Impact of COVID-19 pandemic on reproductive, maternal, newborn, and child health care services in Phuentsholing General Hospital: A retrospective descriptive study

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Abstract
Background: COVID-19 pandemic has derailed health care services. The health resources and manpower were prioritized and diverted to curb the COVID-19 infections at the cost of routine medical services to the people. The impact of the COVID-19 pandemic on maternal and child health is unknown. This study aimed to assess the impact of the Covid-19 pandemic on maternal and child health care services in Phuentsholing General Hospital.

Methods: A descriptive retrospective study was conducted at Phuentsholing General Hospital from January 1 to June 30, 2022. The patient medical records were reviewed for the pre-pandemic years 2018, and 2019, and the pandemic years 2020, and 2021. The medical records of all the female patients and newborns who came to the Maternal and Child Health Unit (MCH), those who were admitted to the gynecology ward, and who underwent obstetrical and gynecological surgeries were reviewed. The data were analyzed using SPSS version 23. Descriptive statistics such as frequencies and percentages were used to describe the study variables. The line graph and bar graph were used to determine the trends and to compare the impact of COVID-19 on MCH services between the pre-pandemic and pandemic years.

Results: During the COVID-19 pandemic, the total admission dropped by 10% to 14.4%; the total deliveries dropped by 16.1%; Cesarean section rate dropped to 12.9%; and fewer gynecological surgeries were performed (13.9% from 20.6%). There was a significant drop in antenatal and postnatal follow-up visits (31.5% and 24.51%) respectively; Pap smear dropped by 93% and colposcopy by 52%. The overall immunization coverage has dropped drastically during the pandemic period.

Conclusion: The pregnant mothers and newborn babies missed antenatal and postnatal follow-up visits, missed immunization, and women were not able to be screened for cervical cancers during the pandemic. These negative impacts of the COVID-19 pandemic on maternal and child health care were profound.
1 | INTRODUCTION

COVID-19 infection started in Wuhan city of China by the end of December 2019.1 COVID-19 outbreak had rapidly spread across the globe and the World Health Organization declared it a COVID-19 pandemic by March 2020.2

In Bhutan, the first COVID-19 infection was detected on the of March 5, 20203; since then the cases are detected in increasing numbers. Today, there are 60,663 confirmed COVID-19 cases with 21 deaths; however, Bhutan has the least number of cases in Asia compared to the neighboring countries.4

In response to the spike in cases of COVID-19 infection, movement restrictions and nationwide lockdowns were imposed by the government on several occasions.5–7 During the period of prolonged nationwide lockdowns, people could not avail medical services as usual. With exception to the emergency unit, the outpatient services, MCH services, dispensaries, and the laboratory facility of the hospital remained closed. Immunization of the newborns was temporarily deferred during the nationwide lockdown periods.8

During the pandemic, Phuentsholing General Hospital has devised alternative means to deliver medical services to the doorstep of the patients by forming the "Mobile medical team (MMT)." The MMT was involved in line listing the patients with chronic medical diseases and dropping medicine at the patient home ensuring no contact with the patients. In addition to MMT, "teleconsultation" was provided to the patients whereby the majority of the patients were reached through this channel.

Other countries have reported, that whatever new service delivery systems were created, the COVID-19 pandemic has disrupted the health services of the people. Total patients availing medical services dropped significantly during the pandemic as compared to pre-pandemic years.9 MCH care requires face-to-face interaction to provide the services, unlike other chronic medical disorders where the medicines can be dropped to their home by the MMT. Pregnant women and newborns missed check-up visits and immunization during the pandemic. Some of the studies have shown that in other countries there are a significant decrease in antenatal visits, immunization, institutional deliveries, and postnatal visits.9–11

A similar impact of the COVID-19 pandemic was expected in Bhutan as well; therefore, this study was conducted to evaluate the impact of COVID-19 on MCH services in Phuentsholing General Hospital.

