

Maternal Healthcare Services in a Rural Area of Haryana during the COVID-19 Pandemic: A Community-Based Study

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Abstract

Background: It is well documented that the utilization of maternal healthcare services during pregnancy and childbirth plays a significant role in reducing maternal morbidity and mortality. Disruptions in maternal healthcare services during the coronavirus disease 2019 (COVID-19) pandemic have been reported. However, there is a paucity of literature from rural areas, as most of the previous studies are either record-based or conducted in tertiary care centers. This study aimed to determine the proportion of women who received the recommended maternal healthcare services during the COVID-19 pandemic and to study various factors associated with the utilization of services. **Material and Methods:** In this community-based study, we assessed the utilization of maternal healthcare services among 520 women residing in the Ballabgarh Block of District Faridabad, Haryana, whose antenatal, intrapartum, and postnatal period coincided with the first wave of COVID-19 pandemic. Domiciliary visits were made, and women were interviewed retrospectively regarding maternal healthcare services utilized by them. The antenatal care (ANC) cards were reviewed, and details were corroborated. **Results:** Full ANC was received by 15.3% of women, and 45% of women had less than four antenatal visits. 30.9% of participants had cesarean delivery. The proportion of cesarean delivery in private facilities was significantly higher than in government facilities [Odds Ratio (OR) (95% Confidence intervals (CI))=10.04 (5.87–17.19); $P < 0.001$]. In multivariate logistic regression, gravidity was negatively associated with full ANC [OR (95% CI)=0.43 (0.25–0.74); $P = 0.002$]. **Conclusion:** Fewer women received the recommended maternal healthcare services during the COVID-19 pandemic. Detailed assessment of health systems and factors affecting routine healthcare services, during the pandemic, can help improve the readiness and response in the future.

Keywords: COVID-19, maternal healthcare services, rural, utilization

INTRODUCTION

The utilization of maternal healthcare services during pregnancy and childbirth plays a significant role in reducing maternal and neonatal morbidity and mortality.^[1,2] The main purpose of antenatal care (ANC) is the prevention and early diagnosis of pregnancy complications. Similarly, intrapartum care provides basic and emergency care to women during labor, delivery, and the postpartum period. Lack of access to appropriate care may potentially have adverse short- and long-term impacts on women and newborns.^[3,4]

The utilization of maternal healthcare services is affected by many factors. It has been reported that socio-demographic factors such as education, household's wealth status, caste, and religion and health system-related factors such as availability and accessibility significantly influence the utilization of services.^[5,6] In addition, humanitarian crises such as calamities, pandemics, and disasters lead to significant

interruptions in the provision of routine maternal and child health services.^[7] Disruptions in maternal healthcare services during the coronavirus disease 2019 (COVID-19) pandemic have been of major concern, as there was a complete cessation of services during the first few months of the COVID-19 pandemic.^[8] Previous studies have documented the reduction in the utilization of maternal healthcare services during the COVID-19 pandemic. However, most of the studies are either record-based or conducted among women admitted to tertiary care centers.^[9-11] There is a paucity of literature from rural areas,

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How to cite this article: Singh T, Kaur R, Kant S, Mani K, Yadav K, Gupta SK. Maternal healthcare services in a rural area of Haryana during the COVID-19 pandemic: A community-based study. *Indian J Community Med* 2023;48:715-20.

Received: 24-01-23, **Accepted:** 30-06-23, **Published:** 07-09-23

Access this article online

Quick Response Code:



Website:
www.ijcm.org.in

DOI:
10.4103/ijcm.ijcm_43_23

which have peculiar sociocultural, geographical, and economic barriers to access maternal healthcare services.

In this community-based study, we assessed the utilization of maternal healthcare services by retrospectively interviewing the women whose antenatal, intrapartum, and postnatal periods coincided with the first wave of COVID-19 pandemic. The objective of the study was to determine the proportion of women who received the recommended maternal healthcare services during the COVID-19 pandemic and to study various socio-demographic factors associated with the utilization of maternal healthcare services.

