisions, constantly worrying about making mistakes and thus experiencing emotional exhaustion and feelings of incompetence (table 2). Some FHWs felt extremely anxious about missing potential cases because it could contribute to the spread of the disease. Further, FHWs expressed concern that their quarantine orders would cause financial damage for individuals and business owners and that their interviews would be exposed by the media without their knowledge and harm interviewees.

Table 2 Individual sources of burn-out and embitterment and illustrative quotes

Subthemes	Illustrative quotes
Mistrust of patients with COVID-19	'I became cynical and mistrustful of people. No matter what patients, close contacts, or others may say, I don't trust them unless there is objective evidence... I eventually look up GPS and credit card transactions because I don't trust them.' – FHW4, male 'When they say they are Christian, then I think 'This person will lie to me.' 'This person is so eloquent so (s)he must be lying.'... Christians are skillful and sneaky. I have strong preconceptions about them now.' – FHW2, female 'When patients say 'I didn't go there' without showing me any evidence, I get angry and yell at them. When I reflected on my behavior later, I was shocked at myself treating them as criminals.' – FHW1, female
Moral dilemmas	'I used to be proud of myself doing such an important work serving our country and the public. The more I work, however, the more I feel like this job is about restricting personal freedom. After I classify people, I tell them, 'Stay inside. Stay inside for 14 days. Go get testing.' Suppressing citizen's freedom like this, I can't say that I feel worth doing this.' – FHW7, male 'We are looking at CCTV, GPS, and credit card records. In fact, even I get scared. What if one day I have COVID-19 symptoms, I know what kind of personal information would be disclosed.' – FHW1, female 'Many patients from Cluster X* refused to be interviewed. Their sexual identity can be exposed during the interviews, so it is understandable that they are lying to me. [During interviews] I asked myself, 'Is it even right to keep interrogating them like this?' – FHW20, male 'Some local authorities are eager to disclose every patient information to the public, and I always feel angry about it. I really don't understand them. They just want to show people that they are doing something and reassure citizens.' – FHW16, male
Anxiety about the impact of decisions	'If I don't look into this case, will I miss contacts leading to the spread of the disease? Anxiety about such things is always present, and it is a major source of my stress... I'm currently relying on medication because of stress resulting from anxiety and guilt.' – FHW1, female 'I got into a huge car accident because I was so preoccupied with thoughts about my work. I classified one person as a close contact [to be in quarantine], but what's the likelihood that this person actually has COVID-19? And what's the possibility that people whom I missed turn out to be patients?' – FHW11, male 'The [sexual minority] patient was very cooperative. But after the interview, I constantly searched news, worrying if this case would be disclosed by the media because then (s)he would be forcibly outed.' – FHW9, female

*Cluster X occurred at a gay nightclub in May 2020. Confirmed and suspected cases of the cluster hid their whereabouts due to a fear of disclosing their sexual identity. CCTV, closed-circuit television; GPS, global positioning system.

Interpersonal level

Poor collaboration with health centre workers

FHWs reported that poor teamwork with community health centre workers has increased their workload, leading to emotional exhaustion (table 3). FHWs stated that some health centre workers shifted their tasks and became dependent on FHWs. Participants also mentioned that working with health centre workers not trained in infectious disease control has impeded their work performance. Additionally, FHWs reported feeling embittered when health centre workers prioritised relationships with local authorities over those with them since such an approach hampered their ability to set work priorities.

Conflict with interested parties

Many FHWs experienced difficulties cooperating with organisations with confirmed cases, which they perceived as a cause of burn-out and embitterment (table 3). Several FHWs reported that some hospitals leveraged their professional networks to pressure FHWs into adjusting epidemiological decisions. FHWs also described that uncooperative school officials asked them to extend the range of students to be quarantined to schedule online classes more easily or reduce complaints from parents. Many FHWs who experienced external forces interfering in their work reported feeling incompetent and sceptical of the value of their work.

Table 3 Interpersonal sources of burn-out and embitterment and illustrative quotes

