

Perception and Experiences of the Front Line Health Workers (FLWs) Attending Suspected or Confirmed Covid-19 Patients in Bangladesh: a Cross-sectional Study

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Abstract

Background: Front-line health workers (FLWs) are always at a very high risk of being infected by COVID 19 due to their close contact with patients; thus, proper protection is critical. Concerning the FLWs' safety, Bangladesh's haphazard health system preparedness response on the eve of the pandemic triggered an uncoordinated management crisis, making the FLWs even more vulnerable. This study aims to elicit FLWs' perceptions and experiences regarding personal safety against COVID-19 while attending suspected/confirmed cases in the pandemic's early days.

Methods: A mixed-methods quick telephone survey of a cross-sectional design was conducted during April and May 2020. 60 FLWs of various categories and levels from 14 districts and 43 institutions participated in the study in two rounds (initial and follow up) by four weeks apart. The participants were chosen using a combination of purposive sampling and the snowball sampling method and responded to a semi-structured questionnaire. Descriptive analysis was done for quantitative data, and qualitative data were thematically analysed.

Results: The FLWs were obvious about the necessity of using Personal Protective Equipment (PPEs) for suspected/confirmed COVID-19 cases with suspected/asymptomatic patients. All types and levels of FLWs did not get the needed formal training on COVID-19 management and prevention. During the initial round, only 75% and 57% FLWs received PPEs and training for their proper use, respectively. Concerns about spreading the infection to family members precipitated mental health problems for the FLWs, so they recommended some safety measures, e.g. separate accommodation, transport, modified duty roster during COVID placement. After almost a month, the follow-up round showed that a total of 76% FLWs received PPEs, but only 20% received training about them during the last month. The recommended measures were found to be more beneficial for physicians than the other FLWs.

Conclusion: COVID 19 highlighted the shortcomings of Bangladesh's health systems and the low priority given to public health. This hampered the COVID 19 response, which was late, fragmented, and poorly coordinated, putting the FLWs at risk even more. Nonetheless, a coordinated, integrated approach involving all relevant authorities is required, and the health ministry should direct an efficient and inclusive COVID response.

Introduction

More than a year has passed after the World Health Organization's (WHO) declaration of COVID-19 as a pandemic[1]. It first appeared in December 2019, when a group of patients with pneumonia of unknown origin was identified in Wuhan, China. Since then, more than 200 countries and territories had more than 100 million diagnosed cases with over two million recorded death [2]. The COVID-19 infection can be asymptomatic or may cause a wide range of symptoms, from minor signs of upper respiratory tract infection to life-threatening lung dysfunction [3]. Epidemiological evidence shows that exposure to an

infected person (for at least 15 minutes, within 6 feet) and briefer exposures to individuals with symptoms (e.g., coughing) are associated with an increased risk of transmission [3].

Asymptomatic, as well as pre-symptomatic carriers, can transmit SARS-CoV-2. [4, 5]. Studies from China and Singapore estimated the percentage of infections transmitted from a pre-symptomatic individual from 48–62% [6]. With a mean incubation period of around five days, 62% of transmissions might occur before the onset of symptoms. The standard diagnostic test is the reverse transcription-polymerase chain reaction (RT-PCR)–based SARS-CoV-2 RNA detection from respiratory samples (e.g., nasopharynx). Still, the sensitivity varies with the timing of testing relative to exposure ranging from 62%-80%, which keeps a window open for false-negative results. Overall, up to 40% of patients need ICU admission, and there is around 20% of hospital mortality [3]. Since healthcare providers have to deal with the patients closely, all these factors make them more susceptible to infection, especially when front-line health workers (FLW) become one of the most vulnerable groups. Evidence suggests that the percentage of hospitalisation and death due to COVID-19 is skewed towards low-income populations, anticipating more vulnerability for the Bangladeshi people and the FLWs serving them.

The first three COVID-19 cases in Bangladesh was confirmed on 8 March 2020 [7]. Before this, China confirmed the first COVID-19 death on 11 January 2020; a couple of days later, the case was confirmed in Thailand [8]. Thus, Bangladesh got a valuable lead time of around 5 to 7 weeks to prepare the people and the health systems for the outbreak and the impending surge of patients. However, neither the Ministry of Health and Family Welfare (MoHFW) nor the political establishment was found to rise to the occasion and provide the necessary stewardship for a coordinated response. There were fragmented, half-hearted, and ad-hoc approaches that created more problems than solutions. Uncertainty about the roles and responsibilities of the different agencies of the MoHFW and the Government at large, lack of intra-ministerial (MoHFW) and inter-ministerial (finance, labour, social security, law and order etc.) coordination, unwillingness to heed the advice of the public health scientists and practitioners in the country, non-inclusion of the non-state sectors and poor service readiness of the public health facilities baffle any description. This was evident at the beginning of the country's outbreak, as a substantial shortage of testing kits and personal protective equipment (PPE) were identified [9].

Along with this, a small number of testing together with the monopolisation of tests to a single government institution, earmarking facilities to screen and quarantine suspected COVID-19 patients, service readiness of the testing laboratories and the hospitals, including resourcing the hospitals with an adequate number of ICUs and ventilators etc., were also significant concerns [9]. However, the most crucial issue under media scrutiny became the availability of, and the quality of, PPE for the FLWs such as the doctors, nurses, technicians and supporting staff. The FLWs (mainly doctors) were rebuked and threatened by the Government for not attending/refusing to treat patients unprotected. This has demoralised large sections of the FLWs and the healthcare professionals and demotivated them to attend to humanity's call [10, 11].

