



Perceptions of health care workers on maternal and child health services in Pakistan during COVID-19: A cross-sectional study

Jamil Ahmed ^a, Ramesh Kumar ^{b,e,*}, Vikram Mehraj ^b, Amer Almarabheh ^a, Sadiq Ali Khowaja ^c, Shahzad Ali Khan ^b, Nawal Naeem ^d, Sathirakorn Pongpanich ^e

^a Department of Family and Community Medicine, College of Medicine and Medical Sciences, Arabian Gulf University, Bahrain

^b Department of Public Health, Health Services Academy, Islamabad, Pakistan

^c Department of health, Government of Sindh, Pakistan

^d Fellow Public Health, Health Services Academy Islamabad, Pakistan

^e College of Public Health Sciences, Chulalongkorn University, Thailand

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ABSTRACT

Background: Maternal and child healthcare service delivery in vulnerable and fragile health systems has suffered a tremendous impact owing to the shift in focus to curtail the COVID-19 pandemic. We aimed to evaluate the impact of the COVID-19 pandemic on maternal and child healthcare services to inform policy advice for a more resilient maternal and child healthcare service delivery in Pakistan.

Methods: A descriptive cross-sectional study was conducted. A structured and validated questionnaire was transformed into an online version and a link was first sent to about 300 healthcare professionals to achieve a sample size of 203, including medical doctors, nurses, and other paramedical staff working in public sector health facilities of the four provinces of Pakistan. The questionnaire was responded to by 195 participants. The Chi-Square test was used to determine the statistical differences between the categorical variables.

Results: Although about two-thirds of the participants reported a moderate adherence to protocols and procedures to prevent COVID-19 in their health facilities, the maternal and child health service delivery-related indicators declined during the pandemic. For instance, 66.8% and 62.4% of the participants, respectively, did not agree that a Neonatal Intensive Care Unit and an Intensive Care Unit to admit sick newborns and women with obstetric complications during the COVID-19 pandemic were available during the COVID-19 pandemic. In addition, 23% and 20% of the participants, respectively, reported that staff availability and the provision of cesarean section were moderate to extremely affected. The association between job designation and the impact of COVID-19 was statistically significant ($\chi^2 p = 0.038$).

Conclusions: The study suggests that maternal and child healthcare services including C-Section, perinatal care, and inpatient care of newborns in Pakistan may have been moderately affected by the COVID-19 pandemic.

1. Introduction

During the acute phase of the COVID-19 pandemic, maternal and child health care (MNCH) service coverage has been disrupted or diminished owing to the unprecedented burden upon health staff and resources, including those necessary for infection prevention and control. MNCH services consist of antenatal, childbirth and postnatal care, including emergency obstetric and newborn care, normal and emergency care of women and babies around birth by skilled birth attendants, immunization, care of sick newborns and children under five years of age [1]. Additionally, the reduction in demand for and access to quality healthcare around birth has also been a major challenge to coverage of MNCH services during the pandemic [2].

The staff and other resources were either repurposed, redeployed, or prioritized for COVID-19-related service delivery. Although high-income countries reported a negative impact on the quality of maternal and newborn care [3] or maternal health indicators like a higher rate of gestational diabetes and pregnancy-induced hypertension during the pandemic [4], this impact has been harder on the countries with fragile and under-financed healthcare systems; for instance, some estimates of the impacts of COVID-19 indicate a 38.6% and 44.7% increase in maternal and child mortality, respectively, per month in 118 low- and middle-income countries [5]. Fear of physical proximity and contracting the virus among healthcare providers may limit or alter provision of care to mothers and their children. It has been reported that social distancing and the fear of spreading the virus

* Corresponding author at: Health Services Academy, Islamabad, Pakistan.

E-mail addresses: jamilnga@agu.edu.bh (J. Ahmed), drramesh1978@gmail.com (R. Kumar), Sathirakorn.P@chula.ac.th (S. Pongpanich).

may lead health workers to deny laboring mothers an outside birth companion or to separate newborns from mothers after birth [6,7].

