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**Original Research Article**

# Effect of COVID-19 pandemic on maternal and child health care in a medical teaching hospital, Bengaluru, India

**Saraswathi Sakranaik[1], Gayathri Devi Chinnappa[2], Vinaykumar Ganesh Hegde[1], Anjali V. Vuttanur[1]*, Abhiram Jois[1]**

[1]Department of Community Medicine, [2]Department of Paediatrics, Bangalore Medical College and Research Institute, Bangalore, Karnataka, India

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***Correspondence:**
Dr. Anjali V. Vuttanur,
E-mail: anjalivasudevv@gmail.com

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## ABSTRACT

**Background:** Maternal and child health (MCH) care is a fundamental service of the public health delivery system of a nation, especially in low and middle-income countries like India. As the Covid-19 pandemic continued throughout the world, the health services such as maternal and child health (MCH) remained in inertia. Stringent lockdown measures and fear of contracting Covid-19 infection made accessing these services extremely hard.
**Methods:** A cross sectional study was conducted in a tertiary care maternity hospital in Bengaluru from July to September 2021 among the post-natal mothers using a semi-structured questionnaire about the utilization of MCH services.
**Results:** A total of 316 mothers were interviewed. Among them, 72.8% mothers had completed 4 or more antenatal visits. Among high-risk pregnancies, only 66.3% had completed adequate antenatal visits. 63% of infants had low birth weight and 83.4% of children were immunized up to date.
**Conclusions:** This study revealed that, more than 1/4$^{th}$ of mothers had not completed 4 or more antenatal visits and about 1/3$^{rd}$ of the high-risk mothers had not completed adequate antenatal visits. More than 2/3$^{rd}$ of infants had low birth weight. This shows that there was a marked reduction in the utilization of MCH services during the Covid-19 pandemic.

**Keywords:** Antenatal care, COVID19, High risk pregnancy, Low birth weight

## INTRODUCTION

Maternal and child health (MCH) care is a fundamental service of the public health care delivery system of a nation, especially in low and middle-income countries like India.[1] Current Maternal Mortality Ratio (MMR) in India is 103 per 100000 live births and the Infant Mortality Rate (IMR) in India stands at 28 per 1000 live births.[2] As the Covid-19 pandemic continued throughout the world, the non-covid health services remained in inertia. Children, adolescents and mothers were not getting the care they needed, this may have life-long and sometimes, life-threatening consequences in some conditions.[3] The shift in focus towards the pandemic inadvertently affected the delivery of basic maternal and child care services hindering its progress.[1]

The pandemic interfered with the provision of prenatal, postnatal, vaccination, and child health and nutrition services as well as access to those services. Stringent lockdown measures and fear of contracting Covid-19 infection made accessing these services extremely hard.[4]

These hurdles in the healthcare delivery negatively impacted the outcome in these mothers and children. This in turn, could reverse all the progress achieved over the years in reducing maternal and child mortality.[5] To the best of the author's knowledge, there is a scarcity of studies conducted in this aspect owing to the pandemic being a new phenomenon. Hence, this study was aimed to assess the utilization of maternal and child health care and its effect on the outcome of pregnancy during the pandemic.

## METHODS

A cross sectional study was conducted in a tertiary care maternity hospital, VaniVilas Hospital Bengaluru, India from July to September 2021. Ethical clearance was obtained from the members of the Institutional Ethical Committee (IEC). Study population included post-natal mothers who gave informed consent. Patients unwilling to give consent and in patient pregnant women yet to deliver were excluded from the study. A semi-structured questionnaire was used to interview the mothers about the antenatal, post-natal and immunization services utilized during and after the pregnancy. The questionnaire was prepared to collect information regarding socio demographic details, MCH care service utilization including antenatal visit, antenatal services utilized, any complications or high-risk status, child birth details and immunization status etc. The case records, Mother-Child Protection (MCP) card or Thayi card were referred in some cases to get additional information.

Sample size was calculated using NFHS 5 data which showed the percentage of antenatal mothers in the place of study, that is, Karnataka, India with at least 4 antenatal visits as 83.4%.[3] Using this data with 5% permissible error, 95% CI and expecting 5% difference between the past and present existing conditions, sample size was estimated to be 310.

The data collected was entered in MS Excel and subjected to statistical analysis. Various tables and charts were formulated regarding the utilization of MCH services and the effect of Covid-19 pandemic on the same.

## RESULTS

Total 316 mothers were interviewed regarding the utilization of MCH services during the pandemic. Distribution is as illustrated in Figure 1.