In the first weeks of April 2020, Bangladesh entered the stage of community transmission and was in the climbing leg of the epidemic in new cases and deaths. According to public health scientists and practitioners in the country, it was presumed to touch the spike within weeks. With this scenario, it became imperative to safeguard the FLWs with the necessary amenities to attend to the suspected/confirmed COVID-19 patients without hesitation and stress. Quite a number of them got infected in treating suspected/confirmed COVID-19 patients. According to a news report, within just one month of the country's outbreak, around 100 FLWs, including doctors and nurses, were currently under quarantine. It is imperative that we listen to their side of the story and learn from their plights for future pandemic preparation and appropriate response.

Methods

A quick telephone-based survey was done to elicit the perceptions and experiences of the FLWs regarding personal safety against COVID-19 infection (by self and family) when attending to the suspected/confirmed patients. This mixed-methods survey adopted a cross-sectional design to elicit relevant information from the FLWs. Data were collected in two rounds: 1st phase during 9–14 Apr. 2020 and the second phase during 5–11 May 2020. Due to time and resources constraints and under lockdown conditions, a telephone interview method was most appropriate. It allows data to be collected from diverse geographical localities, is time and cost-effective compared to a face-to-face interview, better response rate than postal surveys, and better completion of information [12]. This method is increasingly being used in healthcare service research.

In the initial round, a simple two-page tool with 22 topics in a semi-structured questionnaire was developed to address the objectives. This was used as talking points for the telephone interview. The interview was meant to be conducted in a conversation mode. Most of the topics were pre-coded for possible responses, including an "Other" category to accommodate responses beyond the pre-fixed codes. Several open-ended questions were also included in the interview tool. In the follow-up round, eight topics in the form of a structured questionnaire were used.

The participants' eligibility criteria for this study were working at the current station for at least one year, and attending suspected or confirmed COVID 19 cases. In addition to that, for the physicians, the completion of a one-year internship with BMDC registration were also added as eligibility criteria. A purposive sample of doctors, nurses and other FLWs was taken initially, leveraging our past engagement with them about some other studies done earlier. We contacted the FLWs meeting the eligibility criteria, and those who consented were interviewed in a conversation mode. These respondents from the initial list were also used for seeking further eligible respondents by 'snowball' sampling. Overall, a combination of purposive and snowball sampling was used. Ultimately, 60 respondents could be interviewed in the first round, and 46 of them responded to the follow-up survey four weeks later. For the geographical location of the respondents, please see Fig. 1.

The four researchers from the study team used this list to call on the respondents, briefly described the study's context and purpose, the interview contents and probable duration (30 minutes on average) and sought their verbal consent. Following this, either an appointment was made for the interview to occur later, or if agreed to participate, the interview was done simultaneously. Data were collected anonymously. Confidentiality of data was maintained, and data were used for research purpose only.

Quantitative data were entered in a pre-designed google form, curated and made ready for analysis. This data management method was necessary to accommodate the researchers working from home at different locations in Dhaka city. An analysis plan was made to extract the tables for the report. Quantitative variables were coded using a coding manual developed during the analysis plan. Stata V.13.0 were used to clean and analyse the data. Descriptive analysis of characteristics of the respondents and PPE related information were performed. Percentage of receiving PPE and percentage of receiving related training are the main outcome variable. Receiving Trends were visualised using graphical methods. Responses to the open-ended questions were recorded from google forms as qualitative data, then were coded thematically and analysed.

In the first round, the 60 respondents comprised doctors (MBBS and post-graduates), nurses and midwives, and para-medics (Sub-assistant community medical officer- SACMOs, lab technicians, Family welfare visitor- FWVs). These number of persons were reachable within our given time limit and they were from overall every region of the country. We tried to interview a few (10–12 staffs) supporting staff (e.g., Cleaner, Ward boy and Aya), but they appeared to be too apprehensive of backlash from the hospital authority even after all assurances. The respondents were mainly from the COVID 19 dedicated hospitals. In the follow-up round, only close-ended questions were used and 46 respondents out of the initial 60 could be reached in the given time-frame.

Purposeful/purposive sampling is used to identify and select information-rich cases for the most effective use of limited resources[13]. Purposive sampling can often be prone to researcher bias; also, representability or generalisability of the sample cannot be established [14]. Snowball sampling also lack generalisation [14]. To avoid these biases in sampling, we tried to be as inclusive as possible by selecting respondents from all over the country, even under the lockdown. Respondents from both private and public facilities were also included for the same reason.

The research team conducted the interviews using a semi-structured online friendly questionnaire. They conducted the interview after an appointment with the respondent; that is why we didn't encounter any missing values.

Under the lockdown situation, formal ethical clearance was not possible, and we followed the institutional guidance for matters related to ethical issues for conducting the study. Informed verbal consent was obtained from each participant before initiating the conversation over the phone. Moreover, no invasive procedure was used. Data were collected anonymously, the confidentiality of data maintained at all stages of the study and used only for research purposes.

Results

The findings from the first survey are described under the following headings.

Characteristics of the respondents

The majority of the respondents were from public sector health facilities in rural areas (40%), followed by those in Dhaka city (37%) (Table 1). The para-medics of various categories comprised a significant proportion of the respondents (32%), followed by MBBS doctors (30%). Most of them (68%) were in service for more than five years and were on duty in the in-patient wards. About 12% were servicing the emergency room. Twelve per cent of respondents knew about a colleague in their close circle of relatives and friends who became infected while handling a COVID-19 patient. Simultaneously, only 48% received any training/instructions /guideline on how to manage such patients.

