

Original Research Article

Gap between maternal preferences and actual mode of delivery in Agra District of Uttar Pradesh: observational study

Arti Verma^{1*}, Pooja Verma², Preeti Gupta³, Prathyusha Lingareddy⁴

¹Department of Community Medicine, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India

²Department of Emergency Medicine, Santosh Medical College, Ghaziabad, Uttar Pradesh, India

³Department of Physiology, Autonomus Medical College Kanpur Dehat, Uttar Pradesh, India

⁴Department of Community Medicine, Ganesh Shankar Vidyarthi Memorial Medical College, Kanpur, Uttar Pradesh, India

Received: 23 May 2026

Accepted: 20 August 2026

*Correspondence:

Dr Arti Verma,

E-mail: drarti010@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The raising trend of cesarean section deliveries worldwide is a matter of concern. Most of the women prefer normal institutional normal vaginal delivery but their actual mode of delivery depends on their obstetric and healthcare factors. Objective was to assess the gap between preference and practice regarding the delivery mode and to identify factors associated with delivery against maternal preference among women in Agra, Uttar Pradesh.

Methods: A community based cross sectional study conducted among women who had delivered a live baby within the previous one year in selected rural and peri-urban areas of Agra district. A multistage stage random sampling, 300 women were interviewed with pre tested and structured questionnaire, 272 institutional deliveries were included. Data on socio-demographic characteristics, obstetric history, antenatal care and preference were collected and analyzed using descriptive statistic, chi-square test, Fisher's exact test and logistic regression analysis using JAMOV software.

Results: Out of 272 deliveries, 223 (82.0%) were normal vaginal and 49 (18.0%) were cesarean section. Most women (97.4%) preferred normal delivery. Maternal education, husband's education, parity, previous mode delivery and type of health facility were significantly associated. Logistic regression identified place of delivery (AOR=2.93, p=0.004) and previous mode delivery (AOR=7.69, p<0.001) as significant predictors.

Conclusions: A considerable gap exists between preference and practice. Institutional factors and previous obstetric history influence delivery outcomes. Strengthening antenatal counselling and promoting evidence-based obstetric practices, may help reduce unnecessary cesarean sections.

Keywords: Cesarean section, Institutional delivery, Maternal preference, Mode of delivery

INTRODUCTION

The people hold a common traditional belief that childbirth is a natural process which does not require any medical intervention and should be best if it is carried out at home by the family 'Dai', who is a well-known, trusted, familiar, easily available, accessible, and less expensive. This attitude comes with poverty, illiteracy, and ignorance regarding delivery complications, leading to a higher preference for home delivery in developing countries such as India.¹ So many women usually arrive

at the hospital with life-threatening complications, which leads to emergency cesarean deliveries under suboptimal circumstances. On the other hand, in developed countries, women often opt for cesarean delivery due to their better understanding of its benefits and improved health outcomes, and the importance given to the right to self-decision making, regarding mode of delivery.²

The increasing rate of births by cesarean section is an issue of concern in many countries. Even though the WHO recommended no region in the world is justified to

have a cesarean section rate greater than 10-15%, it is the most common obstetrical operation worldwide.¹ It is difficult to pinpoint an exact cause for the rising rates of cesarean sections. The advent of electronic fetal monitoring, as well as better operative techniques, the availability of tertiary care neonatal facilities, and legal, psychological, and socio-demographic factors play a contributing role. India is not an exception to this trend. The rate of cesarean sections in India has increased as follows: from 2.9% of the childbirths in 1992-93 to 7.1% in 1998-99, and further to 10.2% in 2005-06 and a steady rise to 17.2 percent in 2015-16¹ There is a vast variation in rates across states and among rural and urban areas, from 2-30%.³

Also, there is a large difference between cesarean births in public and private health facilities, averaging almost 30%. Two studies from Chennai and East Delhi showed a c-section rate of 32.6% and 34.4%, respectively.¹ Clearly, these rates are unacceptably high all over the globe.² When a cesarean section (CS) is medically justified, it is an effective way to prevent maternal and perinatal mortality and morbidity.³ However, there is much evidence found where the cases were performed without clear medical intervention, and a safe vaginal delivery could have been achieved.⁴