MATERIALS AND METHODS

Study setting: The study area comprised 28 villages in the Ballabgarh Block of District Faridabad, Haryana, and was a part of the Health and Demographic Surveillance Site (HDSS), Ballabgarh. Each individual in the population had a unique identification number. The primary health needs of the population were catered by a network of twelve subcenters, under two primary health centers. Each subcenter had at least two health workers. These village-level health workers visited every household in their area, twice a month, according to a predetermined schedule, and gathered information on health and vital events. The data thus collected were entered into the computerized Health Management and Information System (HMIS) on a monthly basis. In addition, a yearly census was conducted and HMIS was updated on an annual basis. Thus, the HMIS was a database having updated information on demographics, chronic morbidity, family planning, pregnancy, deaths, and other health-related details of all the individuals residing in the HDSS.^[12] For this study, census data from the year 2020 were used.

Study population: Pregnant women registered in the HMIS as on March 31, 2020, and residing in the study area were included. These were the women whose antenatal, intranatal, and postnatal period coincided with the first wave of COVID-19 pandemic (March 2020–November 2020).

Sample size and sampling: Sample size calculation was based on the proportion of women who had at least four ANC visits in District Faridabad as per the National Family Health Survey (NFHS 4) (2015–2016), that is, 30%.^[13] Assuming a relative precision of 15%, with a 95% confidence interval, the required sample size was calculated as 415 pregnant women. Including an additional 10% for pregnancy wastage and another 10% for migration, nonavailability, and nonresponse, the final sample size was calculated as 518, which was rounded off to 520.

A list of pregnant women (registered in HMIS until March 31, 2020) was obtained, which included a total of 900 women. A sequence of random numbers was generated using the Microsoft Excel program, and 520 women were selected from the list by simple random sampling.

Data collection: House-to-house visits were made for the selected participants. The period of data collection was December 17, 2020, to January 26, 2021. A written informed

consent was obtained. The participants were provided with information regarding the expected duration of the participation, expected benefits of the research, any risk associated with the study, confidentiality of records, and freedom to participate and to withdraw from the study at any time.

A semi-structured interview schedule was administered and information regarding socio-demographic details, obstetric history, and details of maternal healthcare services utilized by the women were obtained retrospectively. The ANC cards (provided by health workers to all pregnant women at the time of registration) were reviewed for corroborating various details regarding the ANC. To ensure uniformity and credibility of information, women who did not have ANC cards were excluded. Data were entered into Epicollect application and then transferred to Microsoft Excel 2019.

Operational definitions

Maternal healthcare services: It refers to the services provided for ANC, care at delivery, and postnatal care (PNC), to ascertain the well-being of both mother and newborn.^[14]

Recommended maternal healthcare services: These include the following services:

- (i) Full ANC (defined as registration before 12 weeks of pregnancy, at least four ANC visits, monitoring of weight, blood pressure and hemoglobin at each visit, immunization against tetanus, and at least 100 iron folic acid (IFA) tablets)
- (ii) Institutional delivery
- (iii) Full PNC, that is, discharge from hospital/healthcare facility after 48 hours in institutional deliveries for vaginal delivery and after five days in cesarean, and at least three postnatal visits by healthcare workers.^[15,16]

Statistical analysis

The data were analyzed using Stata 15.2 (College Station, Texas, USA). Mean, Standard deviation (SD) and frequency (percentage) were reported for continuous and categorical variables, respectively. The utilization of maternal healthcare services was reported as the percentage with a 95% confidence interval.

The association of socio-demographic and obstetric factors with the utilization of various maternal healthcare services was analyzed using logistic regression analysis. Univariate analysis followed by multivariate logistic regression analysis was performed. Variables with *P* value < 0.25 in univariate analysis were included for multivariate logistic regression. A *P* value of < 0.05 was considered statistically significant.

Ethical considerations: The study was conducted after approval from the Ethics Committee of the institute. Written informed consent was obtained from all the participants. All information collected was kept confidential.