Table 1
Characteristics of the respondents (N = 60)

Characteristics	% (n)
Facility type	
Public facility in Dhaka city (Hospitals, International airport)	36.7 (22)
Public facility in Rural area (Upazila Health Complex, Union sub-centre, UHFWC)	40.0 (24)
For-profit private facility	10.0 (6)
Not-for-profit private facility (NGO)	13.3 (8)
Type of respondents	
Doctors (MBBS)	30.0 (18)
Doctors (post-graduate)	16.7 (10)
Nurses (All types) and Midwives	21.7 (13)
Para-medics (SACMOs, FWV, Lab technician etc.)	31.7 (19)
Years of service	
< 1 year	3.3 (2)
1–5 year	28.3 (17)
> 5 year	68.3 (41)
Place of duty	
In-patient wards	33.3 (20)
Out-patient department (OPD)	31.6 (19)
Emergency	11.7 (7)
Both outpatient and in-patient	23.3 (14)

Characteristics	% (n)
Knows about a colleague/friend's colleague who became infected while managing a COVID-19 patient	11.7 (7)
Received training/instructions/guidelines regarding the management of suspected or confirmed COVID-19 patients	48.3 (29)

Personal protective equipment (PPE)

The respondents mostly agreed about the necessity of using PPE in the current situation when the epidemic has entered the stage of community transmission (Table 2). The nurses and midwives were more in favour of this (85%) opinion compared to others. Compared to doctors (80–100%), a lesser proportion of nurse/midwives (46%) and paramedics (21%) were found to be aware of the WHO guideline for the use of PPE. Interestingly, 43% of the respondents did not receive any training/instructions on PPE use. Around 54% of nurse/midwives and 37% of the para-medics received any training/instructions/guidelines on PPE use.

Table 2
Personal Protective Equipment (PPE)

	Types of health care professional %(n)				
	Doctors (MBBS)	Doctors (post-grad)	Nurses (All types)/ Midwives	Para-medics (SACMOs, FWV, Lab technician etc.)	All
No. of respondents	18	10	13	19	60
When a health care professional need personal protective equipment (PPE)*					
Physical examination of patient with respiratory symptoms	61.1 (11)	80.0 (8)	53.9 (7)	42.1 (8)	56.7 (34)
While handling any patient in OPD	22.2 (4)	20.0 (2)	-	-	10.0 (6)
Any patient in current situation of community transmission	61.1 (11)	50.0 (5)	84.6 (11)	73.7 (14)	68.3 (41)
Aware of WHO guideline for use of PPE	100.0 (18)	80.0 (8)	46.2 (6)	21.1 (4)	60.0 (36)
Received training /instructions/guidance on use of PPE*	66.7 (12)	80.0 (8)	53.9 (7)	36.8 (7)	56.7 (34)
Source of training					
Health Facility	33.3 (6)	50.0 (5)	38.5 (5)	15.8 (3)	31.6 (19)
Self-study	27.8 (5)	30.0 (3)	15.4 (2)	26.3 (5)	25.0 (15)
National guideline	5.6 (1)	10.0 (1)	-	-	3.3 (2)
WHO guideline	11.1 (2)	30.0 (3)	-	-	8.3 (5)
Did not get any training	33.3 (6)	20.0 (2)	46.2 (6)	63.2 (12)	43.3 (26)
Measures are taken when no PPE was available*					
Using mask and gloves and ordinary gowns	5.6 (1)	10.0 (1)	15.4 (2)	26.3 (5)	15.0 (9)
Use mask and gloves only	5.6 (1)	-	15.4 (2)	21.1 (4)	11.7 (7)
*multiple responses					

Types of health care professional %(n)					
Managed own PPE	5.6 (1)	10.0 (1)	-	5.3 (1)	5.0 (3)
Not applicable/ Received PPE	88.9 (16)	90.0 (9)	69.2 (9)	57.9 (11)	75.0 (45)
*multiple responses					

Seventy-five per cent of the doctors and nurses received PPE following the COVID-19 outbreak, while only around 40% of the support staff got it (Table 3). Respective hospital authorities primarily supplied the PPE. When no gown of PPE was available, they used mask, gloves and ordinary gowns (15%) (Table 2). The respondents expressed doubt about the PPE quality supplied by the hospital authority/ MoHFW administration on further probing. They opined that the supplied PPEs appeared to be made of very ordinary material, which they used to carry home to wash or wash at the facility and reuse, which they perceived as risky for both themselves and the patients. Except for the COVID-19 dedicated hospitals, FLWs in no other facility, including the flu and isolation ward, received a complete PPE set with all components per the WHO Interim Guideline of 20 March 2020.

Table 3

Availability and use of PPE following COVID-19 outbreak and perception about the evolution of the current situation

	%(n)
Doctors and nurses Got PPE following the outbreak	75.0 (45)
Other staff at front-lines who got PPE	
Cleaner	46.7 (28)
Ward boy	45.0 (27)
Aya	40.0 (24)
Others (guards, pathologist, CHCP, SACMO)	26.7 (16)
No other staff got PPE	16.7 (10)
Source of PPE	
Hospital authority/MoHFW administration	66.7 (40)
Donation	18.3 (11)
Personal	18.3 (11)
Did not get any PPE	25.0 (15)
Perceived reasons underlying the situation where HCPs do not have PPEs but have to attend suspected or confirmed patients	
From lack of awareness about the disease and its epidemic potential by policymakers and practitioners	38.3 (23)
Slow/delayed preparation for managing the epidemic;	50.0 (30)
Not valuing the necessity of safety of HCPs by the MoHFW authorities;	31.7 (19)
Not paying attention in time to the warnings by the public health specialists	15.0 (9)
No idea/don't know	21.7 (13)

	%(n)
Think that this situation could have been averted	83.3 (50)
How could have been the situation averted	
Adequate preparation for combating the epidemic in the lead time (about 6-to-8 weeks) that we got since Wuhan);	40.0 (24)
Mobilisation of resources for procuring priority supplies (e.g., test kits, Oxygen, ventilators etc. including PPEs)	43.3 (26)
Operationalisation of Government's strategies on 'health security' and 'one health' that were in place	38.3 (23)
Don't know	1.7 (1)

Perception of the current situation regarding the shortage of PPE

When the respondents were asked about how the current situation evolved when FLWs with an insufficient number of PPEs have to attend to suspected or confirmed patients, 50% identified slow and delayed preparation for epidemic response to be responsible (Table 3). Others mentioned that the situation evolved from a lack of awareness among the policymakers about the disease's epidemic potential (38%) or failure to respond to public health experts' warnings (15%). Still, others stated sarcastically that the authorities didn't value the lives of the FLWs (32%).