In developing countries like India, two main reasons for influencing the pregnant women choose cesarean section over normal delivery: 1) fear of complications and 2) lack of sufficient knowledge about normal vaginal delivery.⁵ There are several studies across the world and from India that have found limited availability of healthcare facilities, socioeconomic disparities, geographic variation, social determinants, literacy levels, etc., significantly affecting maternal healthcare utilization.^{8,9} For these challenges, India has taken multiple initiatives to eliminate barriers for maternal healthcare utilization, such as a conditional cash transfer system such as Janani Suraksha yojana, strengthening of health facilities under the National Health Mission, and infrastructural development.^{10,11}

Despite all the efforts and the implementation of various maternal-related health programs, India is still lagging in finding the optimal maternal health care utilization rates. Whether all these factors still significantly predict the rate of utilization of a health facility as a preferred place of delivery remains a concern. With this background, the present study was planned to assess the gap in preferences and practices regarding the mode of delivery of the baby among the mothers who delivered within the previous year in Agra District.

METHODS

Material and methods

This community based cross-sectional study was carried out at the department of community medicine, SN

Medical College, Agra among eligible women who delivered a live baby within the past one year i.e., from January 2019-2020. The study was conducted in selected area of Agra district which is situated on western border of Uttar Pradesh surrounded by states of Rajasthan and Madhya Pradesh. According to census 2011, total population of Agra was 44,18,797 with 20,53,844 females. All mothers having a live child of less than one year of age and gave informed consent were included in study and those mothers who were sick were excluded we have taken the prevalence of institutional delivery in India is 52.1% (NFHS-IV).³ Thus 52.1% prevalence of institutional delivery was considered as reference for calculating the sample size as reference and by using the formula $4pq/d^2$, a sample size of 131 was calculated with 95% confidence level and 5% margin of (absolute) error. After considering unreliable or incomplete responses a round-off sample size of 150 was finalized for each rural, urban, and peri-urban area of Agra district with a total sample size of 450.

Sampling technique multi stage random sampling technique was used to select one area from each of rural, peri-urban, and urban parts of Agra.

In first step we make a list of all community development blocks of Agra district while a separate list of peri-urban and urban wards was prepared from the list of municipal wards of Agra city.

For selection of rural area, one primary health centre from the list of community development blocks was selected by random technique than later, All the eligible women of the selected village and the periurban and urban mohalla was included in the study.

Methodology

A house-to-house visit was made to find eligible mothers who had a live child of less than one year of age in selected rural (Shyamo village), peri-urban (Ukhara) and urban (Kamla Nagar) areas of Agra district but due to COVID-19 pandemic we were not able to collect data of urban area and so, this study restricts its findings to rural and peri-urban areas of Agra district of Uttar Pradesh only. Thus, a total of 300 participants were interviewed using a pretested, predesigned, and structured questionnaire. All interviews were conducted in private, unless the respondents were comfortable with presence of family members. After establishing a good rapport and obtaining verbal consent from participants in every visited household, the information was recorded regarding their socio-demographic profile and preferences and practices related to place and mode of delivery of current child. Place of delivery was either their home or an institution (government or private) while mode of delivery was either normal vaginal delivery, assisted vaginal deliveries (AVD) or CS delivery. Both NVDs and AVDs were included in VD for purpose of analysis.

Questions related to antenatal and intra-natal events of current birth (e.g., number, place, and quality of antenatal care; presence of ASHA and other decision makers at the time of delivery etc.) as well as any history of abortion and mode of delivery of previous child were also included in the schedule. The information thus collected was transferred on predesigned classified tables and analysed through MS excel. Ethical clearance for the study was taken from the institutional ethical committee of SN Medical College, Agra Univariate, bivariate as well as multivariate analysis was done and appropriate statistical tests like Pearson's chi square test, Fisher exact test and logistic regression test were used in the study. The statistical analysis has been carried out using JAMOVI software 2.7.18 version.

