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ORIGINAL RESEARCH

Effect of COVID-19 Pandemic on Maternal and Child Health Services and Strategies for Effective Service Implementation in Ethiopia

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Introduction: The COVID-19 pandemic is a global burden to the Health sector of developing countries. However, the effect of COVID-19 on maternal and child health services is scarce and no evidence was documented in the Ethiopian context. Hence, this particular study aimed to examine the effect of the pAndemic and to identify effective strategies in Ethiopia.

Methods: Both quantitative and qualitative approaches were applied. For the qualitative, 74 study participants were considered. Study participants were selected purposively and interview guide was used to collect data. Finally audio records were transcribed verbatim, coded and analyzed thematically. For the quantitative, data were extracted from the DHIS2 reports to assess the trend over time.

Results: The qualitative findings indicated that the pandemic affected the MNCH services to be inaccessible and low quality. The trend analysis also showed that the COVID-19 has disrupted MNCH services particularly in the first two months Of the pandemic. Health workers also faced a scarcity of personal protective equipment, work overload and shortage Of resources during the pandemic. As a cope up strategy, the Health system at all levels has established a COVID-19 task force supported by a working guideline. There is also a media prevention program, establishment of quarantine at home, resource mobilization, active surveillance, availing extra ambulances and strong follow-up.

Conclusion: Multiple interventions applied to curb the pandemic have lowered MNCH service utilization. The low commitment of health workers, resources shortage and movement restrictions had a an impact on the uptake of MCH services. There should be a balance in resource utilization to COVID and other essential Health services and the government should avail the necessary supplies during the COVID era. Regionally tailored adaptive interventions are also required to improve MNCH service uptake. Extensive media advocacy and HEWs active involvement for community mobilization are also recommended.

Keywords: COVID-19, pandemic, MCH, Ethiopia, maternal and child health services

Introduction

Background

Globally, there are have been remarkable achievements in improving maternal and child health (MCH) services.[1,2] Despite these efforts, the global mortality of maternal from pregnancy-related complications were remaining extremely high with the majority of the mortality was in Southern Asia and sub-Saharan Africa (SSA). In 2020, the maternal mortality ratio (MMR) was 211 per 100,000 live births while there were around 5.3 million under five deaths.[3]

The Corona Virus Disease of 2019 (COVID-19) has been declared as pandemic situation by the World Health Organization (WHO) on March 11, 2020.[4] According to the current evidence, the COVID-19 virus is mainly transmitted through respiratory drops.[5] Likewise, the provision of MNCH services may lead to a generation of aerosols and droplets.[6]

Currently, the COVID protection approaches in routine care delivery process appear to be unsuccessful in limiting the virus spread. Along this, health workers who have been involved in the clinical area are required to take forward rigorous

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personal protective equipment for all clients and minimize or avoid physical contact that produces aerosols or droplets. With the current COVID-19 pandemic, women and children might be unequally affected by the disruption of basic health care, specifically in developing countries.[7]

Health systems in the past epidemics have attempted to ensure basic and routine health care provision.[8] As noted by the WHO, during pandemics all efforts and logistics shift to manage to the emergencies. With this, the regular and essential basic health care services are often neglected due to the existence of emergency cases.[9]

In 2014, a study conducted on Ebola epidemic showed that there was a decline in coverage in maternal health services. Similar disruptions had been observed with COVID-19. The COVID-19 pandemic and the management modalities to the disease are affecting both the health service provision and utilization of MNCH services.[10–13] MNCH services are among the priorities of the Ethiopian Health Sector Transformation Plan (HSTP) and various effective interventions are being implemented at national level. Therefore, we wanted to examine the effects of the pandemic (COVID-19) on MNCH service utilization.

Conceptual Framework

The following conceptual framework describe the possible effect of COVID-19 on MNCH service provision in Ethiopia (Figure 1).

Rationale of the Study

COVID-19 is a global burden to the health system and currently, Ethiopia has more than 200,000 COVID cases and more than 2, 900 deaths attributed to COVID-19 as of April 4, 2021. The MNCH program is also a top priority under the health sector transformation plan of Ethiopia. Now a days, the effect of COVID-19 on MNCH service provision is scarce and no evidence was documented on the effective MNCH service delivery approach adapting the pandemic in the Ethiopian context. Therefore, findings from this study will help to set new policies, strategies towards combating the undesirable effects of the pandemic on the weak health system and thus could support to sustain endeavors towards achieving the Sustainable Development Goals (SDGs) of "achieving good health and well-being for all" in Ethiopia.

General Objective

This study aimed to examine the effect of the COVID-19 pandemic on MNCH service uptake and to identify effective strategies to ensure MNCH service delivery during the pandemic in Ethiopia.

Specific Objectives

- To assess the effect of the COVID-19 on MCH services in Ethiopia.
- To identify potential barriers that hinder MNCH service delivery during the Pandemic (COVID-19) in Ethiopia.
- To identify effective strategies to maintain MNCH service delivery during the pandemic (COVID-19) in Ethiopia.

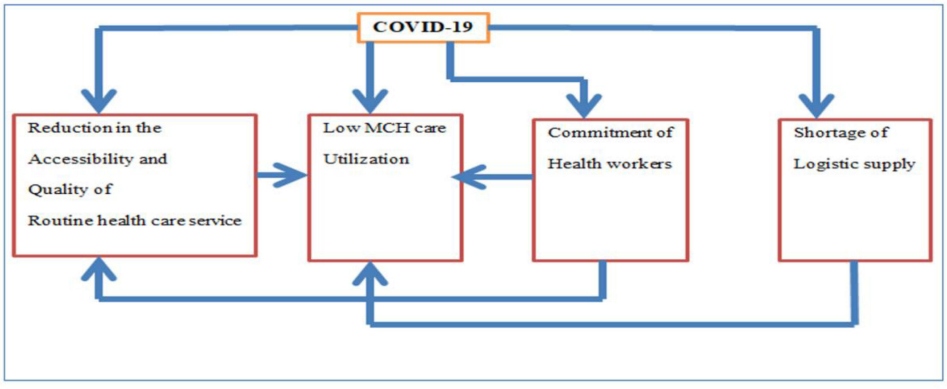


Figure 1 Conceptual map of the effect of COVID-19 on MNCH service provision in Ethiopia.