2 | METHODS

A descriptive retrospective study was conducted at Phuentsholing General Hospital, Chukha, Bhutan from January 1 to June 30, 2022. Ethical clearance was obtained from the Research Ethical Board of Health, Ministry of Health, Bhutan with the Ref. No. PO/2021/093 dated August 2, 2021. Administrative clearance was obtained from the hospital authority, and the patient medical records were reviewed for the prepandemic years 2018 and 2019, and the pandemic years 2020 and 2021. The medical records of all the female patients, pregnant mothers, newborns, and children who came to the MCH unit, patients admitted to the gynecology ward, and those who underwent obstetrical and gynecological surgeries at Phuentsholing General Hospital were reviewed.

The details of antenatal care (ANC) visits, postnatal care (PNC) visits, immunization, family planning, Pap smear, colposcopy, voluntary counseling and testing (VCT), and neonatal services were collected from the respective registry book maintained at the MCH unit. The details of admission to the gynecology ward, deliveries, referrals, and neonatal outcomes were obtained from the register books maintained in the ward. The details of the operative procedures; Cesarean section and gynecological surgeries were collected from the operation room registry book. The medical record books were retrospectively reviewed for the years 2018, 2019, 2020, and 2021 and the data were collected using the standard data collection sheet developed for the study. While collecting the data from the register books, conscientious care was taken to ensure the privacy and confidentiality of the patients. The sensitive data or any data which will identify the patients was not recorded, and the consent was waived by the ethical board since this was a retrospective study that doesn't require direct contact with the patients.

2.1 | Statistical analysis

The collected data were captured using Epi data 3.1.2 and validated to avoid data entry errors. The data were then exported to SPSS format for further analysis. The data were analyzed using SPSS version 23. Descriptive statistics such as frequencies and percentages were used to describe the study variables. The line graph and bar graph were used to determine the trends of study variables over the years and to compare the impact of COVID-19 on MCH services between prepandemic years and pandemic years.

3 | RESULTS

3.1 | Admission to gynecology ward and deliveries

During the COVID-19 pandemic, the total admission to the gynecology ward dropped by 10% in 2020 and further dropped by 14.4% in 2021 as compared to the prepandemic year 2019.

The total deliveries (inclusive of vaginal and Cesarean deliveries) dropped by 16.1% and 6.6% during the pandemic years 2020 and 2021 respectively, as compared to the prepandemic year 2019.
With the onset of the pandemic, the Cesarean section rate initially dropped to 12.9% from 16.0% in the year 2020 compared to the year 2019; however, the Cesarean section rate slightly increased to 16.8% in the subsequent year 2021. During the pandemic periods, lesser gynecological surgeries were performed (13.9% from 20.6%). The referral rate dropped to 2.3% from 3.1% in the year 2020; however, slightly more patients were referred out during the year 2021 (Table 1). The comparison of Cesarean sections, gynecological operations, and the referrals between the prepandemic and the pandemic years are shown in a line graph below (Figures 1A,B).

4 | MATERNAL AND CHILD HEALTH CARE SERVICES

During the pandemic period, the MCH services were badly affected among the other hospital services. The ANC visits dropped by 10.3% in the year 2020, which further dropped by 31.5% in the year 2021 compared to the pre-pandemic year 2019; and the PNC visits dropped by 5.6% to 24.51% in the year 2020 and 2021, respectively. Cervical cancer screening with Pap smear, colposcopic services, and related procedures was affected by the widespread COVID-19 infection. The Pap smear services significantly dropped by 76.5% to 93% in the year 2020 and 2021 respectively; and the colposcopy dropped by 24.5% to 52% in the year 2020 and 2021 respectively, as compared to the year 2019. In contrast, more women availed VCT services in the pandemic year 2020 (increased by 59.8%); however, it dropped to 25.9% from 59.8% by the end of the year 2021 (Figures 2A,B).

4.1 | Family planning services

With the onset of the COVID-19 pandemic, 76.8% to 79.3% of the women used barrier methods of contraception (condoms) as compared to other methods of contraception. During the pandemic, the second most preferred contraception was OCP compared to DMPA and IUCD (Figure 3).

