

RESEARCH ARTICLE

Maternal and child health service disruptions due to COVID-19: A WHO health-care worker exposure response and outcomes survey in western Kenya

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Background: COVID-19 has disrupted health-care services delivery globally. Limited data exists about personal protective equipment (PPE) availability for health-care workers (HCW) and perceptions of COVID-19 service disruption in low-resource settings. **Methods:** We used the Healthcare Worker Exposure Response and Outcomes (HERO) Registry Protective Equipment Survey to assess PPE availability and reuse. HCW reported perceptions of client volume changes and time spent on various activities using a 5-point Likert scale ranging from large decreases to large increases. **Results:** Of the 99 HCW enrolled who completed the HERO survey, 32% were nurses, 21% clinical officers, 16% facility in-charges, among others. Forty percent worked in both maternal and child health and family planning clinics and HCW had an average of 5.3 years (interquartile range: 3.5–10.4) providing care to peripartum women. HCW reported problems procuring multiple forms of PPE, including respiratory masks (71%), face shield/goggles (60%), gowns (58%), surgical masks (54%), hand sanitizer (45%), disinfecting products (43%), gloves (40%), and soap (31%). Re-use of N95/KN95 masks was common with 56% of HCW reporting reusing a single mask when attending to all patients and 2% reporting having sufficient masks to use one per patient. HCW reported reduced volume of women seeking services due to COVID-19; nearly two-thirds reported decreases in antenatal (62%) and postnatal clients (66%), as well as decreases in the number of pregnant and postpartum women initiating or continuing pre-exposure prophylaxis for HIV prevention (60% and 57%, respectively). HCW reported changes in how their time was spent; 79% spent more time disinfecting spaces between clients and 49% reported increases in responsibilities related to providing psychosocial care. **Conclusions:** HCW reported a dual burden of PPE shortages and client psychosocial needs, limiting their own protection and adding to workload during the pandemic.

Keywords: COVID-19, Personal protective equipment (PPE), Service disruption, Healthcare Worker Exposure Response and Outcomes (HERO) survey, PPE shortages

Introduction

The novel coronavirus disease (COVID-19) pandemic resulted in more than 650 million infected people and over 6.5 million deaths internationally [1]. Global supply disruption of personal protective equipment (PPE),

including surgical masks, face shields, and goggles, gowns, disinfectants, soaps, and gloves, exacerbated the crisis leaving frontline health-care workers (HCW) ill-equipped to care for their patients [2]. As COVID-19 overwhelmed health systems, there was an indirect rise in preventable and treatable illnesses, which increased adverse maternal and fetal outcomes [3]. Recent data demonstrating a surge in maternal mortality and stillbirths globally suggest that services offered through maternal and child health (MCH) clinics, including HIV pre-exposure prophylaxis (PrEP) delivery, were adversely affected by the pandemic [4, 5]. Governments had to make difficult decisions to both respond to COVID-19 and preserve basic health services [6].

PPE use was recognized as an effective way to protect HCWs and patients from COVID-19 [7]. MCH clinic services were affected by fear of contracting COVID-19,

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psychosocial effects due to lockdowns, curfews, and government restrictions on gatherings [8]. Using the WHO Healthcare Worker Exposure Response and Outcomes PPE survey [9], we investigated the impact of COVID-19 on PPE availability and service disruption in MCH, family planning (FP), and HIV care clinics. To understand the effect of COVID-19 on MCH clinic services, we assessed perceived changes in patient volume and the time taken by HCW to provide services to patients.