Methods

Study Design and Study Setting

Both quantitative and qualitative approaches were applied. For the qualitative study, a phenomenological study design was employed while for the quantitative study cross sectional design was applied. The study was conducted between July and December 2020.

Sample Size, Study Population and Sampling Procedures

For the Qualitative

For the qualitative study, a total of 74 study participants (50 key informants and 24 in-depth interviews) were included. In this study, four categories of participants: decision-makers, health workers, NGO delegates and clients were considered. The participating facilities included service users, MCH experts and organizational leaders at different levels, i.e., Federal Ministry of Health, RHBs, NGO delegates, woreda health office, health center, health post and community representatives. These participants were from four regions; Amhara, Tigray, Oromia, Benishangul Gumuz and two city administrations; Addis Ababa and Dire Dawa.

Key informants were purposively selected based on their position who could be asked on the behalf of their expertise regarding the issue. Purposive sampling was applied to select key informants who were in a position as MCH expert, health system heads at a different level, health extension workers and community leaders in the selected study settings. The in-depth interview participant was selected randomly among women seeking maternal and child care in the selected health facilities.

For the Quantitative

For the quantitative study, a data extraction sheet was prepared to collect data. Data on selected MCH indicators (CAR, ANC, Skilled delivery, PNC and child immunization) were extracted from national DHIS2 reports. Data were extracted for the years 2019 and 2020 national reports for selected indicators to make comparisons and trend analysis over time.

Data Collection and Analysis

For the Qualitative

A qualitative inquiry describes a phenomenon.[14–16] For this study, an interview guide was developed by the researchers and pilot-tested to assess feasibility and for refinement of the developed tool. The study participants comprised key informants at different levels and women seeking MCH services in Ethiopia.

After participants consent, the interviews were recorded. The interviews took an average of 45 minutes to complete.

The audio records were transcribed verbatim and finally translated into English. The data analysis was done using Open code 4.03 software. Framework analysis was considered during analysis to enrich validity and rigor of the analytic process.[17–20]

The collected data were triangulated with document reviews, field notes and observations to ensure the credibility and validity of the findings.

For the Quantitative

For the quantitative data, descriptive statistics and trend analysis was done using STATA version 14 software. To compare the performances before and during the COVID-19 pandemic, *t*-test was done and a significance level of 0.05 was considered.

Ethical Considerations

Approval to conduct the study was secured from the IRB of the University of Gondar. Additionally, permission letter was written to different stakeholders to support the study. During data collection, the aim of the study was elaborated for the respondents. With this, informed written consent was sought from respondents and the participants informed consent included publication of anonymized responses. Additionally, confidentiality of the collected data was ensured by the research team.

Results

Qualitative

In this study, 74 interviews were conducted at each level of the health system, of which 50 key informants and 24 in-depth interviews from the selected facilities and kebele were interviewed. Many of the KIIs were male, with in the age of 25–34 years and employed whereas the entire in-depth interview participant was female, many of them have primary education and were with the age of 25–34 years (Table 1).

The qualitative analysis revealed five themes, named as a reduction in accessibility and quality of routine health services, Low MNCH service utilization, Challenges on the commitment of health workers, Shortage in the supply of routine resources for MNCH services; and Enduring strategies designed for effective service implementation and suggested recommendation for the future as described below.

Reduction in Accessibility and Quality of Routine Health Services

In a situation without the prevention strategy for the reduction of accessibility and quality of routine health services, the participant perceived the pandemic COVID-19 to seeking routine health services to be inaccessible and low quality. The participant stated that the pandemic COVID-19 was a negative step towards dis-enabling the accessibility and quality of routine health services to seek any health care services at a health facility with bearing a burden of stress and fear.

A 38 years old MCH expert reported that:

> The routine health service was highly influenced by the pandemic COVID-19 especially during March and April most of the health facility was closed by giving emergency service only…

Another participant from the district health office reported that:

> Generally the impact of COVID-19 in all health services especially in immunization service; parents were absent from the service area due to fear, it was difficult to give services on maternal and child health because there were direction and advice given not come at health institutions, due to this the performance now achieved is low. But on the immunization service had no negative impact on performance…

Similarly, the quality of routine health services was also affected by the pandemic. As stated by many of the participants, both preventive and curative cares provided at the community and facility based care were damaged by the pandemic COVID-19.

Table 1 Socio-Demographic Characteristics of Respondents, 2020

Characteristics		Key Informants n (%)	In-Depth Interview n (%)
Total number of participants		50	24
Sex	M	30(60%)	0
	F	20(40%)	24(100%)
Age in years	15–24	5(10%)	2(8.3%)
	25–34	35(7%)	18(75%)
	≥35	10(20%)	4(16.67%)
Educational level	Primary school and below	0	22(91.67%)
	Secondary school	0	2(8.33%)
	10+	14 (28%)	0
	Diploma and above	26(52%)	0

Participant from Regional health bureau MCH focal reported that:

> The accessibility and quality of the MCH service were highly cracked by the COVID-19 pandemic i.e. poor quality with low accessibility of the usual health services…

Another participant reported that:

> The quality and coverage were affected by the pandemic. The service given was not adequate as the previous [services are given before COVID-19], the health workers were not actively involved in the routine health care services except emergency services, the community also not utilizing the health facility for MCH services…

Low MNCH Service Utilization

The designed response activities for COVID-19 compromised the facilities' capacity to deliver essential MNCH service provision in a sustainable manner. The limited access and low client flow to health facilities was attributable to the fear of being infected with COVID-19 at health facilities and due to imposed movement restrictions and health facilities dedication to serve as treatment centers for COVID-19. All MCH users significantly decreased as compared to the previous similar years and a month before COVID-19.