4.2 | Immunization coverage

The overall immunization coverage has dropped over the years during the pandemic periods. The immunization coverage of BCG has dropped to 93.7% and 89.9% from over 100% during the pandemic years 2020 and 2021 respectively, as compared to prepandemic years. The OPV, Hep B, and MR vaccine coverage as well dropped during the pandemic years (Figure 4).

4.3 | Neonatal services and outcome

During the pandemic period, lesser numbers of children were exclusively breastfed and a smaller number of children receive Vit A supplementations as compared to the prepandemic period. In contrast, the number of underweight babies drastically decreased during the pandemic years (Table 1).

5 | DISCUSSION

The COVID-19 pandemic has affected MCH services the most in Phuentsholing General Hospital. The total admission to the gynecology ward dropped by 10% to 14.4%; total deliveries dropped by 16%; the Cesarean section rate dropped to 12.9% and the gynecological surgeries dropped by 13.9% during the pandemic years. In addition to the above findings, 1.3% of the adult female in Bhutan has expressed difficulty in obtaining MCH services in one of the study. Since the beginning of the COVID-19 outbreaks, the southern belt of Bhutan bordering India including Phuentsholing was categorized as a high-risk zone (red zone); and the movements of people from the high-risk to the low-risk zone (green zone) are restricted. Despite the restriction, the majority of the people including pregnant mothers moved out of high-risk zones to low-risk zones for deliveries; on top, Phuentsholing hospital did not entertain routine admissions for elective surgeries during the pandemic periods as per the directives from the COVID-19 task force. These are the likely explanation for the drop in the percentage of admission, deliveries, and operation rates. By the second year of the pandemic, the hospital administration had identified a separate group of health personnel to look after the health-related problems of the people kept in the isolation or the quarantine facilities. This was another innovative intervention instituted to ensure the health services reached to the people at difficult times. A similar negative impact of the COVID-19 pandemic on MCH services were reported in other countries; the antenatal care visits dropped by 26%, total deliveries dropped by 4%, cesarean section and family planning dropped by 28%, overall child immunization dropped by 20%, and in that study, they have reported a significant rise in home deliveries by 74%. However, in the current study the home delivery rate is 0% despite there was an extended movement restriction during the pandemics; this is because, during the pandemic majority of the pregnant mothers used "teleconsultation" to consult with the health personnel, and the pregnant mothers in labor pain were picked and brought to the hospital the by ambulance.

Most of the time MCH services at the hospital remained closed during the pandemic periods, especially during the prolonged nationwide and regional lockdown in southern districts of Bhutan. MCH service delivery requires contact with the patient to screen for high-risk pregnancies; mainly to check blood pressure (BP), examine symphysis fundal height, listen to fetal heartbeats, obstetric ultrasound scanning for dating, and rule out the anomalous fetus, urine and blood tests, and immunization of mothers and newborn babies. These services were not feasible to deliver through teleconsultation or the MMT. The impact of the COVID-19 pandemic on MCH services was profound as shown by the findings of this study. The ANC visits dropped by 10% to 31%, PNC visits dropped by 5% to 24%, and
| Gynecology services, n (%) | Prepandemic years | Pandemic years |
|----------------------------|-------------------|---------------|
|                            | 2018  | 2019  | 2020  | 2021  |
| Cesarean section           | 267 (21.0) | 259 (16.0) | 188 (12.9) | 233 (16.8) |
| Vaginal delivery           | 405 (31.8) | 568 (35.1) | 554 (38.1) | 539 (38.9) |
| Gynecological surgery      | 365 (28.8) | 332 (20.6) | 233 (16.0) | 192 (13.9) |
| Discharged in a pregnant state | 149 (11.8) | 408 (25.2) | 448 (30.8) | 372 (26.9) |
| Referral (referred out)    | 84 (6.6) | 51 (3.1) | 33 (2.3) | 49 (3.5) |
| Total admissions           | 1270 (100.0) | 1618 (100.0) | 1456 (100.0) | 1385 (100.0) |