RESULTS

Table 1 presents the distribution of deliveries according to place and mode of delivery among 272 women. Overall, 223 (82.00%) deliveries were normal vaginal deliveries and 49(18.00%) were cesarean section, yielding and overall normal vaginal delivery: cesarean ratio 4.5:1. Nearly two-thirds of deliveries (64.3%) occurred in government health care institutions, while 35.7% took place in private health care institutions. Government facilities demonstrated a marked predominance of normal vaginal deliveries (160 NVD vs 15 CS; ratio 10.7:1). In contrast, private institutions showed a relatively higher proportion of cesarean deliveries (63 NVD versus 34 CS; ratio 1.8:1).

Table 1: Distribution of deliveries according to mode and place of delivery (n=272).

Place of delivery	NVD	CS	Total deliveries	Ratio of NVD:CS	Percentage (% out of N)
Government healthcare institution	160	15	175	10.7/1	64.33
Private healthcare institution	63	34	97	1.8/1	35.66
Total deliveries	223	49	272	4.5/1	100

Table 2: Determinants affecting the preferences, practices and the gap between preferred and actual mode of delivery among women who delivered in the past one year.

Socio-demographic variables	Normal delivery			Cesarean delivery			Total n (%)
	Preference (n)	Practice As per preference N (%)	Against preference N (%)	Preference (n)	Practice As per preference N (%)	Against preference N (%)	
Age (years)							
<19	2	2 (100.00)	0 (0.00)	0	0 (0.00)	0 (0.00)	2 (0.74)
19-24	149	124 (83.22)	25 (16.78)	3	3 (100)	0 (0.00)	152 (55.88)
25-29	101	83 (82.18)	18 (17.82)	3	1 (33.33)	2 (66.67)	104 (38.24)
30-34	12	12 (100.00)	0 (0.00)	1	1 (100)	0 (0.00)	13 (4.78)
>35	1	0 (0.00)	1 (100.00)	0	0 (0.00)	0 (0.00)	1 (0.37)
For normal delivery: $\chi^2=0.7840$; $p=0.3759$; $df=1$ (In two groups ≤ 30 and ≥ 30 years). For cesarean delivery $\chi^2=0.4667$; $p=0.4945$; $df=1$ (In two groups ≤ 30 and ≥ 30 years)							
Caste							
General	110	91 (82.73)	19 (17.27)	1	0 (0.00)	1 (100.0)	111 (40.80)
OBC	112	91 (81.25)	21 (18.75)	4	4 (100)	0 (0.00)	116 (42.64)
SC/ST	43	39 (90.70)	4 (9.30)	2	1 (50.00)	1 (50.00)	45 (16.54)
Normal delivery: $p=0.35635$; $\chi^2=2.063$; $df=2$. Cesarean delivery: $p=0.1027$; $\chi^2=4.55$; $df=2$							
Type of Family							
Nuclear	116	94(81.03)	22	3 (2.52)	2	1	119
Joint	149	127	22	4 (2.61)	3	1	153
Normal delivery: $p=0.3619$; $\chi^2=0.8310$; $df=1$. Cesarean delivery: $p=0.540$; $\chi^2=0.375$; $df=1$							
Mother's education							
Illiterate	84	77	7	3 (3.45)	2	1	87
1 st -12 th class	157	130	28	4 (2.48)	4	0	161
UG/PG	24	14	9	0 (0)	0	0	24
Normal delivery: $\chi^2=12.7207$; $p=0.00172$; $df=2$. Cesarean delivery: $\chi^2=1.555$; $p=0.212$; $df=1$							
Husband's education							
Illiterate	38	36	2	1 (2.56)	1	0	39
1 st -12 th class	192	162	30	5 (2.54)	3	2	197
UG/PG	35	23	12	1 (2.78)	1	0	36
Normal delivery: $p=0.003$; $\chi^2=11.5649$; $df=2$. Cesarean delivery: $p=0.57121$; $\chi^2=1.122$; $df=2$							
Socioeconomic Status							
Lower	89	77 (86.52)	12 (13.48)	0	0 (0.00)	0 (0.00)	89 (32.72)
Middle	170	140 (82.35)	30 (17.65)	6	2	1	176

Continued.