RESULTS

Of the 520 pregnant women selected from the HMIS data,

32 (6.2%) were not eligible to participate because of abortion, and ANC card was not available with 29 (5.6%) women, two had migrated to other places, and one had died due to postnatal complications. Hence, 456 (87.7%) women were eligible to participate in the study. Of these 456 women, 22 (4.8%) were not available even after two home visits and three (0.7%) refused to give consent. A total of 431 women were enrolled in the study. Thus, the response rate for the study was 94.5%.

The socio-demographic details of the participants are shown in Table 1. A total of 66 women (15.3%) received full ANC, and early registration of pregnancy was reported in 283 (65.7%) of the participants. Less than half (45%) of the participants had at least four antenatal visits, 278 (64.5%) received at least 10 IFA tablets, and 293 (68%) of the participants were examined at each visit. Most (98.6%) of the participants delivered in a healthcare facility, and six (1.4%) participants had home delivery. Nearly half (50.8%) of the participants delivered in a government healthcare facility. Almost one-third (30.9%) of the participants had a cesarean delivery. Nearly half (44.7%) of the participants were discharged before the optimal duration.

Table 1: Distribution of participants by socio-demographic and obstetric characteristics

Variable	Number (n=431)	Percentage (%)
Age group (years)		
<20	20	4.6
20–24	218	50.6
25–29	159	36.9
≥30	34	7.9
Mean age±SD (years)	24±3.3	
Education		
Illiterate	68	15.8
Primary	135	31.3
Secondary	118	27.4
Graduation and above	110	25.5
Economic status		
Above poverty line	375	87.0
Below poverty line	56	13.0
Caste		
Scheduled caste/scheduled tribe	154	35.7
Others	277	64.3
Type of family		
Nuclear	126	29.2
Extended	305	70.8
Obstetric details		
Gravidity		
1	132	30.6
≥2	299	69.4
Living children (at the time of pregnancy)		
No living child	170	39.4
1	163	37.8
2	71	16.5
3	18	4.2
4 or more	9	2.1

One hundred and fifty-nine (36.9%) participants received PNC.

Table 2 shows the association of socio-demographic and obstetric factors with type of delivery. The proportion of cesarean delivery in private health facilities (53.3%) was significantly higher than in government facilities (10.0%) [OR (95% CI)=10.04 (5.87–17.19); $P < 0.001$]. On bivariate analysis, age, education, caste, type of family, and gravidity had a P value of less than 0.25 and were included in the multivariate analysis. In multivariate logistic regression analysis, gravidity was significantly associated with receipt of full ANC with an odds ratio of 0.43 (95% CI = 0.25–0.74) (P value 0.002) [Table 3]. There were no significant associations between intrapartum care and postpartum care.

DISCUSSION

Our study revealed that only 15% of the pregnant women received full ANC, and more than half (55%) of the women did not have a minimum four antenatal visits during the study period. Deficiencies in the provision of maternal health services during the COVID-19 pandemic have been reported previously in India and other countries. Ulaganeethi *et al.* (2021),^[17] in a study conducted in south India, reported that 41.3% of pregnant women did not have the recommended number of ANC visits, while Goyal *et al.*^[18] in a hospital-based study in Jodhpur reported that 43.2% of the women had fewer antenatal visits than advised.

Although the proportion of women who received at least four ANC visits (45%) in our study was similar to the proportion reported by NFHS-4 for the state of Haryana, however, it was lesser than what was reported in NFHS-5 for Haryana (60.4%), as well as the national figure of 58.1%.^[19]

Before the COVID-19 pandemic, the findings of NFHS-4 (2015–16) indicated that 18% of pregnant women received full ANC in rural Haryana,^[13] which is higher than that reported proportion in our study (15%). Although the figures for early registration are comparable (63% in NFHS-4 and 65% in our study), it may be because the participants in our study were the women who were registered in the HMIS up to March 30, 2020, that is, before the lockdown. However, it was much less than the percentage (85.2%) reported in NFHS-5.^[19]