A Participant from the health center reported that:

> It is clearly observed that by taking similar months of the last year 2011 E.C. with 2012 E.C. there is high discrepancy b/n the MCH services i.e. the performance of all components ANC1 2011 E.C March was 106% vs. 88% 2012 E.C, ANC4 66% vs. 61%; April ANC1 87% vs. 63%, ANC4 59% vs. 50%,….All components (ANC, DS, PNC, FP) were very low during this year as compared to the last year with the same month. Home delivery was high during the pandemic as compare to before the pandemic (Before COVID February institutional delivery was 60% but during COVID March it was 56%). There is a facility that completely closes services like FP, ANC, and PNC; except emergency. The services were totally/completely closed in the city area. Generally, there is low service utilization, accessibility and coverage; and a high number of home delivery due to the pandemic effect…

Another participant from the district health office head reported that:

> Immunization performance access is measured by Pentavalent 1, in the last 12 months, the achievement of the previous year performance was over 90% similarly in this year we are evaluating immunization performance monthly and the current progress of achievement performance is over 95%.

> The Skilled delivery performance already low achievement before the COVID-19 occurrence, after COVID-19 the maternal health services follow-up activities were decreased too, currently and previous budget year achieved performance is 30%, which is a low achievement as a woreda level because Mothers are not come to health institution to give birth. Now we're working on it.

During the introduction period of the pandemic COVID-19, all health services were compromised due to fear of the pandemic. The direction given by the higher officials of the health system was also confusing the community and the health workers in the health service utilization. Due to this MCH service utilization was very low.

A participant from the health center reported that:

> There was an impact on maternal health services. "As direction on regional health bureau, mothers were not recommended to come to health institution, i.e., antenatal care visitors should not come frequently to health institutions, maximum they came once or twice only, therefore, we worked on this direction due to this service would achieve low especially Antenatal care visit 1 and 4. In our woreda still challenging and unimproved activity is home delivery; many mothers give birth at home, for different reasons. For example infrastructure and poor confidence in health institutions. We never achieve skilled delivery more than 30% before, COVID-19 made a double burden on skilled delivery service, it declined from 25% to 22%.

A report from EPI focal at the health center,

> There is an impact on immunization, clients were worried about COVID−19 due to this they did not come to health institutions and missed different services. The services are decline. For example; on maternal care services, antenatal care visit service one,

decline from 85% to 65%−60% at least it's the difference of 20% gap. The impact of COVID-19 on immunization was for about a month only, especially missing of measles vaccine at 9 months causes to increase in dropout rate in April and May…

MCH Focal person from the health center reported that:

All maternal health services are affected by COVID-19, the services after COVID-19 are decreased. For example; family planning both long-acting and short-acting before COVID-19 the contraceptive rate was over 80% now it's 70% which is declined by 10%, Antenatal care services decline by 5–10%, delivery declined by 5%, Even if we are not put a plan for home delivery, many mothers are bored at home and it's not reported, currently, health institutions(clusters) are skilled delivery performance is only 20% that means the remaining over 60–70% mothers are delivered at home and other options.

Challenges on the Commitment of Health Workers

The pandemic COVID-19 challenges the health workers capacity and commitment to provide essential and routine health service due to stigma, fear, imposed movement restrictions and departure of resources that resulted in reduced care and respect to the client in the compassionate manner, which in turn results in decreased client need for MNCH services.

A program manager from a regional level reported that:

The health workers were not actively involved in the routine activity, the community also not utilizing the health facility for maternal services…

The community was totally absent from the health facility and the health workers also not working as the previous even though there were compromising of the services…

The health workers were not giving the health services by keeping the professional ethics. The commitment to serve the community by keeping all the professional ethics was very low and compromised…

Health workers also experienced increased workload, a shortage of PPE and stigma from clients. In addition, acquiring COVID-19 and passing it to families was one of the major challenges reported by health workers.

One participant reported that:

The commitment of health workers was highly challenged and they are obligated to stop their routine activity due to frustration and lack of personal protective equipment (PPE).As any other community they have fear and frustration; lack of personal protective equipment's…makes them fear…Generally speaking, the health workers feels fear of the pandemic, lacks PPE and low commitment to serve before COVID were the major things which make their commitment under questions…

Shortage in the Supply of Resources for MNCH Services

For successful accomplishment to every health system, supplying the essential resource is mandatory. The MNCH programs were challenged with shortage of resources during the pandemic COVID-19. Some facility faces a challenge of lack of vaccine-like BCG and measles vaccine due to the pandemic COVID-19.

EPI focal person from health center reported that:

In recent times there are shortages and interruptions of BCG vaccines. We provide BCG vaccine for two weeks by sharing vaccine from other health facilities in the town but we have no BCG vaccine today onward…

Another participant reported that:

Corona cannot be a reason for the difficulty to get inputs. Of course, there was a person who was transporting vaccination inputs from the woreda. After corona, he has not been willing to resume his usual task which is transporting the inputs. The reason is that he said, "I have not paid my per-diem during the past three months…

Lack of PPE is one of the challenges raised by many of the study participants. The lack of PPE makes the health workers to feel fear in giving the health care services in a compassionate, respectful and caring manner.