Methods

This study on COVID-19 impact was nested in the PrEPARE study. The PrEPARE study sought to identify predictors of PrEP implementation and test promising implementation strategies to promote fidelity, penetration, and integration of PrEP within MCH clinics (NCT04712994) [10]. Using a cross-sectional design, HCWs offering MCH services to pregnant and postpartum women in Kisumu, Homa Bay, and Siaya counties of western Kenya were invited to complete a web-based survey. HCWs were able to answer questions on COVID-19 impact and PPEs access if they were providing services during that time. Participants were eligible if they worked in the facility involved in the study, were involved in PrEP service delivery, and were ≥ 18 years old. Participation in the survey was voluntary and participants signed an electronic consent module through RED-Cap. This study was approved by the University of Washington Human Subjects Division (IRB) and the Kenyatta National Hospital-University of Nairobi (KNH-UoN) Ethics and Research Committee (ERC). Participants completed the Healthcare Worker Exposure Response and Outcomes (HERO) Registry Protective Equipment Survey [9] to assess PPE availability and reuse between October 2020 and January 2021. The survey included a 23-item questionnaire assessing HCWs' perceptions on client volume in the facility, access to PPE, and PPE reuse.

A 5-point Likert scale was used to collect survey responses on HCW perceptions of clinic duties and volume of clients seeking different services (1: clinic duties/volumes highly decreased; 5: highly increased). We collapsed Likert scores into 3 categories: decreased (highly decreased and somewhat decreased), no change, and increased (highly increased and somewhat increased). PPE access was categorized as no problem (0), small problem (1), or big problem (2); we collapsed small or big problems into one category. Descriptive statistics about participant demographic characteristics, HCW perceptions of PPE access, and client volumes were calculated. The data were analyzed using STATA version 15 (StataCorp, College Station, TX, USA).

Results

Study population characteristics

Overall, we approached 194 HCW for participation in this study; 188/194 (97%) received survey links for participation, of whom 181/188 (96%) completed the surveys. A subset (99/181 [55%]) of participants were working in a facility at the time of survey completion and were included in this analysis (Supplemental Figure 1). The median age was 34 years (interquartile range [IQR]: 30–40), and 66% were female. HCWs had a range of roles; the

Table 1. Demographics of participants

	n (%) or Median (IQR)	
	Currently Working at Facility (N = 99)	Not Working at Facility (N = 82)
Female	65 (66%)	49 (60%)
Age	34 (30, 40)	31 (29, 36)
Employment classification		
Clinical Officer	21 (21%)	1 (1%)
Nurse	39 (39%)	45 (55%)
Counselors	13 (13%)	17 (21%)
Facility or Department in-charge	21 (21%)	10 (12%)
Other	5 (5%)	9 (11%)
Work location		
MCH	23 (23%)	42 (51%)
FP	1 (1%)	0 (0%)
MCH and FP	40 (40%)	29 (35%)
Youth friendly services	1 (1%)	1 (1%)
HIV care clinic	21 (21%)	3 (4%)
Other	13 (13%)	7 (9%)
Time at current clinic (years)	3.3 (1.5, 5.3)	2.0 (1.0, 2.8)
Experience providing care to pregnant or postpartum women (years)	5.3 (3.5, 10.4)	3.5 (2.3, 5.0)
Experience providing PrEP (years)	3.0 (2.2, 3.5)	2.0 (1.2, 2.7)
Received special training for providing PrEP to pregnant or postpartum women	56 (57%)	67 (82%)

FP = family planning; IQR = interquartile range; MCH = maternal and child health; PrEP = pre-exposure prophylaxis.

most common were nurses (32%), clinical officers (21%), and facility in-charges (16%). Twenty-three percent of the HCWs were working in MCH clinics, 40% both in MCH and FP clinics, and 21% in HIV care clinics. The median years of experience in providing care to peripartum women was 5.3 years (IQR: 3.5–10.4) and the median years of experience in providing PrEP was 3.0 years (IQR: 2.2–3.5) (Table 1).