| MCH services (n) |                         |       |       |       |
|------------------|-------------------------|-------|-------|-------|
| Antenatal care visits | 4010 | 6738 | 6038 | 4612 |
| Postnatal care visits | 3556 | 3022 | 2852 | 2280 |
| Pap smear        | 3077 | 3674 | 860  | 256  |
| VCT services     | 944  | 576  | 921  | 682  |
| Colposcopy performed | 113  | 114  | 86   | 41   |

| Family planning (n) |                         |       |       |       |
|---------------------|-------------------------|-------|-------|-------|
| DMPA                | 3663 | 2034 | 2179 | 1824 |
| OCP                 | 3676 | 1794 | 2356 | 2012 |
| Condom              | 6741 | 12,957 | 17,946 | 14,775 |
| IUCD                | 98   | 67   | 122  | 121  |
| Total               | 14,178 | 16,852 | 22,603 | 18,732 |

| Immunization (n) |                         |       |       |       |
|------------------|-------------------------|-------|-------|-------|
| BCG at birth     | 993  | 776  | 710  | 692  |
| Hep-B at birth   | 960  | 820  | 741  | 705  |
| OPV-0 at birth   | 964  | 776  | 710  | 669  |
| OPV-1st at 6 weeks | 637  | 639  | 536  | 710  |
| OPV-2nd at 10 weeks | 581  | 636  | 499  | 668  |
| OPV-3rd at 14 weeks | 613  | 634  | 491  | 683  |
| Pentavalent-1st at 6 weeks | 637  | 639  | 536  | 710  |
| Pentavalent-2nd at 10 weeks | 581  | 636  | 499  | 668  |
| Pentavalent-3rd at 14 weeks | 614  | 634  | 491  | 683  |
| MR-1st at 9 months | 604  | 603  | 527  | 537  |
| MR-2nd at 24 months | 635  | 583  | 504  | 480  |
| IPV                | 555  | 634  | 491  | 683  |

| Neonatal services (n) |                         |       |       |       |
|-----------------------|-------------------------|-------|-------|-------|
| Exclusive breastfeeding (6 months) | 3387 | 1648 | 483  | 815  |
| Vit A supplementation (6–12 months) | 2506 | 654  | 354  | 549  |

| Neonatal outcomes (n) |                         |       |       |       |
|----------------------|-------------------------|-------|-------|-------|
| Underweight child    | 1573 | 148  | 129  | 63   |
| Stunted child        | 18   | 41   | 110  | 14   |

Abbreviations: BCG, Bacille Calmette-Guerin; DMPA, Depot medroxyprogesterone acetate; Hep-B, Hepatitis B; IPV, Inactivated polio vaccine; IUCD, Intrauterine contraceptive device; MR, Measles and rubella; OCP, Oral contraceptive pills; OPV, Oral polio vaccine; VCT, Voluntary counseling and testing.
newborn babies missed immunizations. Many worried couples and pregnant mothers repeatedly reported to the emergency unit with anxiety, stress, and depression for not being able to come for pregnancy check-ups and for missing the immunizations for pregnant mothers and newborn babies. The impact of COVID-19 on mental health reported depression increased from 46% to 90% during to pandemic period compared to pre-pandemic; however, the impact of COVID-19 on mental health was not studied in the current study.

The screening test for cervical cancer with Pap smear and colposcopy almost came to halt at Phuentsholing hospital. Pap smear and colposcopic services significantly dropped by 76% to 93% and 24% to 52% respectively, during the pandemic periods. During the COVID-19 infections, hospital resources and manpower were diverted and priority was set to tackle the pandemic at the cost of routine hospital services to men, women, and children. This is the likely reason for not being able to provide routine cervical cancer screening services at the Phuentsholing hospital during the pandemic period. However, a resilient strategy was devised in other countries to ensure a cervical cancer screening continued during the pandemic. They have resorted to “self-sampling” for HPV-DNA testing, which has provided the opportunity for women to screen better during the pandemic without coming in contact with health personnel. In Bhutan, cervical cancer screening is done with the conventional Pap smear, and HPV-DNA testing is yet to incorporate into public health services. So, the self-sampling and running HPV-DNA testing instead of Pap smear was not a possible alternative in Bhutan.