MCH officer from regional health bureau reported that:

> The health workers were obligated to stop their routine activity due to frustration and lack of personal protective equipment (PPE)…As in any other community they have fear and frustration; lack of personal protective equipment…makes them fear…

Another participant from health office MCH focal:

> Generally speaking, the health workers feel fear of the pandemic, lacks PPE and low commitment to serve before COVID was the major things which make their commitment under questions…

Enduring Strategies Designed for Effective Service Implementation

With all the challenges of the pandemic, the health sector in collaboration with all other concerned stakeholders has designed different existing strategies for effective service implementation. The participants were stated that house-to-house vaccination activity by keeping the physical distance and contact with a campaign is one of the best strategies implemented to be effective in the immunization program. Whereas to be successful by maternal health services the health system at all levels has established a task force supported by a working guideline that is responsible to trace mothers for the services.

One MCH focal person from RHB reported that:

> After being familiar about the pandemic and once the community was aware those immunization site missed the service were conduct campaign; which was successful in most of the area, therefore the immunization were not that much affected by the pandemic…

Another participant from health center head reported that:

> We try to give vaccination service by keeping their physical distance and adding additional manpower to EPI department to reduce waiting time for vaccination and to avoid overcrowding. In the pre-corona time we allow up to six mothers to enter to one vaccination service room, but currently, we reduce that number to two. Besides that, we implement obligatory mask use both for health care workers and caretakers…

Woreda health office head participant reported that:

> As woreda and all cluster kebele level, we prepared a plan which is called "red micro plan", based on the plan all outreach vaccinate program is working, additional we opened a new static vaccine program which not avail this service before, this enables to vaccinate many children around health institution and minimize the missing program.

There is a media prevention program via awareness creation to solve the fear of the large community on COVID-19, the establishment of quarantine home, resource mobilization at the health facility level, making pregnant women's stay at health facilities for child delivery service if their residence is too far from the health facility, active surveillance of pregnant women, registration, availability ambulance, and strong follow-up via monitoring at the local level was few of the strategy implemented for the effectiveness of the services.

A participant who is EPI focal person from health center reported that:

> Solving the fear of COVID via the media prevention mechanism of the COVID, establishing quarantine home, solving the resource problem at the health facility, making the women whose house is very remote from the health center to stay at health facility which was completely left during the beginning of the pandemic, using the ambulance for transporting women from home to health center and back to home; there is active surveillance of pregnant women and registrations Strategy:-Strong monitoring and follow-up by themselves at the local level, fulfilling the resource…

EPI focal person from woreda health office reported that:

> Now We're Working on Creating Awareness on Community and Health Institutions to Back Normal Services…

The health extension workers and other health professionals were actively involved in the awareness creation program about the COVID-19 and other health services via different health learning materials including locally available audio-visual teaching-learning materials.

A 33 years old service user women reported that:

> Gradually the community start adapts to the pandemic and their fear for the disease reduces time to time. Moreover, the community gets health information about coronavirus through health extension workers and through different media channels…

A health center head reported that:

> The health extension workers, health officers, and health facility workers were giving health education, using montarbo on every cluster of health centers. So immunization service was back to usual activity immediately. Even the performance was low for a month, we could improve through different technical mechanisms traced the defaulted children during the pandemic, and resume their follow-up therefore the performance and service were backing to usual…

In addition to that, the participants also have suggested important recommendations that should be considered to the current pandemic (COVID-19) and for other pandemic situations we would face in the future.

The RHB MCH focal person reported that:

> Therefore all organizations (not only the health sector) should be actively involved in the MCH health services and COVID-19 prevention activity, there should be strong integrations b/n government, non-government organizations, the media and the community at large; and take over strong actions to be successful…

A health center head reported that:

> It is what I suggested before. If clients can wash their hands at the entry, if the temperature is measured and social distancing is kept, better services may be provided. For example in our health setup, it is only the mother who enters to a facility for getting services for her child and other family coming with her stays outside the facility…For future improvements of EPI service in the era of COVID 19, we have to work on the community. No matter for a child delivered at the facility since we have data, but for a child delivered out of facilities and hard to reach populations, make the community well informed of COVID 19 and how to get services with care. The government also should work on the interruption of some vaccine supplies. It is difficult to say this service is not available here once we told them to come and get such service. We better inform the community to come to health facility on walk than using transport and wear face mask in getting the service.

MCH focal person from health center reported that:

> Since coronavirus imposes huge effect on service delivery approach and we could not serve 50 or 60 individuals at a time, we need to inform those who need to come today and those who need to come next day through phone call. Otherwise, health facilities can be a source of coronavirus pandemic and good channel of transmission.

Quantitative

Family Planning Service

The average CAR before the COVID-19 pandemic was 69.2% while it has shown some increment to an average CAR of 71.1% during the COVID-19 pandemic. On average, there was a 1.9% increase in CAR during the COVID pandemic and the *t*-test showed that the changes were found to be statistically non-significant (P-value: 0.0542). As depicted in Figure 2, there was a decrease in the contraceptive acceptance rate in the first two months of March and April but there was an improvement in the remaining consecutive months up to December during the COVID-19 pandemic (Figure 2).

Antenatal Care Service

The mean ANC one coverage before and during the COVID pandemic was 109.3% and 108.2% respectively with a decrease of 1.1% which is not statistically significant (P-value: 0.634) (Figure 3).