Pregnancy cannot be postponed and essential care for every newborn including immediate skin-to-skin contact and early initiation of breastfeeding require close bonding between mothers and their newborn babies; any gaps in such bonding are associated with poor mental health outcomes in mothers [7,8]. This is especially critical for pre-term, underweight, and small babies whose survival relies on the practice of Kangaroo Mother Care, which includes – among other practices – early, continuous, and prolonged skin-to-skin contact between the mother and the newborn. Kangaroo mother care has shown to help reduce neonatal mortality regardless of the gestational age or neonatal weight; with studies concluding that duration must be at least 8 h a day [9]. Government-ordered curfews and lockdowns may prevent or inhibit women's access to routine antenatal care or emergency care or may cause them to give birth at home without the support of a trained midwife or health worker [10,11]. Not only that, but economic hardships from lost jobs and livelihoods limit financial access to health facilities [12]. All this disruption has been associated with an increase in maternal and child mortality, particularly in low- and middle-income countries. Our most severe scenario (coverage reductions of 39.3–51.9% and wasting increase of 50%) over 6 months would result in 1,157,000 additional child deaths and 56,700 additional maternal deaths [13].

Recent studies have evaluated the disruption of MNCH services during the pandemic and its impact on mothers, children, and their families [14–16]. For instance, in India most affected services were antenatal care services which faced a decline of 23% [14], whereas in Mozambique, the family planning and cesarean birth services dropped by 28% [15]. African regions mostly in South Asian and African regions, have reported wide-ranging disruptions to the delivery of the MNCH services impacting child and maternal health and survival for durations ranging from at least a month to several months. This disruption has particularly badly affected outpatient consultations for women and children, as well as childhood immunization. A study from Africa estimated 5.1 million outpatient consultations and 328,961 third-dose pentavalent vaccinations were missed during a five-month duration of the pandemic [16]. Other areas of MNCH services which suffered during the pandemic include facility births, and antenatal and postnatal care [16]. Most of these services were also affected in Pakistan in 2020. For instance, a study reported that treatment of children with pneumonia dropped by 82%, and cesarean sections declined by 57% during January–May 2020, or at the time of the first wave of COVID-19 compared to pre-pandemic levels [17].

It is essential to determine how pandemics and health emergencies pose significant risks to the routine MNCH services in the fragile healthcare systems of low- and middle-income countries. This type of investigation into how healthcare systems continue to function in the face of severe disruptions to service delivery and coverage may assist countries in developing evidence-based policies and, ultimately, interventions to create resilient and better-prepared systems [6,18,19]. In this study, we approached frontline healthcare workers to determine the impact of the COVID-19 pandemic on maternal and child healthcare services in Pakistan. We targeted frontline healthcare workers in this assessment as we expected them to provide most reliable opinion about the disruptions to services and any impact on the maternal and child health because their key role as maternal and child healthcare service delivery in Pakistan.

2. Methods

2.1. Study design

We conducted a cross-sectional study based on a modified version of a validated structured questionnaire (rapid online global survey of maternal and newborn health professionals facing the COVID-19 pandemic) [20] to evaluate the impact of the COVID-19 pandemic on maternal and child healthcare services.

2.2. Study setting

The study was conducted from April 2021 to March 2022 using an online questionnaire where a link was sent to the eligible study participants through a local research team in Pakistan. The first COVID-19 wave peaked in June 2020, and cases started climbing again in Pakistan, the government announced a second wave of COVID-19 on October 28, 2020 [19,20]. There were 245,987 registered medical doctors, 27,360 registered dentists, and 116,659 registered nurses in 2020. In the country, 92,949 Lady health workers are deployed at the community level providing maternal and child health services involved in COVID-19 [21]. The medical and paramedical staff in both public and private sector health facilities in the country were eligible to participate in the study. In Pakistan, although about three-quarters of the population seeks care from the private sector, the main maternal and child healthcare service providers in rural areas are public healthcare facilities, including Basic Health Units, Rural Health Centers, and Taluka and district hospitals.

2.3. Study population

Our study population consisted of healthcare workers from various health facility departments, such as outpatients, maternal child health, pediatrics, and other in-patient departments directly involved in the care of pregnant and postpartum patients, as well as newborns and children. Workers from all four provinces of Pakistan were invited to participate in the study. The study sample is calculated using the formula for the simple random sampling approach $\frac{Z^2 \cdot P(1-P)}{E^2}$, where $Z = 1.96$ (95% C.I.), $P = 15.6$ (Expected proportion in population [21]), $E =$ margin of error = 0.05. The total estimated sample size was 203 participants. We received the data from 203 participants. Among them, 8 participants provided incomplete data. Therefore, those responses were not included in the final sample. Hence, the final sample for the analysis turned out to be 195.