In the study conducted, 293 (92.7%) of mothers had no specific occupation. Majority of them, 238 (75.4%) belonged to lower middle class of modified Kuppuswamy socioeconomic scale.[6] 145 (45.8%) respondents reported their income decreased during the pandemic. In the study, 199 (63.2%) were Hindu followed by 88 (27.8%) Muslims. 178(56.3%) of them were from nuclear families. These demographic details are as shown in Figure 2.

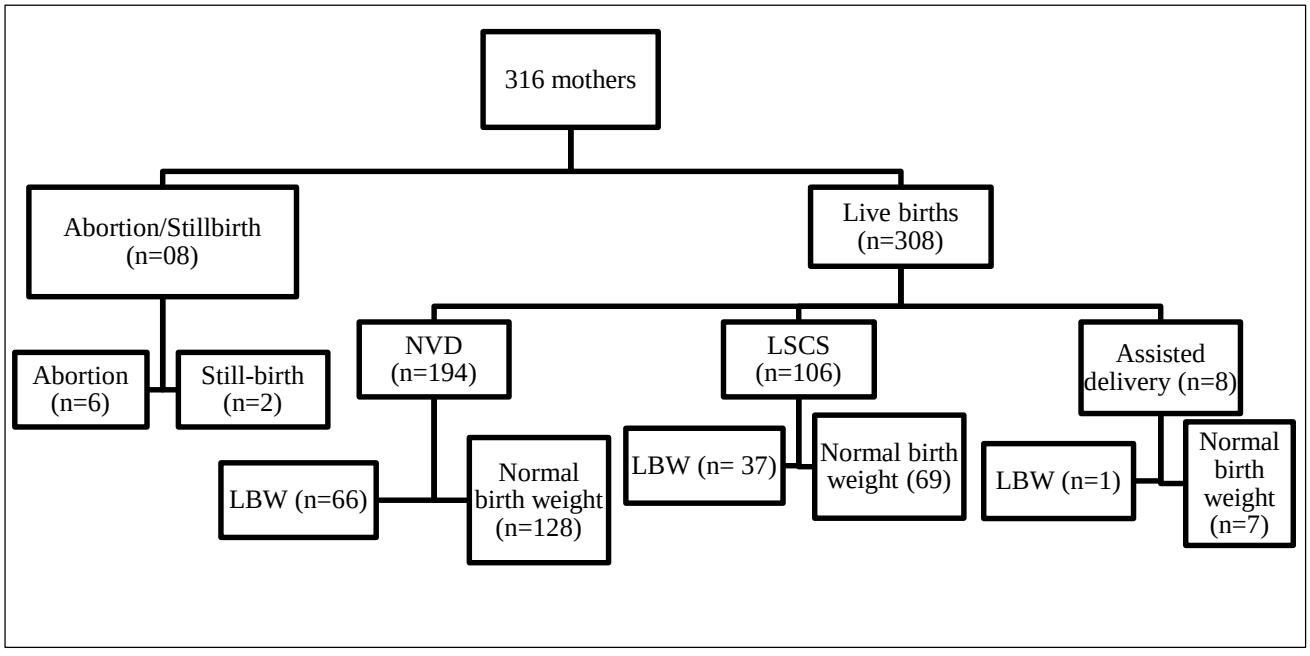


**Figure 1: Outcome of pregnancy among the mothers included in the study. NVD- Normal vaginal delivery; LBW- Low birth weight; LSCS- Lower segment cesarean section**

Among all the mothers, 230 (72.8%) mothers had completed 4 or more antenatal visits. But only 70 (22.2%) of mothers received adequate antenatal care viz., had at least 4 ANC visits, taken 2 Td injections, consumed IFA and calcium tablets completely and had all the routine investigations and scanning done. Among the mothers

who received adequate antenatal care, 46 (65.7%) belonged to joint family, 53 (75.7%) belonged to upper lower socio-economic class and 63(90%) had Anganwadi centre within 1.5 km from their homes. This is shown in Table 1.