Similarly, there was no statistically significant change in antenatal care four coverage across the ten months before and during the pandemic. Before the pandemic, the average ANC four coverage was 71.3% while the coverage decreased

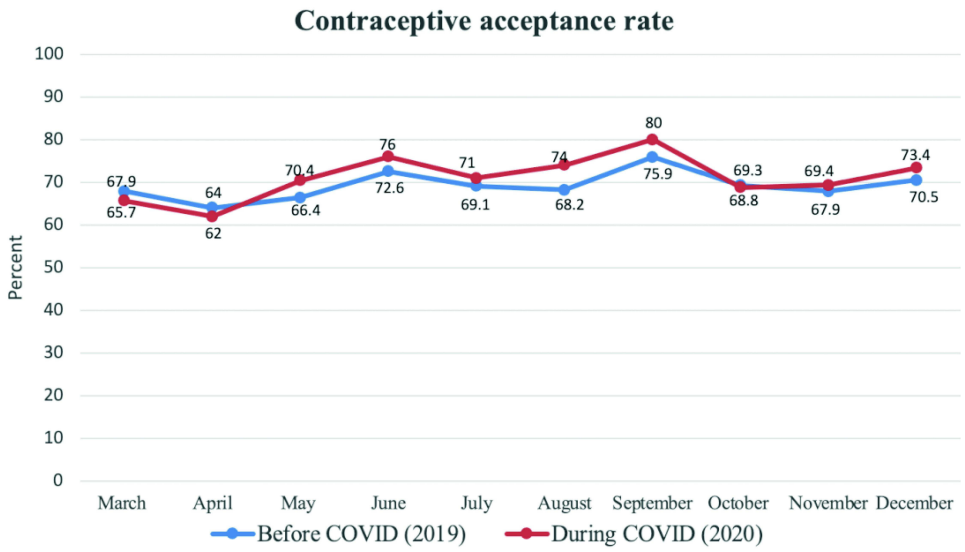


Figure 2 Contraceptive acceptance rate before and during COVID pandemic in Ethiopia.

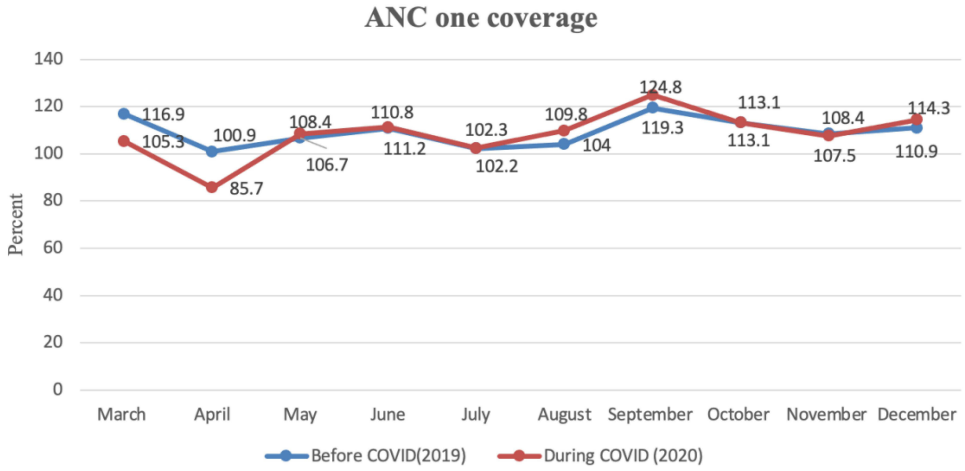


Figure 3 ANC one coverage before and during the COVID pandemic in Ethiopia.

70.9% during the COVID pandemic. Overall, there was a 0.4% decrease in ANC four coverage and the *t*-test showed that the changes were found to be statistically insignificant (P-value: 0.786) (Figure 4).

The ANC four coverage has shown disparities across regions before and during the COVID pandemic. Accordingly unlike the other regions, in the regions of Afar, Benishangul Gumuz, Harari and Tigray the ANC four coverage has shown a decline during the COVID pandemic (Figure 5).

Skilled Delivery Service

There was no statistically significant change in skilled delivery before and during the pandemic. Study findings indicated that the proportion of skilled delivery was on average 63.7% before and 63.6% during the pandemic. The difference was not statistically significant (P-value: 0.939) (Figure 6).

Postnatal Care Service

Our findings indicated that early postnatal care coverage was 82.2% before and 84.4% during the pandemic. The trend analysis also showed that there was a 2.3% increase in early postnatal care attendance during the pandemic. However, the *t*-test indicated that the difference was statistically significant (P-value: 0.018) (Figure 7).

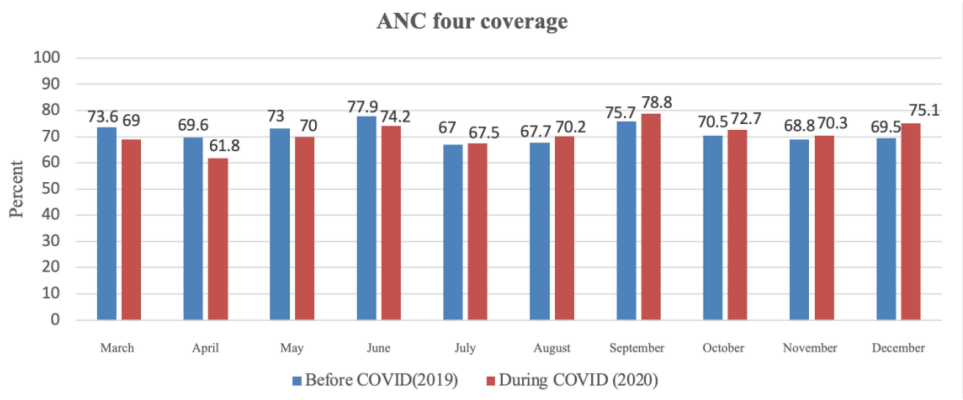


Figure 4 ANC four coverage before and during the COVID pandemic in Ethiopia.