In our study, 98.6% of the participants delivered in a healthcare facility, and half of them delivered in a private health facility. The proportion of delivery by cesarean section was 30.9% in our study, which is higher than the reported in NFHS-4 (11.7%).^[13] This proportion is also higher than that reported in NFHS-5 (19.5%).^[19] This could be due to an increase in referrals from government hospitals, as possessing a COVID-19-negative report was mandatory for admission, and most of the participants did not have the report. Hence, they visited private hospitals. Earlier studies have shown that private facilities contribute more to cesarean deliveries than government hospitals.^[20] Bhatia (2019),^[21] Zhang *et al.* (2019),^[22] and Bisht *et al.* (2020)^[23] also reported

Table 2: Association of socio-demographic and obstetric characteristics with type of delivery

Variable	Category	Total N=431	Type of delivery		Unadjusted		Adjusted	
			NVD (%) n=298	LSCS (%) n=133	Odds ratio (95% CI)	P	Odds ratio (95% CI)	P
Age group (years)	<25	238	171 (71.8)	67 (28.2)	Reference		Reference	
	25–29	159	108 (67.9)	51 (32.1)	0.83 (0.54, 1.28)	0.402	0.82 (0.48, 1.41)	0.481
	≥30	34	19 (55.9)	15 (44.1)	0.50 (0.24, 1.03)	0.061	0.47 (0.19, 1.15)	0.098
Education	Graduation and above	110	64 (58.2)	46 (41.8)	Reference		Reference	
	Secondary	118	82 (69.5)	36 (30.5)	1.64 (0.95, 2.82)	0.076	1.12 (0.59, 2.12)	0.737
	Primary	135	101 (74.8)	34 (25.2)	2.13 (1.24, 3.67)	0.006	1.30 (0.68, 2.49)	0.431
	Illiterate	68	51 (75.0)	17 (25.0)	2.16 (1.11, 4.20)	0.024	1.16 (0.53, 2.53)	0.705
Economic status	APL	375	262 (69.9)	113 (30.1)	Reference		–	
	BPL	56	36 (64.3)	20 (35.7)	0.78 (0.43, 1.40)	0.400	–	
Religion	Hindu	409	282 (69.0)	127 (31.0)	Reference		–	
	Others	22	16 (72.7)	6 (27.3)	1.20 (0.46, 3.14)	0.709	–	
Caste	Others	277	178 (64.3)	99 (35.7)	Reference		Reference	
	SC/ST	154	120 (77.9)	34 (22.1)	1.96 (1.25, 3.09)	0.004	1.40 (0.83, 2.36)	0.205
Type of family	Nuclear	126	86 (68.2)	40 (31.8)	Reference		–	
	Extended	305	212 (69.5)	93 (30.5)	1.06 (0.68, 1.66)	0.798	–	
Place of delivery (n=425)	Private	206	95 (46.1)	111 (53.9)	Reference		Reference	
	Government	219	197 (90.0)	22 (10.0)	10.46 (6.23,17.58)	<0.001	10.04 (5.87,17.19)	<0.001
Gravidity	1	132	86 (65.2)	46 (34.8)	Reference		Reference	
	≥2	299	212 (70.9)	87 (29.1)	1.30 (0.84, 2.02)	0.234	0.88 (0.51, 1.50)	0.629

an increase in cesarean section rates during the COVID-19 pandemic. We found that 159 (36.9%) participants received full PNC in our study area. This is in contrast to the study conducted by Padhye *et al.*^[24] in Assam, where 77.3% of the women received PNC during the pandemic. The findings of the NFHS-4, that is, during the pre-COVID-19 period, also reported a higher proportion (67.3%) of women who received PNC in Haryana.^[13] This can be explained by the fact that home visits by healthcare workers in our study area had declined due to the lockdown.