2.4. Data collection

Healthcare workers from all four provinces of Pakistan were invited to participate in the study. We used existing email addresses of all cadres of healthcare workers available with the corresponding author from the previous training project on COVID-19 after receiving administrative permissions. Reminders were sent through emails and later by mobile phone text messages where the numbers were available. We used a validated structured data collection tool in English language to design the online survey [20]. This pre-tested survey of maternal and newborn health professionals collected data on demographic information and opinions of study participants about how various aspects of maternal and child healthcare service delivery were impacted during the COVID-19 pandemic. The validated rapid online global survey of maternal and newborn health professionals facing the COVID-19 pandemic was modified according to local culture and healthcare system. For instance, the list of service cadre and designations were edited, and geographical locations were added. We conveniently approached the participants and requested that they answer the questionnaire to the best of their knowledge. Data collection was stopped when no further responses were contributed by the potential participants over a two-week period. Thereafter, we relied on the existing sample to analyze the data, addressing our study objectives. The participants were also asked about their perceptions of limitations to the delivery of maternal and child healthcare services during the pandemic, testing their agreement on items using a 5-point Likert scale. When asked to what extent various MNCH services were impacted during the pandemic, the health professionals rated the impact by selecting the options from a Likert scale of extremely, moderately, slightly, somewhat affected, and not affected at all.

2.5. Data analysis

Responses recorded in the online form were exported to Microsoft Excel (Excel Version 2016) and then into the Statistical Package for Social Sciences version 28 (IBM, USA) for analysis. Descriptive statistics were used to summarize the sample characteristics, where categorical variables were presented as frequency and percentage, and continuous variables were presented as mean and standard deviation. A cluster bar chart was used to present a categorical variable. Inferential statistics were used to determine the significance of statistical differences across participant characteristics within affected versus not affected health facilities and services. The Chi-Square test was used to determine the degree of association between the categorical variables. A *p*-value of less than 0.05 was considered statistically significant. Opinions of healthcare workers were assessed using a 5-point Likert scale (good, fair, poor). We used five questions, and one mark was awarded for a correct answer to any of the five questions. Four or five marks were considered good knowledge, three marks were fair knowledge, and fewer marks were considered poor knowledge.

3. Results

3.1. Socio-demographics data

Overall, 195 individuals participated in the study, therefore the response rate was 96%. We received a higher response rate from the province of Sindh. Most healthcare providers who responded worked in public healthcare facilities. The mean age of participants was 37.4 ± 9.7 years, and more than half of the participants (51.3%) were females. Most of the respondents were between the ages of 30 and 40 years (31.3%), followed by those aged less than 30 years (29.7%), 40–50 years (29.2%), and over 50 years (9.7%). Regarding years of working experience, one-third of the participants reported 4–10 years of experience, 23.6% reported less than four years, 23.1% reported 11–15 years of experience, and 20% reported more than 20 years. Most of the participants were from Sindh (63.1%), followed by Punjab (12.8%), Khyber Pakhtunkhwa (10.8%), Baluchistan (6.7%), and Islamabad (6.7%). Among those who were employed, more than half of the respondents (53.3%) were physicians, and about 23.6% were nurses. Regarding participants' type of facility, 35.9% were primary health care centers, 33.8% were tertiary care hospitals, and 30.3% were secondary health care centers. Most of the participants (84.6%) indicated that their work was affected by COVID-19 (Table 1).

More than 80% of the healthcare providers reported that their work was affected during the pandemic. There were no statistically significant differences across gender, age group, current province or city of work, years of practice, or type of health facility as most of these participants reported their work was equally affected ($P \geq 0.05$). Nurses, medical students, and physicians reported more impact on their work during the COVID-19 pandemic compared to the work of pediatricians (specialist cadre providing clinical services to children only) (95.7%, 84.6%, and 83.7% vs. 61.5%). The association between job designation and the impact of COVID-19 was statistically significant ($\chi^2 p = 0.038$) (Table 2).

