

# Repercussions of COVID-19 Pandemic on Prenatal and Antenatal Care in Bahadarbad Block of Dist Haridwar, Uttarakhand, India

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## Abstract

**Background:** The incidence of maternal morbidity and mortality gets reduced if antenatal care (ANC) is provided since it focuses on providing birth preparedness, good health maintenance measures, and awareness regarding pregnancy complications as well as danger signs.

**Methodology:** The present study was conducted in the selected 10 villages in the Bahadarbad block of Haridwar, Uttarakhand. 479 out of 580 pregnant women (who had visited Antenatal Health Camps), responded to the questionnaire thus, leading to a response rate of 82.8%. Most respondents, i.e. 96% (n=461), were 21–30 years old.

**Result:** Out of 461 pregnant women, only 45% visited antenatal health camps and 58% were found anemic. The study also indicated that of the pregnant women who visited antenatal health camps during this period, more than 72% of women gave their previous birth in less than two years. Only 15% of women obtained complete ANC (4 visits) during the study period, just half of the previous year's coverage (31%) for the same duration. The study found that home deliveries increased significantly during the lockdown period. From April to June 2020, the percentage of home deliveries was 41% while from July to December 2020 it was 24%.

**Conclusion:** The study suggested reduced utilization of ANC services during the pandemic and significant factors were women's age, residence, educational status, repurposing of maternity healthcare services, fear of COVID-19 transmission, and transportation disruptions. Thus, efforts should be taken to enhance maternal health services.

**Keywords:** Humans, Female, Pregnancy, Male, Pregnant Women, Pandemics, Incidence, COVID-19, Surveys and Questionnaires,

## INTRODUCTION

The World Health Organization (WHO) defines prenatal healthcare as the “assistance that an expecting mother receives before her child's birth.” It focuses on education, screening, counseling, minor illness treatments, and immunization. The antenatal period is often the first time a woman gets in touch with formal health services and establishes a link between her and a referral system for complication-ridden pregnancies.<sup>[1]</sup>

The incidence of maternal morbidity and mortality gets reduced if antenatal care (ANC) is provided since it focuses on providing birth preparedness, good health maintenance measures, and awareness regarding pregnancy complications

as well as danger signs.<sup>[2]</sup> High mortality rates due to less antenatal care utilization concern in developing countries. Maternal causes were attributed to the death of 861 women in the United States in the year 2020 whereas it was 754 women in 2019.<sup>[3]</sup> Therefore, WHO recommends a minimum of four ANC visits for pregnant women and suggests a visit within 42 days of pregnancy termination. The number of

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children, residence, educational background, profession, religion, socio-economic status, and previous obstetric history are the factors that play an important role in ANC services utilization.<sup>[4]</sup>

It became a challenge for counties to sustain the provision of health quality as well as essential maternal and newborn health services during the COVID-19 pandemic.<sup>[5]</sup> The main causes related to the same have been transportation-related issues and lockdown rules for pandemic management imposed by the government or reluctance to go to health facilities due to increased risk of transmission. A reduced rate of 50–60% was reported in the services of pregnancy and newborn care due to the pandemic which might have contributed to increased maternal deaths.<sup>[6]</sup> The probability of 56,700 additional maternal deaths was reported due to decreased ANC coverage of 39.3–51.9% in the United States.<sup>[2]</sup>

The resources had to be repurposed from almost all healthcare spheres, including pregnancy care as well. This had to be done due to the collapse of healthcare infrastructure during the pandemic, which further increased the risk of maternal morbidity and mortality. The burden of psychological problems also increased i.e. anxiety and obsessive-compulsive symptoms were observed among pregnant women.<sup>[7]</sup> A disruption in healthcare services was exacerbated due to transportation-related disruption, ban on gatherings, measures to curb increased transmission rate, and work overload on health workers. The cases of health emergencies such as the Ebola outbreak reported an increased risk of spontaneous abortion, pregnancy-related hemorrhage, stillbirth, death, and neonatal mortality in West Africa.<sup>[8]</sup> Pregnant women are rendered vulnerable and might be predisposed to a detrimental impact on their health in such scenarios.

There has been very little published literature that aimed to determine COVID-19 impact on ANC services utilization among pregnant women. The study focuses to access the COVID-19 pandemic impact on ANC services utilization among pregnant women attending health facilities in the selected districts of Uttarakhand. It further aims to address the information gap in the published scientific literature by focusing on the plight of pregnant women who were unable to get sufficient health facilities.

## MATERIALS AND METHODS

### Study Setting

The study was performed in the selected 10 villages having a population of 60,000 in the Bahadarbad block of the Haridwar district of Uttarakhand. The rural development institute has been running regular health interventions, including maternal health programs in similar areas for the last 5 years.