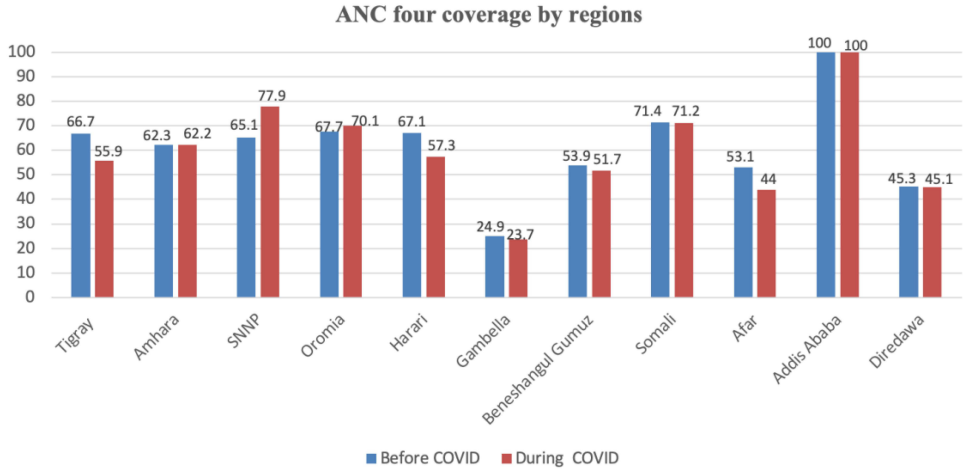


Figure 5 ANC four coverage before and during the COVID pandemic by regions in Ethiopia.

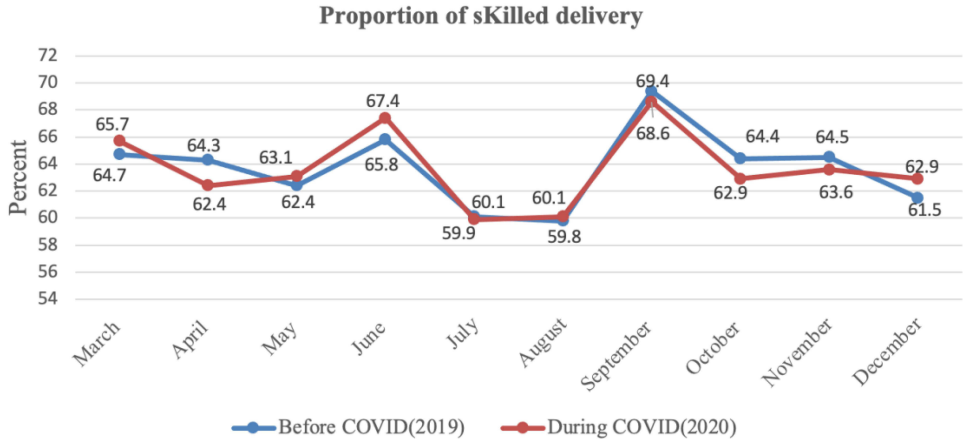


Figure 6 Proportion of skilled delivery before and during the COVID pandemic in Ethiopia.

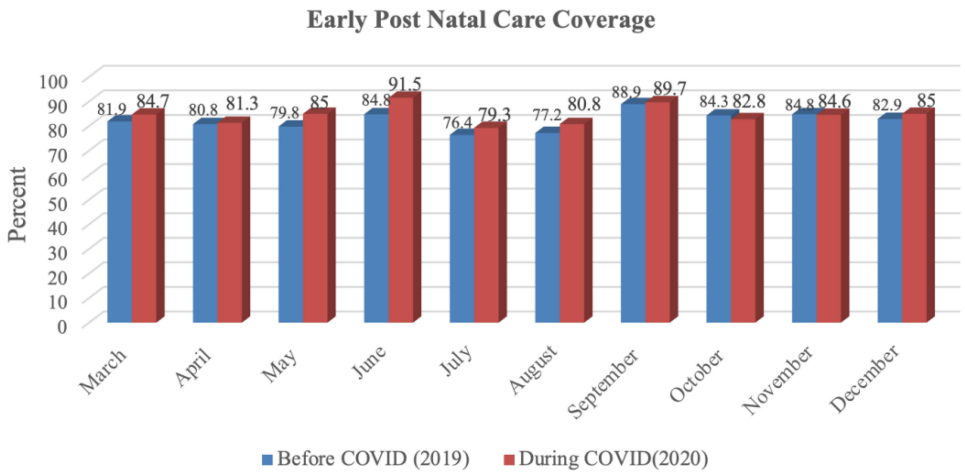


Figure 7 Early postnatal care coverage before and during the COVID pandemic in Ethiopia.

Child Immunization Service

There was an improvement in Penta I coverage during the pandemic in Ethiopia. The mean Penta I coverage was 107.8 and 111.7% before and during the COVID pandemic respectively. On average, there was a 3.9% increase in Penta I coverage and the *t*-test comparison showed that the change was not statistically significant (P-value: 0.069). Similarly, Penta III coverage has shown a significant improvement during the COVID pandemic. The findings indicated that the average Penta III coverage was 100.4% before the pandemic which increased to 105.1% during the pandemic. The *t*-test showed that the increase in Penta III coverage of 4.6% during the pandemic was statistically significant (P-value: 0.029) (Figure 8).

There was an improvement in child vaccination coverage during the pandemic. On average, the coverage was 89.9% before COVID and it has increased by 4.9% after COVID with coverage of 94.8%. The *t*-test comparison showed that the change was not statistically significant (P-value: 0.067) (Figure 9).