Further analysis showed that the majority of the participants (84.9%) said that healthcare staff in their health facilities answered patients' questions about the COVID-19 pandemic, and 77.9% of the participants reported that healthcare centers provided appropriate instructions to pregnant women. More than three-quarters of the participants (76.9%) indicated that they had been provided with appropriate training on how to deal with the COVID-19 pandemic, and 73.9% of the participants agreed that the routine cleaning of the maternity ward has been revised in response to COVID-19. Two-thirds of the participants (66.3%) indicated that the working staff was wearing N95 masks during COVID-19; 60.8% of the participants agreed that the facilities received maternity referral cases in the COVID-19 situation; and 59.8% of the participants reported that the facility reserved isolation rooms for COVID-19 suspected cases. More than half of the participants (55.9%) agreed that the facility set up a well-signposted general entrance and screening area for COVID-19 suspected cases. More

Table 1

The sociodemographic characteristics of the health professionals participating in the study.

Characteristic	n (%) (n = 195)
Gender	
Male	95 (48.7)
Female	100 (51.3)
Age group (mean = 37.39 ± 9.68 years)	
<30 Year	58 (29.7)
30–40 Year	61 (31.3)
40–50 Year	57 (29.2)
> 50 Year	19 (9.7)
Years of Work Experience (mean = 9.95 ± 7.50)	
< 4 years	46 (23.6)
4–10 years	65 (33.3)
11–15 years	45 (23.1)
> 15 years	39 (20)
Current place of work	
Baluchistan	13 (6.7)
Islamabad capital territory	13 (6.7)
Khyber Pakhtunkhwa	21 (10.8)
Punjab	25 (12.8)
Sindh	123 (63.1)
Job designation	
Consultant gynecologist	19 (9.7)
Physician excluding pediatricians	104 (53.3)
Medical student	13 (6.7)
Nurse	46 (23.6)
Pediatrician	13 (6.7)
Type of facility	
Primary Health Care	70 (35.9)
Secondary Health Care	59 (30.3)
Tertiary care hospital	66 (33.8)
Work affected (COVID-19)	
Yes	165 (84.6)
No	30 (15.4)

than two-thirds (66.8%) of the participants did not agree that the facility had a neonatal intensive care unit during the COVID-19 pandemic. Finally, 62.4% of the participants indicated that their facility did not have an intensive care unit to admit women with obstetric complications during the COVID-19 pandemic (Table 3).

About half of the participants ranked the impact of the services from slightly to somewhat affected; a quarter said they were not affected at all. However, participants reported a higher impact on some services than others. For instance, 23% and 20% of the participants rated, respectively, staff availability and the provision of C-sections as moderate to extremely affected. A quarter (24.6%) of the participants reported a moderate or extreme impact was whether health professionals felt that they were sufficiently protected from infection with COVID-19 in their workplace (Fig. 1).

4. Discussion

This study aimed to document the opinions of healthcare workers about their experience of disruptions observed at MNCH services during the COVID-19 pandemic in Pakistan. The study found that more than 80% of the healthcare workers opined that their work was affected by the pandemic. This was equally reported by male and female healthcare workers in all groups, with diverse years of practice, from almost all health facilities in the country. This study also found that most (84.9%) healthcare staff were able to answer their patients' questions about the COVID-19 pandemic in their health facilities, and three-quarters of the healthcare workers believed that their healthcare centers provided appropriate instructions to pregnant women. More than three-quarters of the participants (76.9%) indicated that they had been provided with appropriate training on how to deal with the COVID-19 pandemic, and 73.9% of the participants agreed that the routine cleaning of the maternity ward has been revised in response to COVID-19. More than two-thirds (66.8%) of the healthcare workers said that their facility did not have a dedicated neonatal intensive care unit during the COVID-19 pandemic; additionally, 62.4% of the facilities did not

Table 2
Comparison of socio-demographic characteristics of the health professionals by the impact of COVID-19 on work.