Almost 80% of the women were made to use barrier methods of contraception during the pandemic period. This is due to a shift in the local hospital policy to offer barrier methods and OCP to all eligible

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**FIGURE 1** (A) The line graph shows the total number of admissions to the gynecology ward and the total number of deliveries for the year 2018 to 2021. (B) The line graph shows the total number of Cesarean sections, gynecological surgeries, and referrals (referred out) for the year 2018 to 2021.
couples and females during the pandemic to avoid going into frequent contact with the people. This strategy was to stop the rapidly spreading COVID-19 infections in the community by avoiding physical contact with clients. A similar paradigm shift in the prescription of contraception was reported in the literature; whereby there was a gradual decline in the contraception which required contact with the patient, with rising in the distribution of barrier methods of contraception.16

The overall immunization coverage had dropped during the pandemic periods; this is due to repeated extended lockdowns and movement restrictions in Phuentsholing to curb the rapidly spreading COVID-19 infections, whereby many newborn babies missed the immunization. This has caused panic and confusion among pregnant women because the long-term effects of unimmunized newborns are uncertain. A similar drop in immunization coverage below 2 years to 71% was reported, with the largest decrease seen at the ages 15
month and 18-month old at 14.7% and 16.4%, respectively. However, the immunization coverage was partially recovered towards the end of the year 2020 by improvising the vaccination strategies. This study has found a profound impact of COVID-19 on the MCH services at Phuentsholing hospital. A similar impact must have been present in the rest part of the country in Bhutan. The finding of this study can be taken as a lesson learned from the COVID-19 pandemic, and based on the finding a comprehensive strategy can be developed to manage further outbreaks in the future without hindering routine medical services to the public. This is the strength of the study; however, this study could not review the details of the patients who availed of MMT services and teleconsultations available during the nationwide lockdown. The impact of COVID-19 on other medical disorders could have been studied if the data for MMT and teleconsultations were available.

In continuation to this study, there is a need for further study to evaluate the long-term impact of COVID-19 on women’s and child health.

6 | CONCLUSION

The COVID-19 pandemic has caused disruptions to the MCH service; pregnant mothers missed ANC check-ups, after delivery mothers and newborns could not come for PNC visits, and the newborn babies were deprived of immunization. During the pandemic periods, could not screen women for cervical cancer and not perform the colposcopic examination of the cervix. The long-term impact on these women and children who missed health check-ups and immunization remains unknown. Therefore, the study finding emphasizes the need to have comprehensive strategic contingency plans to handle the outbreak in the future without hampering the routine medical services to the public. Based on the findings from the current study; as a part of readiness to handle another pandemic, there is a need to have an improve global coordination, strengthening surveillance and monitoring systems, and keeping resources provision as pandemic preparedness and response plan, and focusing on quarantine and isolation of infected individuals, rather than shutting down whole country and diverting all the resources which are meant for the routine health care services.

AUTHOR CONTRIBUTIONS

Yeshey Dorjey: Conceptualization; data curation; formal analysis; investigation; methodology; supervision; validation; writing – review and editing. Yezer Tshomo: Data curation; investigation; validation; writing. Dorji Wangchuk: Data curation; formal analysis; investigation; validation. Purushottami Bhandari: Data curation; formal analysis; validation. Choki Dorji: Data curation; investigation; validation. Diptika Pradhan: Data curation; formal analysis; investigation; validation. Rinzin Pemo: Data curation; investigation; validation; writing. Phub Wangdi: Data curation; investigation; validation.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support this writing is available from the corresponding author upon reasonable request.

ETHICS STATEMENT

Ethical approval was obtained from the Research Ethical Board of Health (REBH), Ministry of Health, Bhutan. Informed consent was waived by the ethical board since this was a retrospective study and the study doesn’t involve contact with patients.

TRANSPARENCY STATEMENT

The lead author Yeshey Dorjey affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.
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