Perception of HCWs on client volume and balance of responsibilities during COVID-19

HCW reported decreases in the number of women seeking antenatal care (62%) and postnatal care (66%) services, as well as the volume of women willing to start PrEP (60%) and continue PrEP (57%). Changes in the impact of COVID-19 on service delivery and waiting times were

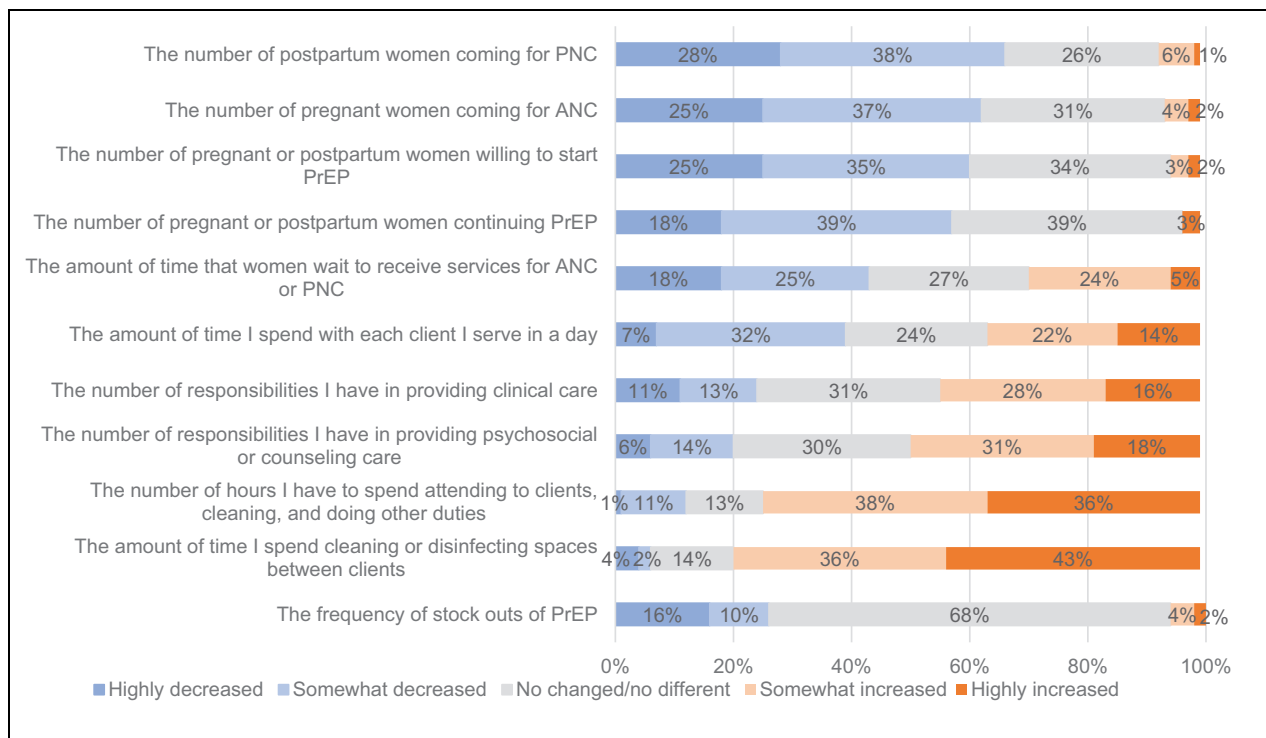


Figure 1. Perception of health-care workers (HCWs) on client volume, responsibilities, and stock outs during COVID-19.

variable. While 39% of HCWs reported decreased client service time, 36% reported increased service time. While 43% of HCW reported decreased client waiting time, 29% reported increased waiting time. About two-thirds (68%) reported that there was no change in the frequency of stock outs of PrEP medication because of COVID-19 (**Figure 1**).

HCWs reported that several activities increased substantially. Forty-four percent of HCWs reported that there was an increase in the number of clinical responsibilities they had and 49% reported an increase in psychosocial care responsibilities. The amount of time HCW spent cleaning or disinfecting spaces between clients reportedly increased (reported by 79%). Three-quarters (74%) of HCWs reported increases in the number of hours they spent attending to clients, cleaning, and doing other duties.

Access to appropriate PPE

Some commodities were less challenging to access. More than half of HCWs reported no challenges in accessing gloves (57%), hand sanitizers (55%), soap (69%), and cleaning/disinfecting products (57%) (**Figure 2**). However, small or big problems were reported in accessing respiratory masks (71%), face shield and goggles (60%), gowns (58%), and surgical masks (54%). Powered air purifying respirator was not frequently used (not applicable: 54%) by HCWs, although 42% of HCWs reported problems in accessing it.