Variables	Work affected due to COVID-19		P value
	Not affected n (%)	Affected n (%)	
Gender			
Male	17 (17.9)	78 (82.1)	0.344
Female	13 (13)	87 (87)	
Age group			
<30 Year	11 (19)	47 (81)	0.730
30–40 Year	7 (11.5)	54 (88.5)	
40–50 Year	9 (15.8)	48 (84.2)	
> 50 Year	3 (15.8)	16 (84.2)	
Years of practice			
< 4 years	9 (19.6)	37 (80.4)	0.668
4–10 years	9 (13.8)	56 (86.2)	
11–15 years	5 (11.1)	40 (88.9)	
> 15 years	7 (17.9)	32 (82.1)	
Current province/city of work			
Baluchistan	2 (15.4)	11 (84.6)	0.168
Islamabad capital territory	1 (7.7)	12 (92.3)	
Khyber Pakhtunkhwa	3 (14.3)	18 (85.7)	
Punjab	8 (32)	17 (68)	
Sindh	16 (13)	107 (87)	
Sindh	16 (13)	107 (87)	
Job designation			
Consultant gynecologist	4 (21.1)	15 (78.9)	0.038*
Physician (Medical doctors excluding pediatricians)	17 (16.3)	87 (83.7)	
Medical student	2 (15.4)	11 (84.6)	
Nurse	2 (4.3)	44 (95.7)	
Pediatrician	5 (38.5)	8 (61.5)	
Type of facility			
Primary Health Care	13 (18.6)	57 (81.4)	0.581
Secondary Health Care	9 (15.3)	50 (84.7)	
Tertiary care hospital	8 (12.1)	58 (87.9)	

* = $p < 0.05$.

have an intensive care unit for women with obstetric complications during the COVID-19 pandemic. In response to the severity of the impact, about a quarter (23%) and 20% of the healthcare workers, respectively, opined that staff availability and the provision of C-sections suffered moderate to extreme impact.

We report that although about three-fourths of the participants considered that their health facilities adhered to COVID-19-related health precautions and guidelines and were responsive to mothers and their newborns in providing COVID-19-related care or information, most responded that their health facilities did not have intensive care services for sick newborns or mothers during the pandemic. This supports the findings from a study from India, which compared data before and after the pandemic, showing a decline of about 23% in institutional births, antenatal care, and immunization which are essential maternal and child healthcare services [14]. Our results contrast with what Semaan, A. et al. reported

from the sub-Saharan African region, where the healthcare system seemed to be more resilient in the face of the pandemic-related shocks. They reported a sustained availability of maternal care in referral hospitals that ensured that the care for the women and their babies was prioritized and did not suffer a negative impact [22].

The responses of health professionals to how negatively MNCH services were affected in their health facilities revealed a mixed pattern of response, with about a quarter of the healthcare workers reporting that services were either slightly or somewhat affected, and reported that staff availability (23%) and C-section provision (20%) were extremely or moderately affected. Specifically, 66.8% of the healthcare workers said that their facility did not have a dedicated neonatal intensive care unit and, 62.4% said their facilities did not have an intensive care unit for women with complications at birth. Staff shortages are linked to an inability to provide emergency obstetrical and newborn care services [6]. Also, availability of C-section and specialized care facilities for neonates and mothers at birth are crucial to save lives [23]. Other studies from low and middle-income countries found a similar pattern in the decrease in the availability of C-section services. Compared to a reported moderate to extreme impact of 20% on C-sections in our study, in Mozambique, for instance, c-sections declined by 28% during the pandemic, which is comparable to the findings from our study [15]. In yet another study that included district-level data from 13 sub-Saharan African countries, inpatient admissions showed the greatest reduction (17.0%) during the pandemic compared to the rest of the services, indicating that the care required for sick newborns and mothers around birth may have been considerably impacted [24]. However, there has been evidence of resilience by some healthcare systems to cope with the COVID-19-induced shocks to c-section provision. For instance, a study that assessed the resilience and vulnerability of maternal health services in Zimbabwe showed that although hospital bookings for pregnant women slightly decreased, the c-section provision did not change significantly from the pre-COVID-19 period. For instance, this study also showed that staff availability also did not change from before to during the pandemic [25].

It is also possible that these service delivery shortfalls may have compromised access for pregnant women and those with babies because of the fear of catching COVID-19 when visiting the health facilities. This is supported by a study that showed that 74.7% of pregnant women are afraid of contracting COVID-19 from public health facilities [26]. A study from Pakistan showed that compared to pre-pandemic levels, 33% fewer patients visited primary healthcare facilities in a typical month during the pandemic [21]. Studies have consistently shown that the burden of MNCH morbidity and maternal and child mortality may have increased during the pandemic [2,13,27]. However, in some countries the impact has been limited by organized efforts of healthcare systems; for instance, a study from Bangladesh reported a little impact on access to MNCH services, which shares similarities with the healthcare system of Pakistan [23]. Access to the MNCH service may also have diminished unequally for women in vulnerable communities, as a study with a refugee population in

Table 3
Health Professionals' opinions of the availability of services and staff related to MNCH in health facilities.