Subthemes	Illustrative quotes
Poor collaboration with health centre workers	'The problem was that health center workers couldn't tolerate malicious civil complaints anymore and dumped them on me... When they implied, 'You don't belong here anyway', I felt embittered. That was the hardest time.' – FHW4, male 'I don't want to meet people anymore. Some health center workers treat me disrespectfully because I'm younger than them... I feel burned out. After I come home, I just don't want to do anything nowadays.' – FHW5, female 'I had to work with health center workers who never managed infectious disease control tasks or those not trained in our system, which we had established so far. I was very exhausted working with them recently.' – FHW6, female 'Health center workers told me, 'Our mayor wants to focus on the Company S case, and (s)he wants to be briefed today.' I had to prioritize that case over other work.' – FHW15, male
Conflict with interested parties	'The director of the hospital contacted other hospitals' directors or doctors associated with the Ministry of Health to intervene in our epidemiological decision.' – FHW2, female 'The director contacted me personally and said, 'How dare you order us cohort isolation? Your work is financially damaging my hospital and how are you going to make it up?' The director verbally abused me after (s)he somehow found my cell phone number.' – FHW6, female 'The school officials indirectly suggested I should extend the range of classification of quarantine... If they are going to [change decisions] like this, why did they even bring me here and make me do this work? I felt doubts about my work.' – FHW4, male
Hostility from patients and contacts	'The close contacts showed strong objections and aggression toward me. I lost my temper at the health center. All the health center workers were shocked to see me screaming and showing such extreme anger that day.' – FHW4, male 'We suffer from verbal abuse and complaints from the public, and sometimes people like business owners chase us or physically attack us when we go to the field... I think it is unfair and unjust. I get enraged at such injustice.' – FHW6, female 'The person identified as a close contact was a lawyer. (S)he said I violated the principles of 'presumption of innocence' because (s)he might not be infected... The lawyer threatened to sue me.' – FHW10, male 'During Cluster Y*, all FHWs in the field were so exhausted both physically and mentally because patients were foreigners who claimed SOFA† as a reason not to cooperate with us. We slept 3 to 4 hours a day, but the investigation still didn't go well.' – FHW9, female

*Cluster Y occurred at a wine bar near a US military base.

†Status of Forces Agreement between South Korea and the US. The agreement limits Korean jurisdiction over legal issues occurred within the US military forces stationed in South Korea.

Table 4 Organisational sources of burn-out and embitterment and illustrative quotes

Subthemes	Illustrative quotes
Heavy workload	'Even when I get off work, I don't really get off. I receive endless calls and requests... I keep having dreams about conducting investigations, every single day. I constantly think about work. When I go to bed, I put my cell phone next to me so I can pick it up right away.' – FHW4, male 'I came home around 3 to 4 AM, but I got another call at 7:30 AM. It was the hardest time for me.' – FHW9, female 'Ever since I started this work, I have had severe headaches because I do 24-hour shifts... I feel nervous all the time. I am constantly receiving phone calls, and maybe because of that, I started having heart palpitations lately.' – FHW13, male 'I need to keep holding my cell phone and waiting for a call every single day because I don't know where I would be asked to go... My life, even during my vacation or bedtime, is basically chained to the unpredictability of work.' – FHW3, male
Lack of office space and essential supplies	'The health center made us work in a cafeteria... During the busiest days, three of us laid sheets of newspapers on the floor and took a nap there because there was no place to rest.' – FHW12, male 'I once contacted a patient using my cell phone. The patient texted me complaining about the government and all, and at the end, the patient said that (s)he will disclose our phone calls and text messages to YouTube. It made my heart sink' – FHW11, male 'Sometimes we had to go to the field without protective equipment. Then we were classified as contacts. I am stressed by such lack of preparedness than the actual field circumstances.' – FHW13, male
Inadequate organisational support	'I've even been summoned to testify as a witness. There's nothing that protects us even in such circumstances. It's sad, but there's nothing we can do because that's the reality of our institution.' – FHW9, female 'I've talked with our organization about [the legal issues I faced] ... Then they told me to adjust classifications of contacts on my own. It's ridiculous. I was so confused.' – FHW10, male 'I've never felt getting support from the organization. I've contacted the office many times about work phone and other issues, but my requests kept getting delayed and I finally got a phone recently... If the organization hired us and needed us, they should have done better by listening to our difficulties. They can't avoid this criticism.' – FHW11, male

Hostility from patients and contacts

Emotional distress and a sense of detachment commonly emerged from participants' experiences of working with hostile patients or contacts (table 3). Participants described that some patients and contacts were aggressive and verbally abusive and had threatened several FHWs with lawsuits, but FHWs had to endure the upsetting circumstances to accomplish their duties. Many participants reported receiving complaints about quarantine orders from people classified as close contacts, particularly from day labourers or business owners who argued that FHWs deprived them of a source of income.

Organisational level

Heavy workload

Heavy workloads contributed majorly to emotional exhaustion and reduced personal accomplishment among FHWs (table 4). FHWs reported working overtime frequently, and they cited personnel shortages and inefficient mobilisation of health workers as reasons for their excessive workload. Most participants reported being on 'standby' during their off-duty hours or days; consequently, they felt a lack of work-life balance. Many FHWs were experiencing noticeable symptoms because of the heavy workload, such as nightmares, headaches, heart problems and insomnia.