Socio-demographic variables	Normal delivery			Cesarean delivery			Total n (%)
	Preference (n)	Practice As per preference N (%)	Against preference N (%)	Preference (n)	Practice As per preference N (%)	Against preference N (%)	
Age (years)							
Upper	6	4 (66.67)	2 (33.33)	1	0 (0.00)	1 (100.00)	7 (2.57)
Husband's Occupation							
Unskilled/semiskilled	191	159	32	3 (1.55)	1	2	194
Skilled/highly skilled	74	61	12	4 (5.13)	4	0	78
Parity							
1 st child	89	71 (79.78)	18 (20.22)	2	1 (50.00)	1 (50.00)	91 (33.45)
2 nd child	120	97 (80.83)	23 (19.17)	3	3 (100)	0 (0.00)	123 (45.22)
3 rd child	47	45 (95.74)	2 (4.26)	1	0 (0.00)	1 (100.00)	48 (17.64)
>3 child	9	8 (88.89)	1 (11.11)	1	1 (100.00)	0 (0.00)	10 (3.67)
Normal delivery: p=0.0108; $\chi^2=6.4860$; df=1. Cesarean delivery: p=0.42735; $\chi^2=0.63$; df=1							
Delivery of previous child							
Normal	159	145 (91.19)	14 (8.81)	2	1 (50.00)	1 (50.00)	161 (88.95)
Cesarean	17	5 (29.41)	12 (70.59)	3	3 (100.00)	0 (0.00)	20 (11.04)
Normal delivery: p=0.00001; $\chi^2=46.5624$; df=1. Cesarean delivery: p=0.170; $\chi^2=1.1875$; df=1							
History of abortion							
Aborted	23	19 (82.61)	4 (17.39)	0	0 (0.00)	0 (0.00)	23 (8.45)
Not Aborted	242	204 (84.30)	38 (15.70)	7	5 (71.43)	2 (28.57)	249 (91.54)
Normal delivery: p=0.8321; $\chi^2=0.0449$; df=1. Cesarean delivery: p=0.170; $\chi^2=1.1875$; df=1							
Number of ANC visits							
Up to 3	101	87	14	3 (2.88)	3	2	104
4 or more	164	134	30	4 (2.38)	4	0	168
Normal delivery: p=0.346; $\chi^2=0.8863$; df=1. Cesarean delivery: p=0.0533; $\chi^2=3.733$; df=1							
ASHA at delivery							
Present	223	190 (85.20)	33 (14.80)	4	2 (50.00)	2 (50.00)	227 (83.46)
Absent	42	31 (73.80)	11 (26.19)	3	3 (100.00)	0 (0.00)	45 (16.54)
Normal delivery: p=0.068; $\chi^2=3.3126$; df=1; Cesarean Delivery: p=0.1472; $\chi^2=2.1$; df=1							
Type of Facility							
Government	173	158 (91.33)	15 (8.67)	2	0 (0.00)	2 (100.00)	175 (64.34)
Private	92	63 (68.48)	29 (31.525)	5	5 (100.00)	0 (0.00)	97 (35.66)
Normal delivery: p=0.0000009; $\chi^2=22.64$; df=1. Cesarean delivery: p=0.0081; $\chi^2=7$; df=1							

In this study we included 272 women, majority (97.43%) of the study subject's preferred normal delivery over cesarean delivery (2.57%). Of those who had cesarean delivery 28.57% had it against their preference for normal delivery. Additionally, who preferred normal delivery (16.60%) had to undergo cesarean delivery against their preference difference however statistically insignificant (Table 2).

Women whose was age less than or greater than 30, caste, type of family, socioeconomic status, occupation of their husband, those women have previous history of abortion their ANC visit and ASHA presence at the time of delivery were not significant associated with practices per preference for mode of delivery ($p>0.05$).

Women ($\chi^2=12.72$, $p=0.001$) and their husband ($\chi^2=11.56$, $p=0.003$) education was significantly associated with normal as per preference whereas there were no significant association was observed for cesarean delivery.