Description of services at the health facilities*	Yes n (%)	No n (%)
Facility has an intensive care unit (ICU) which can admit women with obstetric complications in the COVID-19 situation.	70 (37.6)	116 (62.4)
Facility has a neonatal intensive care unit (NICU) in the COVID-19 situation	62 (33.2)	125 (66.8)
Facility receives maternity referral cases in the COVID-19 situation	110 (60.8)	71 (39.2)
Feel that patients' questions about COVID-19 are being answered adequately by staff.	157 (84.9)	28 (15.1)
Facility set up a well sign-posted general entrance and screening area for COVID-19 suspected cases	109 (55.9)	78 (44.1)
Facility reserved isolation rooms for COVID-19 suspected cases	110 (59.8)	74 (40.2)
Routine cleaning of the maternity ward changed in response to COVID-19?	144 (73.9)	51 (26.1)
Working in emergency / Triage area, staff was wearing N95 Masks	118 (66.3)	60 (33.7)
<i>Description of staff at the health facilities</i>		
Staff was provided any training on COVID-19	150 (76.9)	45 (23.1)
Facility implemented COVID-19 guidelines for women's care during pregnancy	152 (77.9)	43 (22.1)

* The Yes and No in the columns are for the N and percentages for the items in the rows.

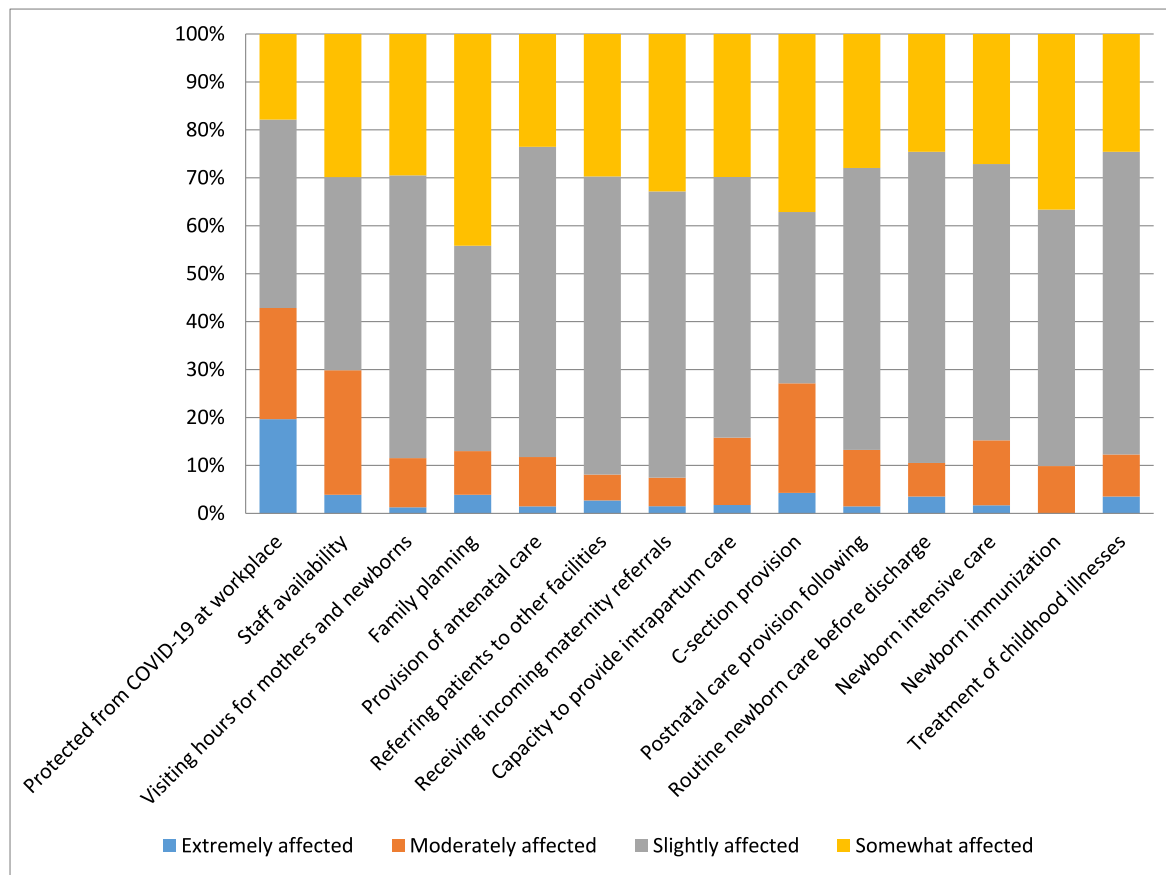


Fig. 1. Health professionals' responses of how negatively the MNCH services were affected in their health facilities.

Kenya reported that more women had to give birth at home during the pandemic [28].

Recent evidence suggests that these disruptions in MNCH service delivery resulting from pandemics are avoidable with existing interventions. These successful interventions such as the development of updated policy guidelines by some countries have prevented major disruptions to MNCH service delivery. For example, a recent review identified that preserving quality care for pregnant women around birth and afterward has been possible for countries like Kenya, Mozambique, Uganda, and Zimbabwe, which like Pakistan have had a high burden of maternal and child morbidity and mortality. The review showed a pattern of resilience as depicted in the policy guidelines listing antenatal and intrapartum care, family planning, and immunization as essential services during any pandemic [6]. A study documented these interventions and highlighted the importance of implementing virtual patient encounters, improved patient triaging, dedicated maternity centers, or maternity schools; however, these interventions have not been effective [18]. Therefore, it is critical that these policy guidelines are implemented using evidence-informed interventions to ensure a resilient and quality maternal and child healthcare service delivery [18]. Also considering the contextual factor such as local resource availability is crucial to develop any interventions for MNCH service improvement during pandemics [29].

5. Strengths and weaknesses