When asked, the great majority (> 80%) believed that this situation could have been averted. According to respondents, this could be done if the lead time that Bangladesh got could be appropriately utilised for preparation (40%), resources could be mobilised (43%), or timely activation of the already existing strategies on 'One Health' or 'Health Security could be initiated (38%).

Doctors vs non-doctors

Next, we grouped the respondents into doctors (n = 28) and non-doctors (n = 32) and wanted to investigate their differences in experiences and opinions, if any. We found a more significant proportion of doctors (39%) working in both OPD and in-patient wards than others (9%) and exposed to more risk. A tiny proportion of the non-doctor FLWs (19% vs 82% for the doctors) received training/instruction/guideline on management and prevention of COVID-19. Only 31% of them were aware of the WHO guideline for PPE use than 93% of doctors. More doctors got a donation of PPE (32%) than non-doctors displaying their relative importance before the concerned's eyes.

When asked to express their opinions on the evolution of the current situation, many doctors blamed the authorities' lack of awareness (71%) about the disease and its epidemic potential shown in China. On the

other hand, the non-doctors (38%) placed the blame squarely on slow/delayed preparation for the outbreak (Table 6). Doctors (89%) more than non-doctors (78%) thought that this situation could have been averted by adequate preparation (61%) and mobilisation of resources (64%). Interestingly, half of the non-doctors perceived that it could be avoided if the existing health security strategies and one health could be called into action.

Responses to open-ended questions from the first round

During the initial round, we had some open-ended questions in our list of talking points. We encouraged the respondents to freely state their opinions on some relevant issues and noted their responses. The key thematic responses are summarised below.

GoB announcement on monetary incentives

A mixed response was observed to the Government's announcement of awarding monetary incentives for directly serving FLWs. Some of the respondents praised this declaration as encouraging. Others preferred proper PPEs and pragmatic management of the Covid-19 (e.g. training) crisis to monetary reward as they consider them as life-saving measures for them and their family members.

"We don't need a reward. Just a little praise, encouragement is what we need. What honourable PM said is a result of a fabricated statement that reached her through the bureaucrats. Our demand was for PPE, N95, face shield, but the bureaucrats made it like our demands are not met, we will not attend patient. Even at a video conference today, an assistant professor told the health minister that we don't need an incentive. We need protective equipment." (male_34_physician)

Some of them mentioned providing 'risk allowance' now rather than reward/insurance in the future. Some illustrative quotes:

"I appreciate this announcement. However, apart from PPE, risk allowance would be motivational and helpful for the healthcare providers in this corona pandemic."

(female_24_midwife)

However, they expressed concern about how this announced amount would be distributed as no details were laid out. Also, the amount of this kind of allowance should be more than declared, they thought.

"Also, the amount is less, it should be increased. I am doubtful about the list as speaking from my previous experience there might be a political issue." (male_34_physician)

Moreover, FLWs of the private sector were baffled about this announcement as the reward was announced for the government health workforce only.

"The doctors in the periphery are fighting as a first-line health care worker. We are also working, but ours is a corona dedicated centre. So, working as a first-line health care worker is not clear. We have seen in the

past that many people have collected the freedom fighter certificate without even fighting in case of this insurance that may happen also. The doctors of private hospitals are also front-line health care worker. Who will get the insurance & how this should be clear." (Female_36_physician)

However, some SACMOs were content about it, while others felt the same as other FLWs.

"In this war, we are the soldier. We have to protect us and serve people with what we have; it doesn't matter whether the government provides something or not." (Female_28_SACMO)

Role of Health Professional Associations

The respondents were primarily dissatisfied with the role played by the different professional associations in this crisis. From the various cadres of FLWs, these associations were playing an almost non-existent role. The role of the largest physician association was described as frustrating:

"...all of the members of this association are in Covid steering committee, but they are doing nothing at all." (Male_34_physician)

"They failed to be the communication tether between us and the policymakers" (Male_33_Physician)

According to the physician respondents, in this tumultuous time, the alternative social media-based professional association for physicians like 'Bangladesh Doctors Foundation (BDF) and Foundation for Doctors Security and Rights (FDSR) are working as their voice instead:

"Recently, a new association known as the 'Bangladesh Doctors Foundation has taken some initiatives to make doctors' life comfortable. They manage ambulances for doctors to commute them to hospitals; they help doctors' family members in emergencies. Moreover, they are neutral and provide equal services to all" (Male_33_physician)

Other professional cadres, e.g. SACMO, nurse and midwives, Medical technologists, FWV etc., had more or less the same idea about their respective professional associations. But according to some of them, some are still playing a praiseworthy role on a small scale:

"We have an association like 'FWV association'. We 19 members in our area, visit different areas and provided awareness campaign among people. We did some BCC sessions with them. We trained them about handwashing, social distancing and aware them of staying at home." (Female_58_FWV)

The mental health of the FLWs

Almost all respondents mentioned panic, anxiety, irritability, frustration, and other psychological symptoms since the COVID-19 crisis began. These symptoms were mainly happening because they felt unsafe and insecure due to the poor availability of PPE and other supplies while handling suspected or confirmed COVID-19 cases. The probability of asymptomatic cases during community transmission and patients' tendency to hide true history was the primary underlying reason triggering these symptoms. In some cases, fear for family members' safety also came up. The thought of children and elderly of the

family getting infected from them makes them terrified, resulting from which many FLWs mentioned having insomnia and symptoms of depression. Some are staying away from their families for their safekeeping. Other than this, they appeared to be fearless to deal with, and treat any, suspected and/or confirmed COVID-19 patients with proper protection:

"I came home and took my baby; later, I felt like I infected him. Then my wife said that if we die, we all die together. The day I attend admission, I cannot sleep at night; it feels like covid is everywhere around me. It's a panic. If I am given accommodation from the hospital, I will not come home; I need to keep my family safe." (Male_34_Physician)

"I am always scared nowadays. Scared of my family and relatives. We handle different types of patients, and as a result, we can be infected, and ultimately the whole family will suffer." (Female_54_FWV)

Recommendations of the FLWs for effective COVID response

To make a recommendation or appeal to the authorities to make their professional life more safe, secure and productive, the FLW's came with several suggestions: i) increasing the number of tests so that the actual situation can be assessed; ii) transparency in reporting the number of tests, positive cases, morbidity and mortality; iii) procurement of sufficient and quality PPE; iv) arranging accommodation nearby; v) rotation duty for FLWS to limit exposure and keep health workforce charged and reserved; vi) structured guidelines and protocol to manage COVID-19; vii) increasing pool of oxygen supply, ventilators, ICUs by co-opting the private sector in COVID response and finally, viii) building awareness among people through an extensive, culture-sensitive and effective IEC campaign.

Overall, the FLWs mentioned a substantial lack of PPE and other preventive amenities, poor quality of supplied PPEs, lack of training on COVID-19 and the PPEs. Besides, they also mentioned mental health problems and burnouts from long and arduous duty hours without sufficient rest and the constant worry of spreading the virus to family members. They recommended urgent procurement of quality PPEs, including training for its use, arranging accommodations and food at a nearby place to ward off the concern of infecting family members, and roster duty for the attending staff to charge up physically and mentally.

Extensive dissemination activities were undertaken to inform the relevant authorities about the study findings and FLWs' recommendations.

Findings from the second (Follow-up) Round

Around a month after the initial round of the study, we decided to re-interview at least 50 respondents (out of 60 interviewed initially) on the same issues, following the same methodology to see if any change occurred. Besides PPE and training, we asked them about their recommendations during the initial round

to check if the relevant authorities addressed the recommendations. The re-survey was done from 5–11 May 2020.

In all, we could reach 46 respondents who agreed to be interviewed (others were either unreachable or did not agree to respond this time). Most of the respondents were from public sector facilities in the peri-urban/rural areas (43%), followed by those in the urban facilities (33%), the majority being doctors (39%), followed by different categories of paramedics (35%). Forty-three per cent of the FLWs worked in the OPDs, while 37% worked in both OPD and in-patients.

Data were disaggregated by the four original categories of FLWs (Annex 1). In the intervening period, only 9% received any training on COVID-19 and 20% on the proper use of PPE supplied. During this time, in total, 76% of the respondents reported to have received PPE, the proportion being more remarkable for the paramedics (87.5%) than the others (Fig. 2) and much greater than the earlier study (58%). However, only 56% of the respondents were satisfied with the PPE quality, and only 33% were nurses/midwives.

Only in the case of 43% of the respondents, the duty roster was changed, mainly for the doctors (above 60%). Doctors, especially the post-graduates (80%), were satisfied with the change but not the other categories.

Accommodation at or near the workplace was arranged for only 24% of respondents, compared to just 8–12% for the paramedics and nurse/midwives. Less than 50% of the doctors received accommodation in this way. The same situation is observed for food, and it was interesting to note that the post-graduate doctors (80%) were much advantaged in this regard compared to medical graduates (31%). The latter divide was also observed in the arrangement of transport (80% vs 61.5%). The improvement in mental health status was insufficient for most categories (around 1/3rd of the respondents) except the paramedics (56%) (Annex 1).

Finally, we compared the doctors and other FLWs (Bangladesh's health systems is very hierarchical with doctors at the top of the pyramid) on the above issues (Annex 2). A substantial difference was observed for training (on COVID-19 and use of PPE) (non-doctors received more training than the doctors), change in duty roster and satisfaction with the change (both were greater for the doctors), the arrangement of accommodation and food and transport (greater for doctors), and improvement of mental health status (lesser for doctors) (Fig. 3).

Discussion

This telephone-based mixed-methods study revealed a lack of preparedness at every step of the Bangladesh health system's COVID-19 response in the initial weeks. Findings reveal the concerns of the FLWS of getting infected, self and family members, from the poor covid response of the health system; continued shortage of PPE and other protective supplies, fatigue from overwork and inadequate rest, lack of incentives such as dedicated accommodation and transport for those working at the covid hospitals,

and mental health consequences of these factors combined. The implications of the findings for rapid, appropriate and effective response is discussed.

Inadequate health system response to COVID-19:

From the detection of SARS-CoV 2 in China in December 2019 to detecting the first case in early March 2020, Bangladesh got more than two months to be prepared to face the pandemic in a densely populated LMIC. Health systems were the least prepared among all sectors of the Government. As a result, there was a lack of protective gears such as the PPEs; if present, FLWs were not satisfied with the quality of the PPEs. There was also a lack of training on COVID 19, donning and doffing of PPE, and proper infection and prevention control facilities in the hospitals and other health centres. As a result, in the initial period, the pandemic's mismanagement resulted in many casualties among the doctors and other FLWs.

Along with some other factors, the FLWs with inadequate and inappropriate PPEs had an increased risk of COVID 19 compared to others [15]. In the early days of the pandemic, a global shortage of PPE was observed [16]. Many countries that were hit hard by COVID 19 in early 2020 also reported a deficit of PPE, fatigue of the FLWs etc. By the end of February 2020, more than 2500 FLWs were positive in China [17], where the shortage of PPE and FLWs' prolonged exposure to infected patients were among the reasons [18]. By mid-March, around five thousand Italian FLWs (9% of the total case) were infected [19]. Around one-fifth of the nurses in a South Korean health facility resigned by the 1st week of March 2020, another hospital pleaded for emergency reinforcement of the FLWs [20]. But unlike Bangladesh, these countries did not get the lead time of two months to be prepared and were hit badly even before understanding the disease. Incidentally, Even the Joint External Evaluation (JEE) (mandated by International Health Regulation 2005) Bangladesh Mission report 2016 indicated that the country was poorly prepared for an epidemic [21]. The haphazard situation of the health sector is a reflection of that evaluation.