In our study parity showed significant association with delivery as per preference for normal delivery ($\chi^2=6.49$, $p=0.010$), with higher proportion of those women who had ≥ 3 children. Women with previous mode of delivery were significant associated with the present mode of delivery as per preference ($\chi^2=46.56$, $p<0.001$).

Place of health facility was significant associated with mode of delivery. Cesarean section against their preference was significant higher in private hospitals compared to government hospitals ($\chi^2=22.64$, $p<0.001$ for normal mode of delivery; $\chi^2=7.00$, $p=0.008$ for cesarean delivery).

Table 3 showed after using multivariate logistic regression analysis that present place of delivery was significantly associated with delivery against their preference. Women delivering at the present place had almost three times higher odd of experiencing delivery against their preference compared to delivery as per preference (AOR=2.93, $p=0.004$).

Table 3: Logistic regression analysis for factors associated with delivery against their preference.

Variables	B = regression coefficient	SE = standard error	Wald chi- square test statistic	df = degrees of freedom	P = probability value	OR = odds ratio	Crude odd ratio
Present health facility of delivery	1.075	0.375	8.195	1	0.004	2.93	3.964
Delivery of previous child (overall)	—	—	20.684	2	0.001	—	—
Delivery of previous child (1)	-0.536	0.411	1.705	1	0.192	0.59	2.569
Delivery of previous child (2)	2.039	0.593	11.845	1	<0.001	7.69	0.176
Husband's education	0.343	0.594	0.33	1	0.564	1.41	2.971
Mother's education	0.576	0.674	0.730	1	0.393	1.78	3.422
Parity	-1.168	0.662	3.109	1	0.078	0.31	0.303
Constant	-2.859	1.061	7.256	1	0.007	-	-

Mode of delivery for the last baby showed a significant association ($p < 0.001$). Women with last child mode of delivery (type 2) had nearly eight times higher odds of delivery against preference (AOR=7.69, $p < 0.001$) education their husband, education of mothers and their parity were not significant associated with delivery against preference.

DISCUSSION

It was assessed that preferences for normal vaginal mode of delivery was met for 83.40% women while preference for c-section delivery was met for 71.43%. So, 16.60% women were delivered through c-section though they had a preference for normal delivery.

An overwhelming majority of women (97.42%) in the present study preferred vaginal delivery and potential demand for CS was 2.58%. In actual, 81.99% mothers got delivered by normal delivery and 18.01% by cesarean section. The difference between preferred and actual mode of delivery is found to be statistically significant (P value < 0.00001). A study conducted by Ajeet et al also found that majority (91.50%) of women wanted their delivery by vaginal mode and 8.50% by cesarean section.¹²

During the time of interview 211 women who were delivered in an institution were further asked about their preferred and actual mode of delivery and an analysis was done to find some socio-demographic factors which might affect their preference and practice related to mode of delivery. We also tried to find out factors that were associated with gap in the preference and practice in regard to mode of delivery. Following factors were assessed:

This study showed concordance between mother's preferred and present mode of delivery and identified those factors which influencing the preference and practice gap. These findings clearly indicated that concordance is shaped predominantly by their obstetric history and institutional practices rather than socio-

demographic characteristics. National evidence such as NFHS-5 from international institute for population sciences similar shows that while most Indian female's prefer normal delivery, health care intuitional factors strongly influence actual mode of delivery.¹

In our study previous mode of delivery shows as a one of the strongest determinants showing a highly significant association with concordance for normal ($\chi^2=46.56$, $p < 0.001$). those women who delivered previously by normal mode of delivery had a more chance of achieving their preferred mode compared to those women who had previous cesarean section. This extensive research identifying previous cesarean section as the single most important determinant of repeat cesarean delivery, both in India and globally.^{17,18} Studies from south Asia and India have similar finding that low vaginal delivery after cesarean section and high rates of present cesarean delivery due to provider caution and institutional protocols.^{18,19}