The analysis by region showed that the full immunization coverage has decreased during the COVID-19 pandemic in Gambella region, Somali region, Afar region and Dire Dawa city administration (Figure 10).

Discussion

This study has attempted to see the effects of the pandemic (COVID-19) on MNCH service utilization and strategies for effective service implementation in Ethiopia. The qualitative findings showed that the pandemic has reduced MNCH service utilization access and coverage. Findings from this study identified a reduction in accessibility and quality of routine health

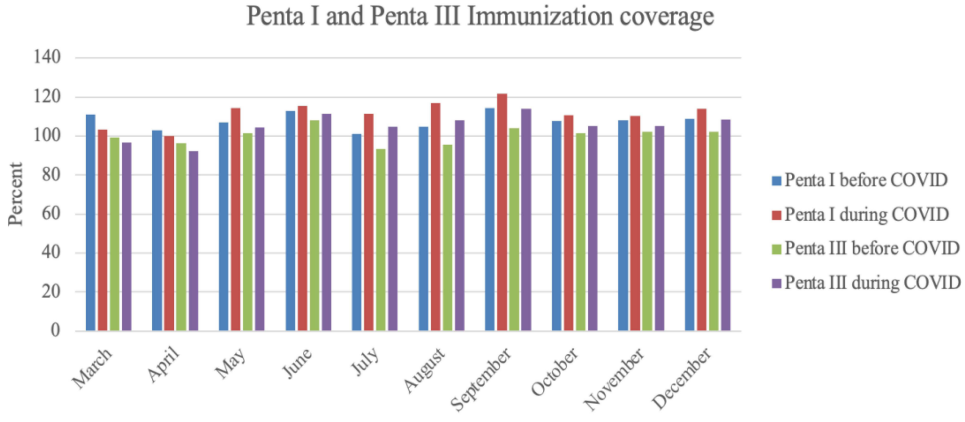


Figure 8 Penta I and Penta III coverage before and during the pandemic in Ethiopia.

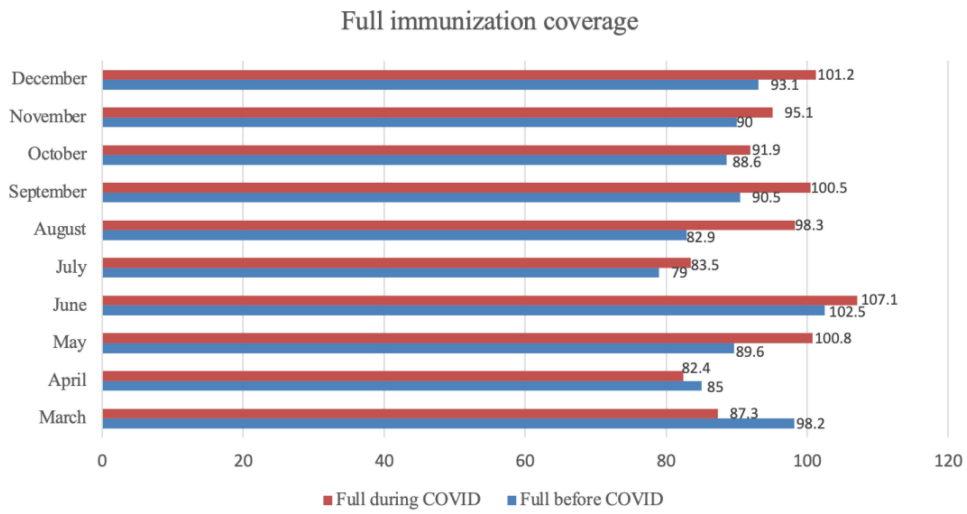
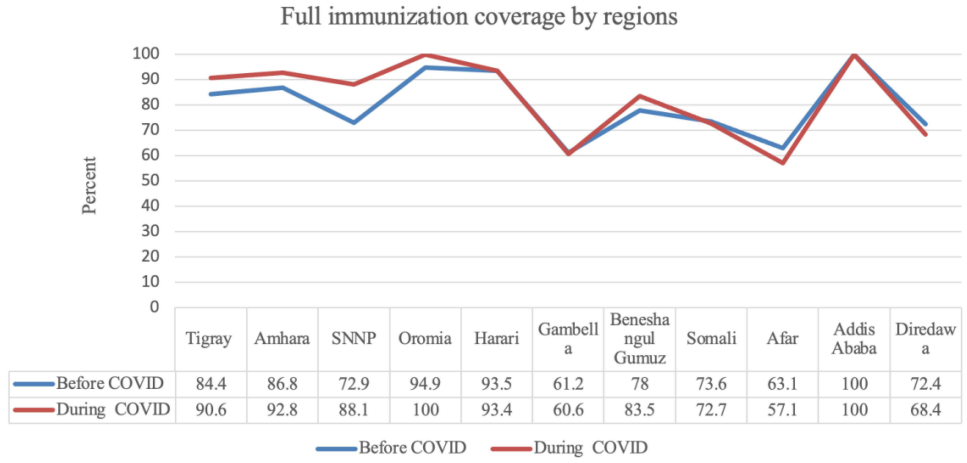


Figure 9 Child full immunization coverage before and during the COVID pandemic in Ethiopia.



	Tigray	Amhara	SNNP	Oromia	Harari	Gambella	Beneshangul Gumuz	Somali	Afar	Addis Ababa	Diredawa
Before COVID	84.4	86.8	72.9	94.9	93.5	61.2	78	73.6	63.1	100	72.4
During COVID	90.6	92.8	88.1	100	93.4	60.6	83.5	72.7	57.1	100	68.4

Figure 10 Full immunization coverage before and during the pandemic by regions.

services, low MNCH service utilization, challenges on the commitment of health workers and shortage in the supply of routine resources for MCH care services as an effect of the COVID pandemic for MNCH service uptake. Enduring strategies designed for effective MCH care service implementation was also identified as another theme in this study.