Bahadarbad is one of the largest blocks of the Haridwar district and consists of residents of the complex of society. The community is diversified in religion, caste, income, education,

and living standards. A large number of families are migrant laborers and factory workers. The population of entire blocks was found to be dependent on the public health system. The public health system in the entire study area is crossroads. Government facilities were reported to be struggling with a shortage of staff, professionals, and technicians, as well as an irregular supply of medicine and consumables. Many health facilities also lacked adequate infrastructure, essential equipment, referral system, and other support.

### Study Design and Period

A household-based cross-sectional study was performed among pregnant women who conceived during the first COVID-19 wave (1 April 2020 to 31 December 2020). Frontline health workers conducted the study (Accredited Social Health Activists [ASHA]) in coordination with trained investigators. The investigators validated the questionnaire and data before the analysis. The incomplete forms were not included in the survey analysis. The survey data was downloaded in an excel sheet and explored in Statistical Package for the Social Sciences-19 (SPSS-19) to gather insights. Our study population constituted the pregnant women who attended ANC camps conducted at sub-center or Aganwadi levels while the data collection process was performed on 389 pregnant women who fulfilled the inclusion criteria and were included in the study analysis. The questionnaire was prepared in Google form and the responses were received through an online system. The frontline health workers facilitated an online survey at the responder's levels.

### Sample Size Determination and Sampling

A single population proportion formula was used for the determination of sample size prevalence. The assumptions made for the formula included a confidence level of 95%, a margin error of 5 and a 50% ANC services utilization proportion during the COVID-19 pandemic period since previous literature data was not present.

The single population proportion led to the sample size determination constituting 479 subjects after the addition of a 5% non-response rate. A double population proportion with the assumption of 95% level of confidence, 80% power  $d$ =permitted error 5%, P1 (percentage of outcome in an unexposed group), the ratio of an exposed and unexposed group (1), and OR from previous literature was considered as the factors that influenced the sample size.

ANC utilization was considered the study's outcome variable. However, the study's independent variables were considered sociocultural and socio-demographic background, facility-related information, and obstetric factors. Three ANC visits, 90+ iron consumption and folic acid tablets, and administration of two or more tetanus toxoid injections were considered to define ANC utilization. The pregnant women were coded as 1 if they received the entire recommended ANC and were coded as 0 if they did not receive care.

## Data Collection and Quality Assurance

An interviewer-administered questionnaire was used for data collection that was developed, followed by the literature review. The questionnaire was designed based on the factors related to socio-demographic, sociocultural, and health facilities. Data collectors and supervisors were trained for 2 days to assure data quality. A pretest was done on 10% of the sample addition to it. During the data collection process, the determination of completeness and consistency was ensured by the everyday supervision of data collectors.

## Data Management and Analysis

The inconsistencies, incompleteness and missing values were determined before proceeding to data addition into SPSS. Texts and tables were used to present the computed descriptive statistics data, including frequencies and proportions. The binary logistic regression analysis identified factors related to the utilization of ANC services for the result interpretation. The candidate variables with a *p-value* of <0.2 in the bi-variable analysis were selected using the enter method followed by the multivariable analysis to control the possible cofounders. The strength of association was represented by the estimation of the adjusted odds ratio (AOR) with 95% CI.

## RESULTS

A total of 479, out of 580 pregnant women (who had visited Antenatal Health Camps), responded to the questionnaire. Thus, leading to a response rate of 82.8%. Most respondents, i.e. 96% (n=461), were 21–30 years old. 26 (4.4) years was concluded to be the mean (standard deviation) age. 214 (55%) women were reported to have completed secondary school and above while 67.4% of them were housewives.

Total 55.5% of respondents were reported not to utilize or were late to start ANC services owing to the pandemic. Fear of COVID-19 transmission was found to be the cause for not assessing ANC services by the majority of the respondents (56.48%) followed by an irregularity as well as maternal services resource utilization to COVID-19 (33.3%) management. 17% of the subjects were found to not utilize the services due to lockdown measures and 7.2% remarked that transportation was costly for the pandemic management principles.

Out of 461 pregnant women, only 45% visited antenatal health camps and 58% were found anemic. 43% of anemic pregnant women were found with hemoglobin levels between 10–10.9%, 15% showed 7–9.9% and only 1% were found with levels below 7%. The study also revealed that only 7% of pregnant women presented a body mass index (BMI) below 18.5 while 22% of pregnant women's BMI was more than 24.9. The study also indicated that of the pregnant women who visited antenatal health camps during this period more than 72% of women gave their previous birth in less than two years. Only 15% of women obtained complete ANC (4 visits) during the study period, just half of the previous year's coverage (31%) for the same duration.