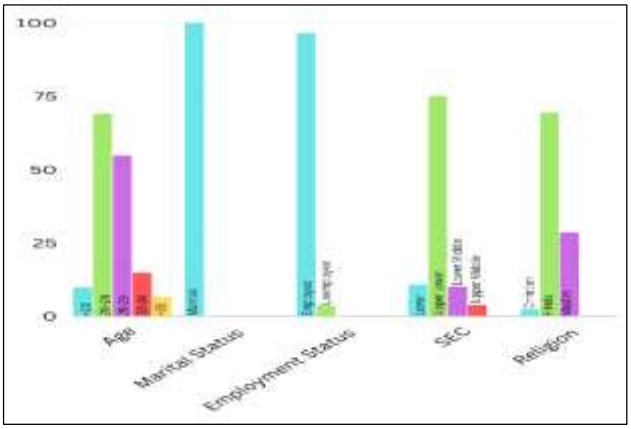


**Figure 2: Demographic details of study subjects. SEC: Socio-economic class (modified Kuppuswamy scale).**

In this study, 199 (63%) of the mothers had a high-risk pregnancy and 132 (66.3%) of the high-risk mothers had 4 or more antenatal visits. There was a statically significant increased prevalence of anemia in mothers who had completed less than 4 ANC visits compared to ones which 4 or more visits as illustrated in Table 2.

Among all the live-births, the variation in the number of normal vaginal delivery, assisted delivery (foreceps/ vacuum) and lower segment cesarean section in mothers with <4 ANC visits and >4 ANC visits is as seen in Table 3.

In the study, 63% of the children were born with low birth weight i.e. <2.5 kg. Mean birth weight was 2.61 kg. There was a statistically significant difference between the mean birth weights of children whose mothers completed 4 antenatal visits and those who did not as shown in Table 4.

The immunization status of the children included in the study is as shown in Table 5. 26 (10.5%) were unimmunized in the <4 weeks age group, 5 (14.4%) in 4-14 weeks and 2 (12.5%) in >14 weeks.

**Table 1: Utilisation of antenatal services with respect to number of antenatal visits.**

| Antenatal services | Yes/ No | Antenatal visits (<4) N (%) | Antenatal visits (4 or more) N (%) | p value |
|---|---|---|---|---|
| **Mother and child protection card issued** | Yes | 78 (90.7) | 217 (94.3) | 0.44 |
| | No | 8 (9.3) | 13 (5.7) | |
| | Total | 86 | 230 | |
| **Incentive given under Janani Suraksha Yojana** | Yes | 12 (13.9) | 34 (14.8) | 0.84 |
| | No | 74 (86.1) | 196 (85.2) | |
| | Total | 86 | 230 | |
| **Iron and folic acid supplementation** | Yes | 72 (83.7) | 199 (86.5) | 0.75 |
| | No | 14 (16.3) | 31 (13.5) | |
| | Total | 86 | 230 | |
| **Injection Td (2 doses)** | Yes | 74 (86.1) | 204 (88.7) | 0.76 |
| | No | 12 (13.9) | 26 (11.3) | |
| | Total | 86 | 230 | |
| **Routine investigations** | Yes | 35 (68.6) | 160 (69.6) | 0.11 |
| | No | 51 (31.4) | 70 (30.4) | |
| | Total | 86 | 230 | |

**Table 2: Distribution of antenatal visits among high-risk pregnancy mothers.**

| High-risk | Yes/ No | Antenatal visits (<4) N (%) | Antenatal visits (4 or more) N (%) | p value |
|---|---|---|---|---|
| **Anemia** | Present | 43 (50.0) | 85 (37.0) | 0.048 |
| | Absent | 43 (50.0) | 145 (63.0) | |
| | Total | 86 | 230 | |
| **Pregnancy induced hypertension** | Present | 23 (26.7) | 40 (17.4) | 0.09 |
| | Absent | 63 (73.3) | 190 (82.6) | |
| | Total | 86 | 230 | |
| **Gestational diabetes mellitus** | Present | 01 (1.1) | 03 (1.0) | 0.585 |
| | Absent | 85 (98.9) | 223 (99.0) | |
| | Total | 86 | 230 | |

**Table 3: Mode of delivery among live-births as per number of antenatal visits.**

| Mode of delivery | Yes/ No | Antenatal visits (<4) N (%) | Antenatal visits (4 or more) N (%) | p value |
|---|---|---|---|---|
| **Normal vaginal delivery** | Yes | 48 (57.1) | 146 (65.1) | 0.19 |
| | No | 36 (42.9) | 78 (34.9) | |
| | Total | 84 | 224 | |
| **Lower segment cesarean section** | Yes | 33 (39.2) | 73 (32.6) | 0.27 |
| | No | 51 (60.8) | 151 (67.4) | |
| | Total | 84 | 224 | |
| **Assisted delivery (forceps/vacuum)** | Yes | 3 (3.5) | 5 (2.2) | 0.51 |
| | No | 81 (96.5) | 219 (97.8) | |
| | Total | 84 | 224 | |

