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Pregnancy Registration Among Currently Married Women in India: Results from National Family Health Survey (NFHS-5) (2019-21)

Khushbu Arya[1], Suman Singh[2]

[1]Research Scholar, Department of Geography, Institute of Science, BHU, Varanasi.
[2]Professor, Department of Geography, Institute of Science, BHU, Varanasi.

Abstract

Background Evidence suggests that antenatal care (ANC), institutional delivery, and proper postnatal care (PNC) play pivotal roles in reducing maternal morbidity and mortality**.** Notably, India has made substantial strides in this area, with maternal mortality decreasing from 556 deaths per 100,000 live births in 1990 to 174 in 2015, reflecting an annual decline rate of 15.8%**.** Despite its importance, delayed ANC registration remains a widespread issue in developing countries, including India. This delay often results in missed opportunities to address preventable complications during pregnancy. Recognizing this persistent challenge, the Indian government has implemented several policy initiatives to promote timely pregnancy registration and ANC uptake. Initiatives such as the distribution of Mother and Child Protection (MCP) cards and Thayi cards, equipped with unique identification numbers, aim to streamline free ANC and delivery services for socioeconomically disadvantaged women in both public and registered private healthcare facilities.

Methods Data from the fifth round of the National Family Health Survey 2019-21 (NFHS-5) was used. The outcome variable was pregnancy registration. Bivariate analysis was used to examine the disparity in the pregnancy registration. In addition, binary logistic regression was used to assess the net effect of predictor variables on pregnancy registration.

Results The pregnancy registration rate among currently married women in India is 95.29%. Statistically significant differences were observed in pregnancy registration based on the participants' background characteristics. Statistical analysis revealed significant associations between pregnancy registration and factors such as ANC trimester (OR = 1.428, CI = 1.175–1.736), ANC visits (OR = 1.485, CI = 1.229–1.794), education (OR = 1.277, CI = 1.002–1.628), wealth index (OR = 1.792, CI = 1.261–2.548), and mass media exposure (OR = 1.307, CI = 1.036–1.648).

Conclusion The pregnancy registration among currently married women is influenced by various socio-demographic, economic, and healthcare-related factors. Education, ANC visits, and media exposure emerge as critical determinants of higher registration rates. Efforts to improve registration rates should focus on enhancing access to antenatal care, increasing educational opportunities for women, and leveraging mass media campaigns to target underrepresented groups. Addressing disparities based on wealth and ensuring targeted support for middle-income and less-educated mothers can further improve maternal healthcare utilization.

Keywords Pregnancy registration, pregnancy intention, ANC trimester, ANC visits, National Family Health Survey-5, India

INTRODUCTION

Despite recent advancements, maternal mortality in India continues to be a major public health concern. Severe maternal morbidities, occurring at an alarming rate of 120 per 1000 live births, underscore the critical need for improved maternal health services [1, 2]. Evidence suggests that prenatal care (ANC), natal care, and proper postnatal care (PNC) play pivotal roles in reducing maternal morbidity and mortality [2, 3]. With maternal mortality falling from 556 deaths per 100,000 live births in 1990 to 174 in 2015, representing an annual drop rate of 15.8%, India has made notable progress in this area. [1]. This progress, however, must be bolstered to address persistent gaps.

Early registration for antenatal care is a cornerstone of maternal health, as it enables the timely detection and management of pregnancy-related complications. Over time, ANC has evolved, with outpatient services becoming increasingly prevalent [4]. Despite the proven benefits of early ANC registration—including improved access to vaccinations, vitamin supplementation, and appropriate care—delayed registration remains common in many developing nations, including India [4]. Recognizing this challenge, the Indian government has introduced numerous policy initiatives to enhance pregnancy registration rates. Programs such as the distribution of Mother and Child Protection (MCP) cards and the issuance of Thayi cards with unique identification numbers have been implemented to facilitate free ANC and delivery services for socioeconomically disadvantaged women in registered private hospitals [2].