The mental health of the FLWs

Mental health is an important indicator that showed a slight improvement in the follow-up round concerning several indicators. The participants mentioned gradual mental health deterioration as they had symptoms like panic, anxiety, irritability, frustration, and insomnia. On top of that, since they are uncertain about the protective gears they are being supplied with, fear of infecting their family member was an additional irritant.

A cross-sectional study from Dhaka Medical college hospital, among the physicians dealing with pandemic incidents of insomnia and symptoms of depression and anxiety, was observed [22]. Depression, stress, anxiety, and post-traumatic stress disorder (PTSD) was found prevalent among all the health care workers (HCWs) of Singapore contemporarily [23]. A systematic review also reported anxiety, depression, and stress among HCWs of varying prevalence across studies [24]. Underlying reasons for the HCWs' mental health problem was found to be exposure to COVID 19, being women and worries about infection or infecting others- was reported by another review [25]. Even WHO addressed this grave

problem by issuing several guidelines so that HCWs can support themselves and be supported by society [26].

FLWs' suffering while confronting the pandemic is a recognised global phenomenon. But addressing the problem has to be done locally, in a culturally sensitive way. Mental health is one of the least prioritised areas in a densely populated LMIC like Bangladesh, let alone the mental health of the HCWs. As a result, the pandemic's immense pressure took a toll on the psychology of the FLWs. However, a regular lesson on stress management for this high demanding sector could have played some preventive role initially, but not for the long run. It is of paramount importance to keep those healthy who keep the whole society healthy.

The necessity of a strong public health sector: Lesson for a way ahead

The poor covid-response displayed a low priority given to public health in Bangladesh. During the SARS outbreak in 2003, 41% of the total cases were health workers [27]. Singapore enhanced the capacity and capabilities for pandemic preparedness since then, including stockpiling PPE at the national level for protecting their FLWs from the next disease outbreak, such as the current COVID-19 [28]. As a result, by mid-April, only 1.7% of cases were HCWs, having family/household as the most familiar source of exposure [29]. Along with this measure and is one of the highest COVID 19 testing states of the world with the mandatory mask-wearing provision, Singapore had only a 0.05% mortality rate by September 2020, below the global average (3%) [30].

Vietnam, another Southeast Asian country with a long, porous Chinese border, took rigorous measures to control the spread right after China first acknowledged COVID 19 [31]. As a result, they had fewer COVID 19 morbidity and mortalities, among which very few FLWs were tested positive [32, 33]. Strong government leadership with effective multi-sectoral collaboration, a robust response system, and WHO's support for strengthening health emergency response after previous epidemics are lessons from Vietnam [34].

Because of a solid public health system, the HCW and general population of the above two countries did not suffer much from COVID 19 despite being in the vicinity of Wuhan's primary epicentre. Bangladesh should learn from this experience and move forward to strengthen the public health system for preparedness, early warning and prompt response to any future outbreak.

Limitations

The survey was conducted on a purposive sample of a limited number of FLWs within a short time. However, data were collected from quite some different areas as an attempt to avoid potential bias. Though not generalisable, we think this gave enough diversity and may help policymakers make decisions. Moreover, the study was conducted at the height of the outbreak in Bangladesh, limiting the findings' generalisation.

Conclusion

This pandemic revealed the weaknesses of Bangladesh's health systems and the low priority given to public health and pandemic preparedness. As a result, the covid-19 response was slow, ad-hoc, delayed, fragmented, non-inclusive and poorly coordinated. It could not effectively utilise the lead time it got, unlike China's immediate neighbours when the pandemic expanded. Nevertheless, it's never late for well-coordinated, well-resourced and multi-sectoral measures involving all relevant ministries under the stewardship of the health ministry for an efficient and inclusive covid response.

Abbreviations

COVID 19 Coronavirus disease

DGHS Directorate general of health services

FLW Front-line (health) worker

FWV Family welfare visitor

HCW Health care worker

HCP Health care provider

MoHFW Ministry of health and family welfare

PPE Personal protective equipment

SACMO Sub-assistant community medical officer

WHO World Health Organization

Declarations

Ethics approval and consent to participate:

Under the lockdown situation, formal ethical clearance was not possible. We followed the institutional guidance for matters related to ethical issues for conducting the study. Informed verbal consent was obtained from each participant before initiating the conversation over the phone.

Consent for publication:

Not applicable.

Availability of data and materials:

All data generated or analysed during this study are included in this published article [and its supplementary information files].

Competing interests:

The authors declare that they have no competing interests.

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Author Contributions:

Conceptualisation: BZI, MRI, SNBKT and SMA; methodology: SMA; tool development and validation: BZI and MRI; formal analysis: MRI and BZI ; data entry: MRI and BZI; writing—original draft preparation: BZI and MRI; writing—review and editing, SNBKT and SMA.; supervision: SMA; funding acquisition: SMA

All authors have read and agreed to the submitted version of the manuscript.