**Table 4: Association between number of antenatal visits and mean birth weight of infants.**

| No of antenatal visits | Mean birth weight (kg) | Standard deviation | p value |
|---|---|---|---|
| **Antenatal visits <4 (n=84)** | 2.4 | 0.47 | < .001 |
| **Antenatal visits >4 (n=224)** | 2.68 | 0.55 | |

**Table 5: Immunization data.**

| Age of the child | Immunized up to date, N (%) | Partially immunized, N (%) | Unimmunized, N (%) | Total N (%) |
|---|---|---|---|---|
| **Neonate** | 222 (89.5) | ----- | 26 (10.5) | 248 (80.5) |
| **4 weeks to 14 weeks** | 28 (63.6) | 11 (25) | 5 (14.4) | 44 (14.3) |
| **>14 weeks** | 11 (68.8) | 3 (18.7) | 2 (12.5) | 16 (5.2) |
| **Total, n (%)** | 261 (84.7) | 14 (4.6) | 33 (10.7) | 308 (100.0) |

## DISCUSSION

This study showed 72.8% of mothers had completed minimum 4 antenatal visits. Among high-risk mothers only 66.3% completed adequate antenatal visits. The most common reason (71%) to miss the check-up was inability to go to hospitals because of lack of transport facilities followed by the fear of getting infected with COVID-19. This was similar to the study by Goyal et al as well as Rabbani et al in which one third of women had inadequate antenatal visits and the main reason was lockdown and fear of contracting infection.[9,10] It shows lack of awareness about the availability of services and apprehension about visiting health care facilities during the pandemic.

There was also an association noted between anemia and number of antenatal visits as well as PIH and number of visits. Frequency of anemia and PIH were lower in mothers who completed the adequate visits compared to those who did not complete adequate number of visits which was statistically significant. Study conducted by Yakar et al found that 63.8% of pregnant women who did not use oral iron supplementation were found to have anemia (Hb <11.0 g/dL).[11] ANC and micronutrient supplementation measures being severely hampered by the pandemic could be attributed to the same. Previous literature has revealed a higher risk of eclampsia, postpartum hemorrhage and intensive care unit admissions among women with inadequate ANC visits as compared to its counterpart.[12] This emphasizes the dire need for ensuring adequate coverage for antenatal services as well as nutritional supplementation during pregnancy.

In the study conducted, 99.02% of mothers had undergone institutional delivery. 3 of the mothers had at home deliveries, 2 out of which were conducted without trained birth attendant (TBA). This could imply that even in the midst of lockdown, institutional delivery facilities weren't as severely impacted.

In our study, 63% of the infants were found to have low birth weight. In a study conducted by Raatikainen et al reported a difference of 489g and 799g lower mean birth weight in non-attenders and under attenders respectively when compared to mothers with at least 6 ANC visits.[13] A similar finding was noted in this study with a statistically significant 280g decrease in mean birth weight in infants born to mothers with less than 4 ANC visits as compared to ones with more than 4 visits. Previously conducted study by Stacey et al revealed more than two-fold increase in late stillbirth associated with accessing less than 50% of ANC visits as compared with accessing the recommended number.[14] Hence, this is

makes it a matter of concern and reduced ANC coverage may directly have a negative impact on outcome of pregnancy.

Only 84.7% of infants were vaccinated up to date which is similar to the study by Singh et al, where there was more than 20% reduction in immunization services.[4] It serves as some evidence that childhood vaccination services were considerably decreased during the pandemic.

Limitation of our study could be that only mothers attending our tertiary care government hospital were considered and not mothers who may have attended private hospitals and peripheral health centres.

## CONCLUSION

This study showed more than 1/4$^{th}$ of mothers had not completed 4 or more antenatal visits out of which less than 1/4$^{th}$ had utilized all the available MCH services. This shows that there was marked reduction in the utilization of MCH services during the Covid-19 pandemic. 1/3$^{rd}$ of the high-risk mothers who required additional care did not receive the minimum care. Similarly, the immunization coverage among children was inadequate. Efforts should be made to strengthen the primary health care system in case of such epidemics by judicious use of resources. The measures could be telemedicine services, mobile health clinics, and the delivery of medicines and supplies to people's homes. Public should be made aware of the utilization of MCH care to prevent maternal and child morbidity and mortality. The pandemic showed that strong foundations at the primary level are necessary to tackle grave problems. Similarly, maternal and child health relies on the utilization of services provided at the primary level. It is important to address the challenges faced by healthcare providers and increase awareness among communities about the importance of accessing essential health services, even during the pandemic.

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