Place of delivery was another major determinant. Those women delivered in government hospital found their preferred normal delivery (91.33%) compared to those in private hospitals (68.48%) ($\chi^2=22.64$, $p < 0.001$) and this is significantly associated. Concordance for cesarean section was also significantly associated with health institute ($p=0.047$). These findings reflect the national patterns where cesarean rates in private hospital remain higher than in government institutions as reported in NFHS-5 and many Indian studies.^{2,15} delivery occurred in different institutional difference in clinical decision-making, financial incentives, and care giver have been widely affecting contributing factors.^{14,15}

In his study showed that maternal education had a significant association with normal delivery ($\chi^2=12.72$, $p=0.001$). Illiterate women exhibited the highest concordance (91.67%) whereas women with higher education had lower concordance (60/87%). A similar association was seen husband's education ($\chi^2=11.56$, $p=0.003$). these finding align with earlier research showing that higher education and better socioeconomic

status are often associated with increased cesarean preference and utilisation- likely due to difference in risk perception fear of labour pain, more believe towards the surgical intervention and this surgical intervention higher use in private hospital.^{6,16} Indian studies have also found similar trends, where women with higher education are more likely to undergo elective or physician-recommended cesarean birth.²⁰

In our study number of antenatal visits and multiparous women also had significant association the women those antenatal visits more than 3 had highest concordance association; ($\chi^2=4.60$, $p=0.010$) adequate antenatal visit provide recognised to strengthen preparedness. Counselling and enable early identification of complication, so that they alignment between preferred and actual delivery mode.¹³ Indian studies have also found that quality ANC improves decision making and reduces unnecessary intervention.²² women those had more than two children exhibiting higher concordance ($\chi^2=6.49$, $p=0.010$), (94.64%) compared to those women with one or two children (80.38%) ($\chi^2=6.49$, $p=0.010$), by this finding we compare with existing evidence that multiparous women had more confidence regarding to give virginal birth and less toward for cesarean section delivery.^{7,18} In many study which were done in India shows higher rate for normal delivery rate among multiparous women due to favourable steric histories and smoother labour progression.²¹

In contrast, other variable such as age. Caste, family type history of abortion, socioeconomic status presence of ASHA, and place of ANC visit, these variables not show any statistically significant association. This suggests that socio-demographic factors influence the health seeking behaviour, they may not directly affect concordance when clinical history and institutional determinants have strong role.

So overall finding reinforces that although maternal preference for mode of delivery plays a crucial role, the final decision for mode of delivery is predominantly determined by a women's experiences and the clinical practices of the facility where they delivered.

The final mode of delivery is predominantly determined by a woman's previous obstetric experiences and the clinical practices of the facility where she delivers, here we highlight the influence of the health system facilities which affect the individual preference strengthening standardised obstetric counselling and regulating unnecessary cesarean section, especially in private facilities, may help reduce preference-practice discordance.

CONCLUSION

This study showed that the past obstetric history mainly from past mode of delivery experience and health facilities practices are the main determinants that women

achieved their preferable mode of delivery found. Ensuring evidence based obstetric decision-making, improving ANC counselling and standardising delivery practices across government and private hospitals are essential to reduce preference-practice gap and promote safe, and more respectful maternity care which they deserve.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. International Institute for Population Sciences (IIPS), Ministry of Health and Family Welfare. National Family Health Survey (NFHS-5), 2019-21: India Report. Mumbai: IIPS; 2021. Available at: http://rchiips.org/nfhs/NFHS-5Reports/NFHS-5_INDIA_REPORT.pdf. Accessed on 9 June 2014.
2. World Health Organization. WHO Statement on Cesarean Section Rates. Geneva: WHO; 2015. Available at: https://iris.who.int/bitstream/handle/10665/161442/WHO_RHR_15.02_eng.pdf. Accessed on 9 June 2014.
3. International Institute for Population Sciences (IIPS), Ministry of Health and Family Welfare. National Family Health Survey (NFHS-4), 2015-16: India Report. Mumbai: IIPS; 2017. Available at: <https://dhsprogram.com/pubs/pdf/FR339/FR339.pdf>. Accessed on 9 June 2014.
4. Sreevidya S, Sathiyasekaran BWC. High cesarean section rates in a tertiary care hospital in South India. *J Obstet Gynecol India*. 2003;53(6):588-90.
5. Boerma T, Ronsmans C, Melesse DY, Barros AJ, Barros FC, Juan L, et al. Global epidemiology of use of and disparities in cesarean sections. *Lancet*. 2018;392(10155):1341-8.
6. Betran AP, Torloni MR, Zhang J, Ye J, Mikolajczyk R, Deneux-Tharaux C, et al. What is the optimal rate of cesarean section at population level? A systematic review of ecologic studies. *Reprod Health*. 2015;12(1):57.
7. Mishra US, Mishra V. Determinants of cesarean section in India. *Health Policy Plan*. 2016;31(2):188-99.
8. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci Med*. 1994;38(8):1091-110.
9. Singh A, Trivedi A. Socioeconomic determinants of maternal health care utilization in India. *PLoS One*. 2015;10(3):e0120820.
10. Ministry of Health and Family Welfare. Janani Suraksha Yojana: Guidelines for Implementation. New Delhi: Government of India; 2005.
11. Ministry of Health and Family Welfare. National Health Mission: Framework for Implementation. New Delhi: Government of India; 2013.