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Figures

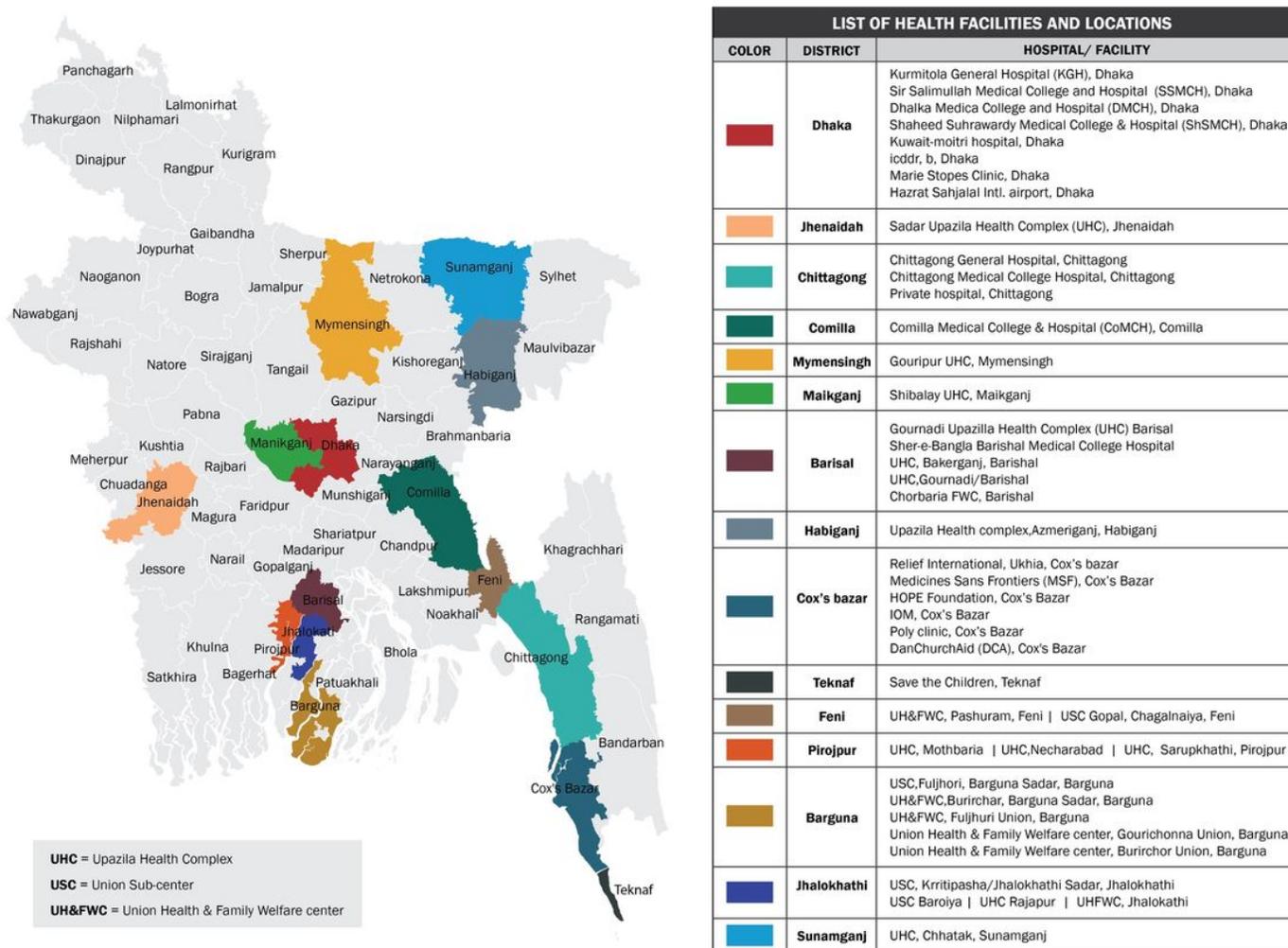


Figure 1

List and the locations of the health facilities where respondents are based. Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.