The physiological changes of pregnancy bring risks of adverse events and complications that may impact both mother and fetus. In low- and middle-income countries (LMICs), 94% of global maternal and infant deaths occur, highlighting the urgent need for robust maternal health interventions [5]. Early pregnancy registration is critical to ensuring access to recommended ANC services, which were initially developed in Europe during the early 20th century to support women in socially challenging circumstances. Modern ANC services address minor pregnancy issues, screen for risks, provide therapeutic interventions, and offer guidance to prepare women for safe childbirth [6].

Sociocultural barriers, such as caste-based discrimination and stigma, exacerbate delayed pregnancy registration in India, particularly among lower caste groups. These systemic inequities contribute to poor health outcomes, unequal access to healthcare, and underutilization of maternal health services. While early registration has been shown to improve maternal and child health outcomes, The factors influencing pregnancy registration in India have not been extensively studied empirically. Additionally, little is known about the connection between registration and pregnancy intention at the time of the last birth. The purpose of this study is to investigate the factors that influence pregnancy registration, with a particular focus on the role of pregnancy intention and ANC visits, using nationally representative data [2].

Methods

Data sources

This study takes use of NFHS-5 data taken from 2019 to 2021. With a focus on topics which include socioeconomic status and demographics of reproductive health, mother and child health and and family planning, the NFHS is a key instrument for understanding important health and well-being indicators throughout India. The official national report, which is accessible online, provides specifics on the sampling techniques employed in this questionnaire [7, 8]. Interviews occurred with 724,115 women

between the ages of 15 and 49 who were recruited from 636,669 households in NFHS-5. With a 97% response rate, this comprehensive coverage comprised information from 707 districts across 28 states and 8 Union Territories (UTs). [7, 8].

In this research, out of the 724,115 women surveyed, we concentrated on 512,408 moms who reported having married within the five years before to the survey, with a particular emphasis on their most recent live birth. A total of 211,707 women were excluded because they were not currently married. Additionally, 338,470 women were excluded because their pregnancies were not registered, leaving 173,938 women with registered pregnancies. From this group, 160,720 women were excluded because their pregnancies were not intentional, resulting in 13,218 women whose pregnancies were intentional. Of these, 1,122 women were excluded because their first antenatal care (ANC) checkups were not done, leaving 12,096 women with completed first ANC checkups. Finally, 617 observations with missing or inconsistent data in the caste variable were dropped. As a result, 11,479 Indian mothers between the ages of 15 and 49 contributed to our final sample (see Fig. no.1).

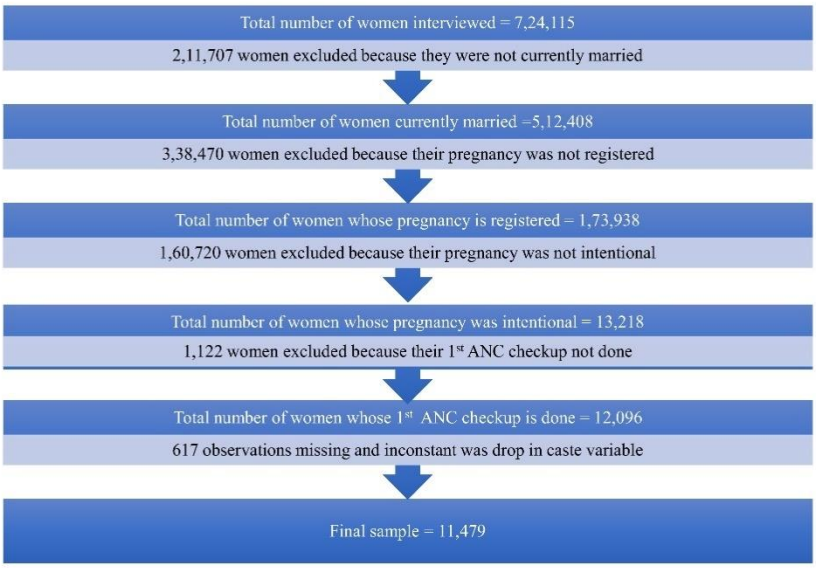

Fig. 1 Flow chart showing the selection process of the study sample (pregnancy registration among currently married women)

Dependent variable

According to guidelines provided by the Government of India's Ministry of Health and Family Welfare and backed by existing research, In this study, the dependent variable is the registration of pregnancies among women who are currently married [7, 8].