12. Saoji A, Nimbalkar S, Bansal R. Preferences of pregnant women regarding mode of delivery and factors influencing it. *J Obstet Gynecol India*. 2011.
13. Neuman M, Alcock G, Azad K, Kuddus A. Prevalence and determinants of cesarean section in private and public health facilities in India. *BMJ Glob Health*. 2018;3:e000671.
14. D'Souza R, Arulkumaran S. To 'C' or not to 'C'? Cesarean delivery upon maternal request. *BJOG*. 2013;120(11):1273-6.
15. Goli S, Rammohan A. Rising cesarean section rates in India: the role of the private sector. *PLoS One*. 2014;9(11):e112713.
16. Kambo I, Bedi N, Dhillon BS. A critical appraisal of cesarean section rates in India. *J Obstet Gynecol India*. 2002;52(4):82-6.
17. Guise JM, Denman MA, Emeis C, Marshall N, Walker M, Fu R, et al. Vaginal birth after cesarean: new insights on maternal and neonatal outcomes. *Obstet Gynecol*. 2010;115(6):1267-78.
18. Betrán AP, Ye J, Moller AB, Zhang J, Gülmezoglu AM, Torloni MR. The increasing trend in cesarean section rates: global, regional and national estimates: 1990-2014. *PloS One*. 2016 F;11(2):e0148343.
19. Federation of Obstetric and Gynaecological Societies of India (FOGSI). Guidelines on vaginal birth after cesarean (VBAC). Mumbai: FOGSI; 2020.
20. Padmadas SS, Kumar S, Nair SB. High cesarean rates in India: evidence from population studies. *BMC Pregnancy Childbirth*. 2016;16:25.
21. Singh PK, Rai RK, Alagarajan M, Singh L. Determinants of maternity care services utilisation among women in India. *PLoS One*. 2012;7:e31666.
22. Kumar C, Dhillon P. Antenatal care and maternal health outcomes in India. *J Public Health*. 2020;42(3):e327-35.
23. Garber A, Klein E, Bruce S, Sankoh S, Mohideen P. Metformin-glibenclamide versus metformin plus rosiglitazone in patients with type 2 diabetes inadequately controlled on metformin monotherapy. *Diabetes Obes Metab*. 2006;8(2):156-63.
24. O'Brien C. Drug addiction and drug abuse. In: Brunton LB, Lazo JS, Parker KL, eds. *Goodman and Gilman's The Pharmacological Basis of Therapeutics*. 11th edn. New York, NY: McGraw-Hill; 2005:607-29.
25. National Cancer Institute. Fact sheet: targeted therapies to treat cancer. 2012. Available at: <http://www.cancer.gov/cancertopics/factsheet/Therapy/targeted#q1>. Accessed on 9 June 2014.

Cite this article as: Verma A, Verma P, Gupta P, Lingareddy P. Gap between maternal preferences and actual mode of delivery in Agra District of Uttar Pradesh: observational study. *Int J Community Med Public Health* 2026;13:5044-50.