We found that participants who were multigravida were less likely to have full ANC. Similar findings were reported by

Kaur *et al.* (2018)^[25] and Gupta *et al.* (2017)^[26] where lesser utilization of maternal healthcare services was observed among mothers with higher parity. This might be because as the age and experience of the mothers increase, they have better knowledge and understanding of pregnancy and related events, and hence, they might tend to miss the routine ANC visits if there are no complications.

An analysis of NFHS-4 data by Paul and Chouhan (2020) showed that higher education, economic status, and caste other than scheduled castes/tribes were significantly associated with higher utilization of maternal healthcare services.^[27] In a study conducted in Uttarakhand, Bijalwan *et al.* (2023)^[28] also

Table 3: Association of socio-demographic and obstetric characteristics with receipt of full antenatal care

Variable	Category	Total N=431	Full antenatal care received* (% (n=66))	Unadjusted		Adjusted	
				OR (95% CI)	P	OR (95% CI)	P
Age group (years)	<25	238	42 (17.6)	Reference		Reference	
	25–29	159	21 (13.2)	0.71 (0.40,1.25)	0.237	0.77 (0.41,1.44)	0.412
	≥30	34	3 (8.8)	0.45 (0.13,1.55)	0.206	0.54 (0.15,1.92)	0.338
Education	Graduation and above	110	24 (21.8)	Reference		Reference	
	Secondary	118	15 (12.7)	0.52 (0.26,1.06)	0.071	0.52 (0.25,1.10)	0.090
	Primary	135	20 (14.8)	0.62 (0.32,1.20)	0.158	0.74 (0.36,1.51)	0.411
	Illiterate	68	7 (10.3)	0.41 (0.17,1.01)	0.054	0.57 (0.22,1.47)	0.244
Economic status	APL	375	55 (14.7)	Reference		–	
	BPL	56	11 (19.7)	1.42 (0.69,2.92)	0.337	–	
Caste	Others	277	48 (17.3)	Reference		Reference	
	SC/ST	154	18 (11.7)	1.68 (0.60,4.72)	0.326	0.77 (0.41,1.42)	0.397
Family	Nuclear	126	13 (10.3)	Reference		Reference	
	Extended	305	53 (17.4)	0.63 (0.35,1.13)	0.121	1.50 (0.76,2.97)	0.246
Gravidity	1	132	31 (23.5)	Reference		Reference	
	≥2	299	35 (11.7)	1.83 (0.96,3.49)	0.067	0.51 (0.29,0.92)	0.024

reported that utilization of ANC services during COVID-19 was associated with the age and educational status of women.

In our study, we did not find a significant association between utilization of full ANC services and age, education, economic status, and caste. It could be because the number of women who received full ANC was small (n = 66). Due to further smaller numbers in each of the subcategories, the statistical association may have been missed, even if it existed.

Our study had a few limitations. We did not capture the effect of COVID-19 pandemic on the timeliness of the services and on pregnancy outcomes and, thereby, suggest further research in this regard. However, the community-based study design, selection of participants by simple random sampling, and good response rate were some of the strengths of this study.

Previous studies have reported that lack of availability of transport and fear of getting COVID-19 were important reasons for the reduction in utilization of services. After the initial phase of the pandemic, the Government of India released guidelines for the operationalization of maternal healthcare services during the COVID-19 pandemic. Newer initiatives such as tele-consultation were introduced to mitigate the adverse effect of reduced visits. The *e-Sanjeevani* platform under the Ayushman Bharat was utilized to provide telemedicine services to patients, as well as doctor-to-doctor

consultation. The frontline workers such as Accredited Social Health Activists (ASHAs) and Auxillary Nurse Midwives (ANMs) played a proactive role in the provision of maternal healthcare services.^[29]

CONCLUSION

A lesser proportion of women received the recommended maternal healthcare services during the COVID-19 pandemic in the study area. A detailed review of the health systems and assessment of facilitators and barriers in the provision of routine healthcare services, during the pandemic, can help improve the readiness and response to such challenging situations in future.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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