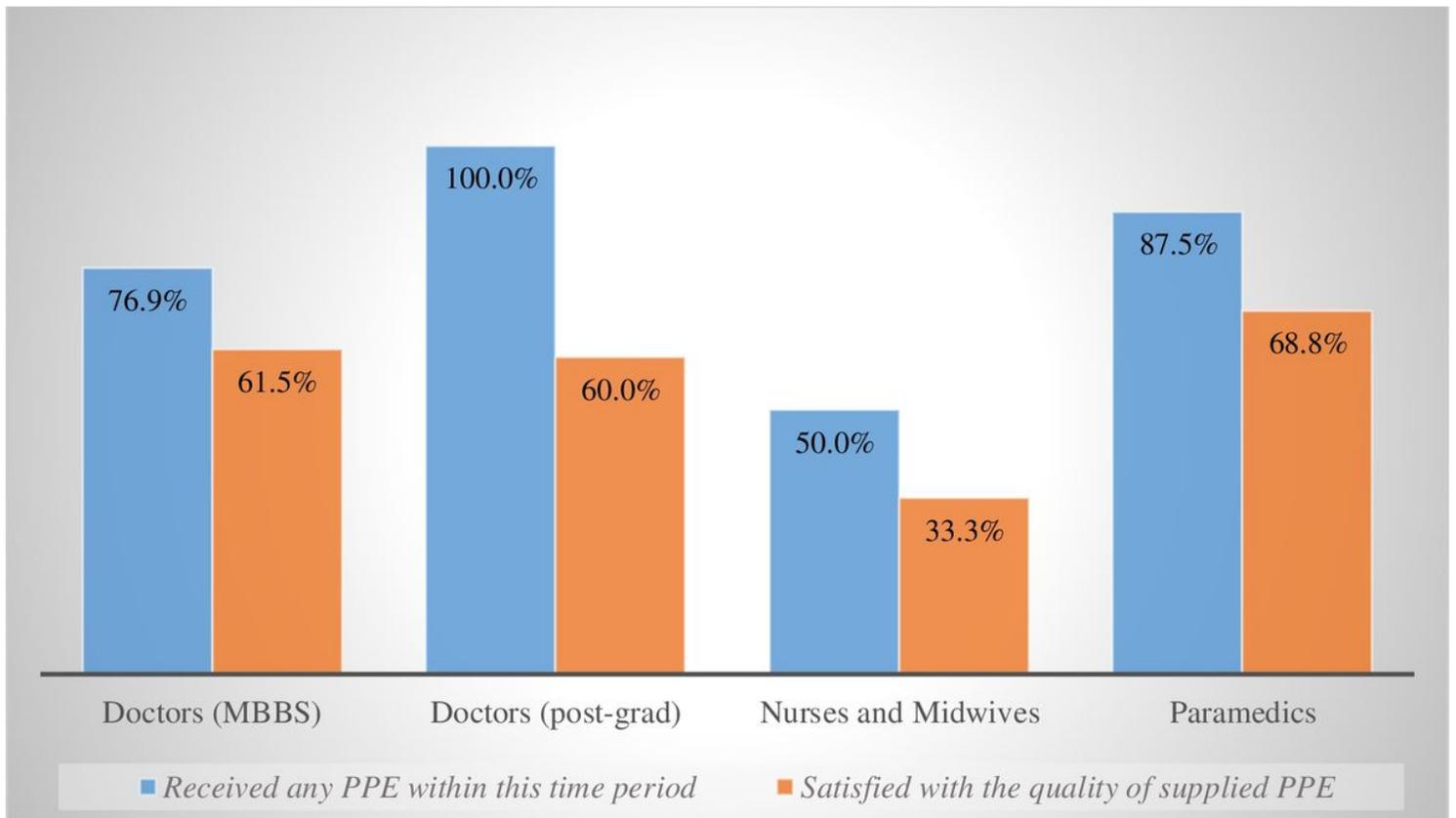


Figure 2

Percentage of FLWs (follow-up round) who received PPE and expressed satisfaction with the quality (disaggregated in four categories)

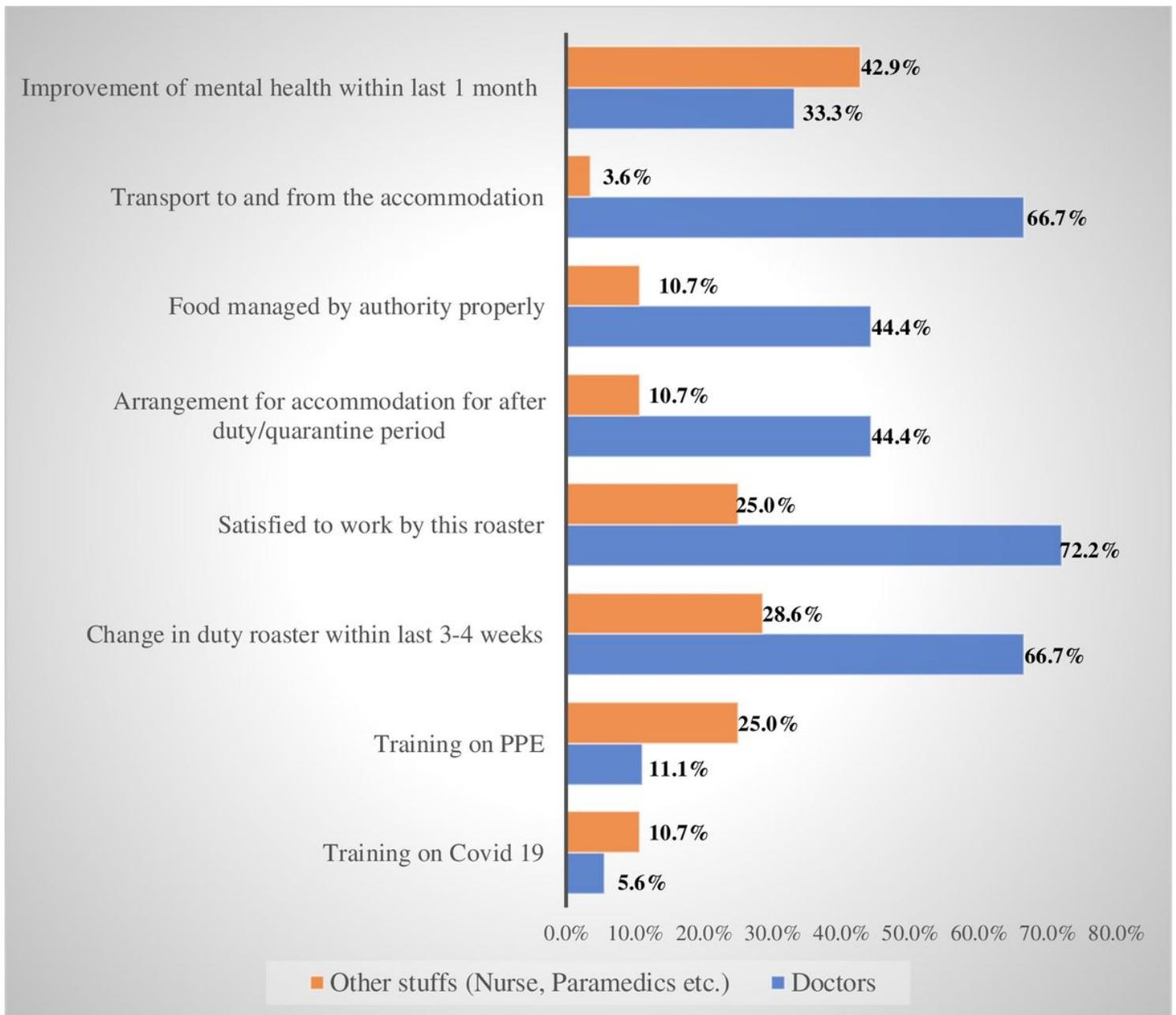


Figure 3

Comparison between the doctors and other FLWs (follow-up round)

Supplementary Files

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