The use of a structured, validated tool and the de-identified responses from frontline health workers are strengths of this study. The study also had some limitations. These included non-random sampling using an online questionnaire where it is expected that the participants may respond from a non-representative population, which may indicate that results could be cautiously generalized. Another limitation was a

low response rate (as we originally invited about 500 participants) resulting in small sample size. Considering these limitations, we expect that although the findings from our study are suggestive of a perceived impact on MNCH service delivery, it may not be the experience of all the healthcare workers.

5.1. Conclusions and implications

MNCH services in Pakistan seemed to have been moderately affected by the COVID-19 pandemic. Although 84.9% healthcare staff were able to answer their patients' questions about the COVID-19 pandemic in their health facilities, and three-quarters responded that their healthcare centers provided appropriate instructions to pregnant women, more than 80% of the participants found their work was affected by the pandemic. The study also concluded that 66.8% facilities lacked a dedicated neonatal intensive care unit and 62.4% of the facilities did not have an intensive care unit for women with obstetric complications during the COVID-19 pandemic. Lastly about a quarter of the participants believed that staff availability and the provision of C-sections suffered moderate to extreme impact during the pandemic.

We recommend that to avoid such a high impact on healthcare workers' work during the COVID-19 pandemic, pandemic preparedness needs to be implemented and must include strategies to protect MNCH services in the face of shocks to enable a resilient and sustainable healthcare service delivery system. We also recommend the establishment of intensive care units for neonates and women requiring specialized care around birth where they are not currently available or accessible to catchment populations. Further research is required to understand the long-term impact of the COVID-19 pandemic on maternal and child health and to measure the availability of MNCH services, especially emergency and specialized care services around birth post-COVID-19.

Ethical approval

This study was approved by the Institutional Review Board of Health Services Academy, Islamabad Pakistan (7–82/IERC-HSA-2020-22).

Authors' contributions

JA conceptualized this study; AA, NN analyzed the data and VM, and SP contributed to drafting and critically revising the manuscript. SK, RK, and SAK were involved in data collection, and they revised the manuscript. FA revised the manuscript. All authors read and approved the final manuscript.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Ramesh Kumar reports statistical analysis and writing assistance were provided by Health Services Academy. Ramesh Kumar reports a relationship with Health Services Academy that includes: employment. NA.

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