Lack of office space and essential supplies

FHWs reported poor work environments, both in health centres and in the field, exacerbating physical and emotional depletion (table 4). Some reported needing to work in publicly open spaces at community health centres. Additionally, FHWs reported receiving limited office supplies from their organisations and health centres. Specifically, while organisationally issued phones were needed to conduct interviews, many FHWs used their own cell phones, leading to serious invasions of privacy. Moreover, participants felt unsafe when their organisations did not provide protective equipment for field investigations.

Inadequate organisational support

Participants reported receiving insufficient support from their organisations, which exacerbated their mental health conditions, especially embitterment (table 4). Some participants mentioned that even when they were at risk of being sued by individuals

disobeying quarantine orders, their organisations instructed them to resolve the matter individually without providing any guidelines or legal support. Furthermore, their requests for increased personnel and office supplies were delayed or not fulfilled at all, although a few FHWs mentioned that such support improved over time.

Social and structural levels

Politicisation of COVID-19

Participants expressed profound feelings of embitterment toward the current politicisation of COVID-19 and their work (table 5). Several FHWs reported that political parties have applauded or criticised the COVID-19 control system depending on their own political agenda, with little concern for public welfare. One FHW reported suffering extreme emotional exhaustion when asked to prepare reports for a politician gathering evidence to attack the opposing party.

Lack of social recognition

FHWs reported feeling unjustly treated insofar as the public has not appreciated the importance of their work (table 5). Participants mentioned that the public scarcely recognises FHWs, as compared with medical professionals. Additionally, many FHWs had met citizens who believed that their work was politically driven, increasing their embitterment about the public misunderstanding of their motives for working as civil servants.

Employment instability

Participants cited unstable employment status as another reason for their embitterment (table 5). One pointed out that they must renew their contracts each year so that future (ie, postpandemic) employment is not guaranteed. The participant described that the recent amendment of the infectious disease prevention and management policy stipulated that communities must hire at least one regular FHW, but this position is still on a temporary contract.

DISCUSSION

This study suggests that policy-makers and public health officials examine the multilevel causes of mental health challenges among FHWs to better support the epidemic control workforce. Our

Table 5 Social and structural sources of burn-out and embitterment and illustrative quotes

Subthemes	Illustrative quotes
Politicisation of COVID-19	'COVID-19 has become a battleground for politicians. One side is applauding the system, while the other side is saying that their opponents are hiding the number of cases, and recently they fight about the vaccines. All I did was my work, but suddenly it became a political battleground... I started having strong doubts and cynicism about society.' – FHW1, female 'After Cluster Z*, I had to prepare reports for a politician for a month, even until now... They were trying to gather evidence to prove the governor's decisions had flaws, and I had to write reports three times to meet their requirements... When I was involved in the political fight putting aside my epidemiological investigation over a month, I felt extremely embittered.' – FHW9, female
Lack of social recognition	'I just did my job, analyzing CCTV, classifying people, and stopping transmission, but I was blamed. I heard unfair criticisms. I heard 'You are a government stooge', and it's so unfair. I felt embittered... The foremost important value for me is justice, but for them, it's politically interpreted. I collapsed emotionally... I just want them to know our work is neutral. This work is about responding to the pandemic.' – FHW1, female 'There was a campaign that people cheer for medical professionals, but even though we are working at the forefront of the pandemic, there is no such campaign for us... I think it is unfair that there is no such encouragement or emotional support for us.' – FHW6, female
Employment instability	'We are not on a permanent term but on a temporary-based contract so our employment status is not stable because we have to renew it every year. After the pandemic is over, can we [still work]? The recent amendment requires cities and towns to hire an FHW, but even this position is temporary... Who will protect our position when the pandemic is over? Being in the circumstance that the future is not stable, I felt it's unfair and unjust.' – FHW6, female 'When cities and towns hire an FHW, existing public officers will be overburdened with additional work. Even I am under so much pressure, but would they be able to handle different tasks simultaneously? This is also an employment instability issue.' – FHW7, male

*Cluster Z occurred at a distribution centre in May 2020. Over 4000 individuals, including day labourers, were classified as close contacts to be quarantined. The governor limited social gatherings in the distribution centre for 2 weeks.
CCTV, closed-circuit television.

recommendations may inform health workforce management strategies and infectious disease response systems.

First, heavy workload emerged as a primary perceived source of burn-out among FHWs. The participants were on 'standby' even after leaving work, checking emails and awaiting emergency requests from coworkers, and such protracted engagement in work has hampered their ability to maintain a healthy work-life balance. FHWs cited personnel shortages and inefficient mobilisation of health workers as reasons for working beyond regular hours. Studies on previous epidemics have also emphasised that a lack of adequate personnel for infectious disease control may overstretch the existing workforce and result in ineffective epidemic control.^{27–29} Thus, we suggest three ways to reduce burn-out caused by intensive workloads amid pandemics: securing sufficient FHWs, training FHWs to be skilled in implementing protocols, and building participatory contact tracing systems that reflect their needs. We recommend working closely with FHWs to determine the most optimal systems for promoting their well-being and work performance.