The current study showed that the accessibility and quality of the routine health services were not given properly during the COVID-19 period especially when the pandemic was first introduced in Ethiopia most of the health facilities were not open for routine health services. This finding is in line with a finding from Bangladesh, Qatar, Pakistan, Nigeria and Kenya.[21–26] Accessibility to effective health care communication using the primary health care is crucial to provision of MNCH services during the pandemic in a sustainable manner.[27] It implies that the accessibility and quality of routine health services could be ensured through primary healthcare, which is the first line of defense against the pandemic.

The findings from this study also revealed that MCH care service utilization including immunization, ANC, delivery service, family planning and PNC in Ethiopia reported having problems in visiting health facilities due to anxiety, fear to the pandemic and lack of transportation. It corroborates with findings from Panama and Zimbabwe.[28,29] During lock-down, pregnant women are at risk and they might not be able to have routine ANC and PNC services as scheduled making them more vulnerable to pregnancy related complications.[28] This implies that efforts have to be made to boost maternal health during pandemic situations.

The quantitative trend analysis from the national report indicated that MCH services have no significant change before and during the pandemic. In the trend analyses, there was a decline in coverage in the first two months and a slight increase in coverage afterward in the consecutive months. This could be related to the anxiety created at the initial phase of the pandemic and the adaptive modalities of the pandemic over time. Besides, the health system has also responded to the pandemic with different community mobilization and campaign programs which could be possible explanations for the increase in coverage of some indicators like child immunization during the pandemic. This implies that more children get vaccinated with the rise of the COVID-19 pandemic.

In the trend analysis, disparities in coverage of selected MCH indicators were observed among different regions of the country where regions requiring equitable development has documented low coverage during the pandemic than that of agrarian regions. In the city administrations, the coverage of selected indicators did not show a major difference before and during the COVID pandemic. The differences in coverage across regions could be related to the difference in health infrastructure, availability of supplies and social mobilization activities related to the pandemic in each region.

In response to the pandemic (COVID-19), health workers were highly challenged to serve the community. During the pandemic, there was a shortage of health care workers in health facilities, since they were assigned to treat emergency cases only while MNCH services were compromised despite the fact that they are essential services. In addition, lack of a head preparation of health facilities was reported as another challenge that hampers MNCH service provision. With increasing case load of COVID-19 in the Ethiopia context and shortage of PPE, health professionals are demoralized and stressed in many of the health facilities. Other studies conducted in India, Australia, and Canada[30–33] also showed similar findings with the current study. The health workers were distressed by the lack of PPEs in the health facility and developed anxiety due to the fatality and way of the transmission of the COVID.

There is a shortage in the supply of routine logistics for MNCH service utilization. Logistics storage and movement have been directly affected by the effects of the pandemic. Disruptions in the logistics supply-chain caused by the pandemic to the health sector could affect the accessibility and quality of MCH health care services.[34]

With all the above impacts, strategies designed and efforts have been made for effective MCH care service implementation.[35–37] House to house community mobilization and various IEC materials have been distributed to increase community awareness during the pandemic. The prevention activities include health information disseminated by the COVID task force, health extension workers and health development army. Due to a high number of dropout rate for immunization and high number of home deliveries, the ministry of health planned to have an immunization campaign for the dropout which is successful and establishing a task force supported by working guideline, up to the lower level; the way how can we combat the challenges and COVID adaptive solutions to be successful in the maternal health service utilization; there is strong follow-up by reporting and other means of communication up to the health facility level.

Strength and Limitation of the Study

The study applied both a qualitative and quantitative approaches. It also addressed a wide range of settings involving many health facilities in Ethiopia. As a limitation, there could be potential bias as service user women were interviewed.

Conclusions

The multiple modalities applied to control and combat the COVID-19 pandemic have aggravated the reduction of accessibility and quality of routine MCH care services and lowered MNCH service utilization. The low commitment of health care workers, imposed movement restrictions and shortage of resources had a negative effect on the provision of MNCH services during the pandemic. There could be a balance in resource utilization to COVID and other essential health services and the government should avail the necessary logistics and supplies for essential health service provision during the COVID era. Regionally tailored interventions are also required from policy makers and program implementers to address the challenges faced by the COVID-19 pandemic and design adaptive mechanisms to improve MNCH service delivery.

High risk and vulnerable population groups like pregnant women and newborns should also be given special attention while planning for pandemic events. In order to manage COVID-19 infection among women and children, the policy makers and program managers should implement mandatory effective preventive strategies. Extensive media

advocacy with more focus on skilled delivery and HEWs active involvement for community mobilization are also recommended.

Abbreviations

ANC, Ante Natal care; CAR, Contraceptive Acceptance Rate; COVID, Corona Virus Disease; DHIS, District Health Information System; EPI, Expanded program on Immunization; FP, Family Planning; HEW, Health Extension Workers; LMICs, Low Middle Income Countries; MCH, Maternal and child health; MNCH, Maternal, Neonatal and Child Health; PNC, Post Natal care; PPE, Personal Protective Equipment; RHB, Regional Health Bureau; WHO, World Health Organization.

Data Sharing Statement

The data used for this study is available up on reasonable request from the corresponding author.

Ethics Approval and Consent to Participate

Ethical approval was secured from the University of Gondar IRB. Moreover, permission to conduct the study was obtained at different administrative levels of the health system. Informed written consent was also sought from each respondent. Finally, confidentiality and anonymity of data were ensured.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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