The study found that home deliveries increased significantly during the lockdown period. From April to June 2020, the percentage of home deliveries was 41% while from July to December 2020 it was 24%. The majority of pregnant women avoided visiting health facilities due to the fear of COVID 19 infection (79%).

The health workers also faced various challenges in serving their community regularly. 90% of health workers did not get any protective equipment or kit from their departments, 60% faced transportation challenges and 19% faced their health or family member's health issues. The majority of health centers faced the challenges of the limited supply of iron folic acid (IFA) tetanus toxoid (TT), calcium, and contraceptives.

“Women's age, residence, educational background, stillbirth history, utilization of resources related to maternity service for COVID-19 management, fear of COVID-19 transmission, and transport services disruption were found to be the major predictors for ANC services utilization.

Pregnancy during the age range 21 to 30 years was found to increase the ANC service utilization by 12 times compared to pregnancy above age >30 years. Women residing in urban areas were found to be 9 times more likely to utilize ANC services than women residing in rural areas. 79% less probability of ANC services utilization was reported amongst women who had no formal education compared to the ones who had secondary and above education.

A 32% reduced full-service utilization was revealed as an interruption and diversion of maternal healthcare services due to COVID-19 responses. A four-fold increased ANC service utilization was found to be directly related to increased transport accessibility. On the other hand, full-service utilization by 87% was found to be associated with the fear of COVID-19 infection.

## DISCUSSION

The study revealed that only 15% of pregnant women were able to utilize the recommended ANC services during the COVID-19 pandemic. The number was found to be comparatively lower than the data reported in the Indian studies (45%). A decreased coverage of ANC was provided the previous year (31%) as suggested by the study findings and it could be possibly due to differences in certain parameters that included sociocultural and awareness characteristics, socio-demographic characteristics, and study period differences (previous studies were conducted before the COVID-19 pandemic period, unlike the current study). Impositions on transportation and movement, fear of transmission, economic constraints, workforce as well as medical resource utilization issues, and health workers repurposing were reported to be associated with decreased utilization of ANC services. A positive and significant association was observed between the age of respondents and ANC service utilization.

Previous studies conducted in developing countries remarked higher educational levels to be related to improved ANC service utilization.<sup>[9,10]</sup> Our study demonstrated that women with secondary education better utilize the ANC services than women without no formal education. Thus, educational status correlated with an increased understanding of danger signs and as well as bad consequences owing to not attending ANC services.

ANC services utilization reduction was observed because of COVID-19 transmission fear. Women feared going to prenatal checks and were concerned about getting contracted to COVID-19.<sup>[11]</sup> The creation of low awareness from the responsible body and gaps in the practice of preventive COVID-19 measures were found to be the factors responsible.

A limited or altered care provision was found to contribute to an increased COVID-19 transmission fear. The pregnant women reported an increased level of anxiety. 100 pregnant women who were a part of a survey conducted in Italy feared hospital visits for childbirth since they feared vertical transmission and remarked being scared of getting infected with the novel coronavirus. Increased risk of ANC service utilization was found to be related to lack of transport accessibility.

The problem related to lack of transportation led to increased complications and deaths of pregnant women due to lack of proper care in Nepal.<sup>[2]</sup> COVID-19 prevention measures were associated with unemployment, reduced income, and low purchasing capacity.<sup>[12]</sup> These factors altogether led to the change in priorities and limited utilization of ANC services. An obstruction and repurposing of maternal healthcare services led to a decreased full-service utilization by 32%. Various studies conducted in the Asia Pacific region reported a decrease in service utilization by half. Maternity wards were converted into COVID-19 units which led to a stressful situation among the healthcare workforce and it became tough to maintain a similar quality of services.<sup>[13]</sup> The pandemic depicted the shortcomings in the healthcare system, with the majority of both health facilities and staff being ill-equipped in India and Nepal.

An even worse situation was observed in the rural areas owing to the absence of well-maintained infrastructure and resources. III equipment and collapse of the health system or decisions leading to a workforce reduction in the various healthcare sector due to repurposing of both healthcare staff and equipment restricted the number of ANC visits.

## CONCLUSION AND RECOMMENDATION

The study suggested reduced utilization of ANC services during the pandemic among pregnant women in the Bahadarbad block of Haridwar. The significant responsible factors were women's age, residence, educational status, repurposing of maternity healthcare services, fear of COVID-19 transmission, and transportation disruptions.

Thus, efforts should be taken to enhance maternal health services. Information, Education, and Communication (IEC) materials should be produced to impart knowledge to curb the increased risk of complications among pregnant women. Transportation services could have made the situation better and should be provided to pregnant women in such scenarios. Phone-in services could have helped in better transportation. Virtual consultation with obstetricians provided via telemedicine services to women seeking maternal health services in emergency conditions can be of great help.

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## CONFLICTS OF INTEREST

There are no conflicts of interest.

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