Reuse of N95 and KN95 masks was very common with 56% of HCW reporting reusing a single mask when attending to all patients, while just 2% reported having sufficient masks to use one per patient (**Figure 3**).

Discussion

This study revealed challenges HCW face in accessing PPE, perceptions of reduced client volumes, and reported shifts in clinical and non-clinical responsibilities for HCW during the COVID-19 pandemic in Kenyan hospitals. HCW reported decreases in the number of clients seeking antenatal or postnatal care and PrEP for HIV prevention services. They also reported mixed experiences with waiting and service delivery time, but highlighted increases in clinical, psychosocial care, and decontamination and cleaning activities. The study highlighted shortages in some PPE, including respiratory masks, face shields, and goggles, gowns, and surgical masks, despite strong government effort to supply PPE.

The decline in the number of women seeking different MCH services could have been attributed to the Kenyan government's measures to curb the spread of COVID-19, including travel restrictions, bans on public gatherings, and social distancing [11]. The findings of this study concur with the findings of a systematic review that concluded that the pandemic reduced the utilization of antenatal care services among pregnant women [12]. One study in Saudi Arabia noted that a third of women missed at least one antenatal care appointment during the COVID-19 pandemic [13]. The peripartum period is a critical period for MCH care; gaps in service delivery can lead to increases in neonatal mortalities, stillbirths, and maternal stress, as demonstrated by a recent systematic review on the effects of the COVID-19 pandemic on maternal and perinatal outcomes [3] and a separate study in a multinational cohort [14]. In addition to antenatal care, the COVID-19 pandemic led to decreased

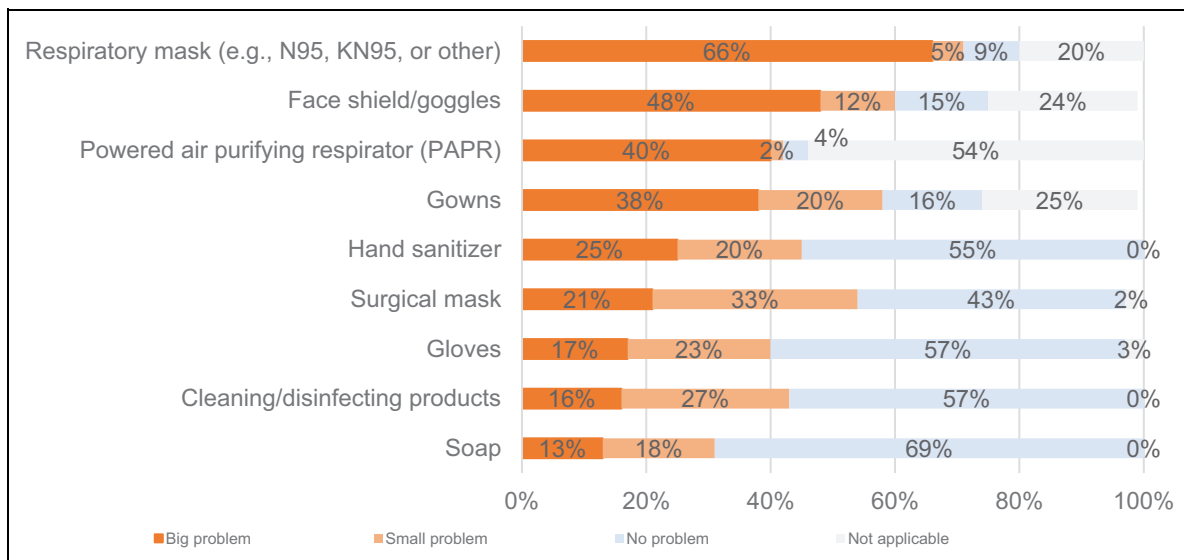


Figure 2. Access to appropriate personal protective equipment (PPE).