Second, strategies must be established to protect FHWs from moral injury, including recriminations from individuals dissatisfied with epidemiological decisions. Our data show that the participants have been lied to consistently, emotionally abused and threatened by patients or other interested parties, exacerbating mental health problems and reducing job satisfaction. Their emotional burdens are rooted in the aggressive contact tracing protocol that requires FHWs to extensively collect personal information notwithstanding patients' high noncompliance. This partly implies that the current system prioritises social achievements based on scientific principles over the values embedded in the system. It is crucial to reform the system to reduce interpersonal stressors experienced by the workforce and protect their personal values and emotions throughout the investigation procedures. We also suggest developing and applying effective public health messaging strategies to enhance public trust and participation in contact tracing efforts. Moreover, our findings demonstrate that organisations have hardly attempted to monitor or stop maltreatment of FHWs by external forces. We stress the need for organisational support and guidance to prevent moral injury in the workplace. Standardised guidelines for epidemiological decision-making may restrain interested parties from pressuring FHWs

to alter decisions. Additionally, we encourage institutions to implement mental health interventions for FHWs that use both individual and systemic approaches, promoting appropriate behaviours to achieve mental wellness and allowing time for them to attend mental health services.^{30 31}

Third, our study highlights that the current epidemiological investigation procedure raises intrinsic ethical concerns, contributing to FHW burn-out and embitterment. Specifically, local authorities often publicise patient information, which conflicts majorly with FHWs' moral standards. Healthcare professionals may not divulge patient information under the law,³² but specific sanctions deterring such public announcements have been lacking. Our data also reveal that some participants have encountered ethical dilemmas while using digital technologies to obtain patients' personal data. Prior studies have underscored that healthcare professionals engaging in moral wrongdoing are contravening their roles as caregivers, and the resulting moral distress manifests as various mental symptoms and ultimately impedes overall quality of care.^{33 34} Therefore, strengthening data security systems or disclosing only deidentified data may alleviate their ethical and emotional burdens.^{4 35–37} We further encourage policymakers to establish a code of ethics for health workers and other stakeholders involved in pandemic control to address to what extent personal information access and disclosure should be conceded and how to resolve moral dilemmas among health professionals performing ethically ambivalent duties during a crisis.

Lastly, we suggest enhancing infectious disease control capacity with more contingency plans functioning during emergencies, particularly for workforce development and management as well as for resource distribution. Our findings indicate that poor collaboration with health centre workers has escalated emotional exhaustion among the participants. The results suggest that a dearth of contingency plans tailored for the temporary workforce has led to the disruption of workflow and partnerships. As the conventional mobilisation of health workers no longer works in times of crises, strategies for engaging and managing a contingent workforce must be established well before a pandemic to support their performance and cooperation with regular workers. Also, current FHWs have been assigned to COVID-19 control tasks without

sufficient training due to their immediate placement, with the expectation that gaps would be filled by individual health workers. The development of a simplified and evidence-based curriculum and its rapid roll-out may help the workforce gain necessary skills within a limited time frame. Additionally, our study participants have experienced embitterment due to employment instability and adverse working conditions. We recommend that health institutions devise a plan to protect the labour rights of interim health professionals. In particular, contracts for temporary FHWs should be formalised and must clearly outline the workforce's responsibilities and rights—including shift duration, vacation and benefits—to reduce mental health problems caused by unexpected obligations and uncertainty about the future. Furthermore, we highlight that contingency plans must delineate the allocation of resources, as our data show that a shortage of essential supplies (particularly organisationally issued phones and protective gear) has caused severe privacy and workplace safety issues, increasing emotional depletion and embitterment towards organisations. Providing health workers with sufficient protective equipment during a pandemic may significantly reduce health risks as well as psychological burdens.³⁸ In the face of uncertainty, contingency planning may benefit from a pragmatic and flexible strategy that maximises the use of available means and adjusts to evolving threats and complexities during health crises.³⁹

Limitations and strengths

Our study did not capture perceived institutional and system factors comprehensively, calling for further evidence to facilitate improved policy decisions pertaining to pandemic control. Furthermore, we recruited a small number of female participants so our data did not ensure robust findings in gender-differentiated burdens. This qualitative study is also inherently limited in verifying causal links between mental health issues and their perceived sources. Lastly, our online interviews had internet connectivity issues but reduced potential logistics problems (eg, scheduling) and concerns about social distancing during the pandemic. Overall, our qualitative study's exploratory approach with respect to FHWs' occupational mental health provides rich and timely insights into protecting the healthcare workforce and improving pandemic control systems. To the best of our knowledge, this is the first qualitative study to date exploring epidemic control FHWs' mental health problems and their associated contexts.

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