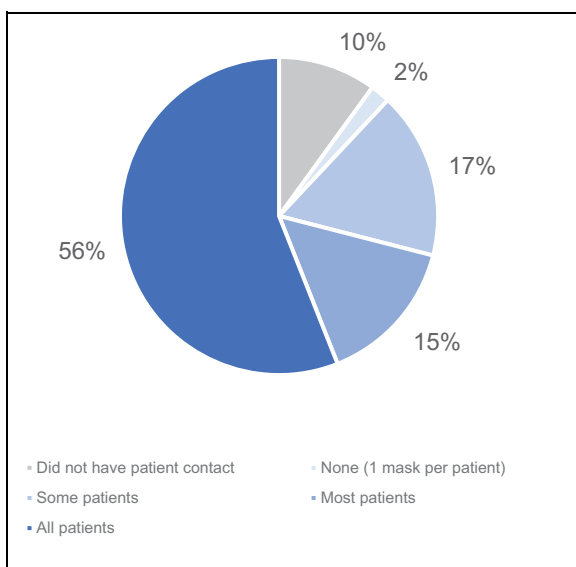


Figure 3. Personal protective equipment (PPE) reuse.

numbers of clients seeking postnatal care and child welfare care services. According to the World Health Organization, there has been a continued decline on global vaccination coverage with over 25 million infants missing out on lifesaving vaccines during that period [15], which could lead to decrease in quality of life, outbreak of vaccination preventable diseases, and a decrease in infant life expectancy.

In addition to the normal delivery of essential health services, HCWs were required to identify and manage potential cases of COVID-19 as soon as possible and avert the risk of transmission to contacts and HCW, as well as support the provision of vaccination services against SARS-CoV-2. Recent studies have shown that COVID-19 resulted in increased psychological stress and fear of contracting the virus among HCWs [16]. The unavailability of PPE for HCWs caring for people with other serious infections has been shown to be a significant source of physical and

psychological stress for HCWs and their close contacts [11]. As the COVID-19 pandemic accelerated, global health systems were overwhelmed with potentially infected patients seeking testing and treatment. The use of PPE such as gloves, face masks, air-purifying respirators, goggles, face shields, respirators, and gowns are effective in preventing the spread of infection between HCW and patients [2]. Despite Kenyan governmental efforts to increase supply to meet the new demand shortages were notable in this study.

In our study, HCWs were able to complete surveys anonymously, provide honest feedback start, and complete surveys at their own convenience. Online surveys also minimized the spread of COVID-19. Our biggest limitation is that we used self-report on all client volume and time items, which are subject to several sorts of bias compared to direct measurement. Only HCWs who were providing care during the time of this study completed surveys, thus limiting the sample size. Some HCWs were unable to complete the surveys due to internet challenges in remote areas. While HCWs reported increases in psychosocial care responsibilities, we did not evaluate how this affected their service delivery or mental health. These study results may be less generalizable to other regions; the facilities selected for participation in research tend to be better resourced compared to other facilities in a region, similar to recent findings from our own prior studies [17]. In addition, the evolution of COVID-19 pandemic led to changes in practices and protocols that may leave these results less applicable to the current day.

In conclusion, health services faced multifaceted challenges because of the COVID-19 pandemic. These challenges ranged from reduced access to maternal and child services and care, to treatment and prevention. With the reported dual burden of PPE shortages and increased responsibilities to meet the psychosocial needs of clients, HCWs were limited in their own physical and mental protection during the pandemic.

Data accessibility statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Supplemental files

The supplemental files for this article can be found as follows:

Supplemental Material_Figure.docx

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Competing interests

The authors have no conflicts of interest to declare.

Author contributions

ADW, JK, and GJ-S were the study principal investigators. NN, FA, JCD, LG, ADW, JK, and GJ-S designed and supervised protocol implementation. JS, FA, and BO coordinated data collection, conducted by GO and ES. JS conducted data cleaning and analysis, supervised by JCD and ADW. JS wrote the first draft of the manuscript. All authors contributed to the article and approved the submitted version.

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