The analysis's dependent variable was "pregnancy registration." Mothers were questioned in the study if their pregnancy was registered for the recent child birth. Mothers' responses led to the variable being coded with 0 representing "no" and 1 representing "yes."

Independent variable

We taken into consideration a variety of socioeconomic and demo- graphic independent variables such as pregnancy intention, ANC trimester, ANC visits, mother's age, woman's education, religion, caste, place of residence, wealth index, parity, mass media exposure. The existing literature on the use of prenatal care

from low- and middle-income developing nations serves as a guidance for the selection of these factors [9].

Statistical analysis

To determine variables associated with pregnancy registration among Indian women who are currently married, we employed both bivariate and multivariate analysis. To examine the association between the dichotomous independent and dependent variables, A logistic regression model was used.

Although the response variable we used was binary, we employed multivariable logistic regression to determine the characteristics related to pregnancy registration[10] . After determining their independent relationship to the predictor variables that were included in the regression analysis were determined by looking at collinearity between the predictor variables and the dependent variable (pregnancy registration). Adjusted Odds Ratios (AOR), p-values, and 95% Confidence Intervals (CI) are displayed with the logistic regression findings; p = 0.05 is considered statistically significant. Utilising the Variance Inflation Factor (VIF) approach, multicollinearity was assessed. The analysis was conducted using the national individual sample weight. Using Stata (Version 17), the analysis was conducted at a significance level of 5%. With the help of ArcGIS 10.8 software, we applied a variety of spatial statistical techniques.

Results

Table 1 presents the weighted percentage distribution of currently married mothers who delivered their last child within the five years preceding the survey, categorized by selected background characteristics. The majority of mothers reported their pregnancy as intended (84.46%), and approximately half (56.03%) had at least four prenatal care (ANC) visits. 46.25% of moms were between the ages of 20 and 34. More than half of the mothers had attained secondary education. The majority identified as Hindu (80.92%). Approximately 46.96% of mothers belonged to the OBC category. Most mothers (78.26%) resided in rural areas. Compared to moms in the highest wealth quintile, mothers in the poorest wealth quintile (26.47%) were more probable to have reported a pregnancy. The majority of mothers had only one child. Additionally, 40.91% of mothers had low exposure to mass media.

Table 1 Percentage distribution of pregnancy registration among currently married women by background characteristics in India, NFHS 5 (2019-21)

Background Characteristics	%	N
Pregnancy Registration		
No	4.71	496
Yes	95.29	10,983
Pregnancy Intension		
Not Wanted or Wanted Later	84.46	9,810
Wanted	15.54	1,669
1st ANC Check up		
No	26.52	2,931
Yes	73.48	8,548
ANC Visits		
1 to 3 visits	43.97	4,973
At least 4 ANC	56.03	6,506
Mother's Age		

21-24	46.25	4,859
25-30	43.73	5,192
<32	10.02	1,428
Education		
No Education	21.29	2,400
Primary	12.73	1,539
Secondary	52.5	6,133
Higher	13.48	1,407
Religion		
Hindu	80.92	8,539
Muslim	15.07	1,562
Others	4.01	1,378
Social Group/ Caste		
SC	25.92	2,585
ST	10.62	2,505
OBC	46.96	4,673
Others	16.5	1,716
Place of Residence		
Urban	21.74	1,976
Rural	78.26	9,503
Wealth Index		
Poorest	26.47	3,247
Poorer	22.88	2,836
Middle	20.15	2,250
Richer	18.03	1,880
Richest	12.47	1,266
Parity		
1 Child	92.48	10,552
2-3 Children	6.97	852
3 or More Children	0.55	75
Mass media Exposure		
No Exposure	30.97	3,503
Low Exposure	40.91	4,761
Medium Exposure	22.46	2,508
High Exposure	5.66	707

N number of mothers (frequency), All percentages are weighted

Pregnancy registration among currently married mothers in States & UTs

Fig 2 shows that regional differences were also evident in pregnancy registration. States in the Northeast and Northwest, along with Kerala and Karnataka, had the highest rates, while the North-Central region showed average rates, and Bihar and Jharkhand recorded the lowest rates in India. Among the states and union territories, approximately half had high pregnancy registration rates (above 97.13%), while the other half fell within the lower range (88.52%–91.39%).

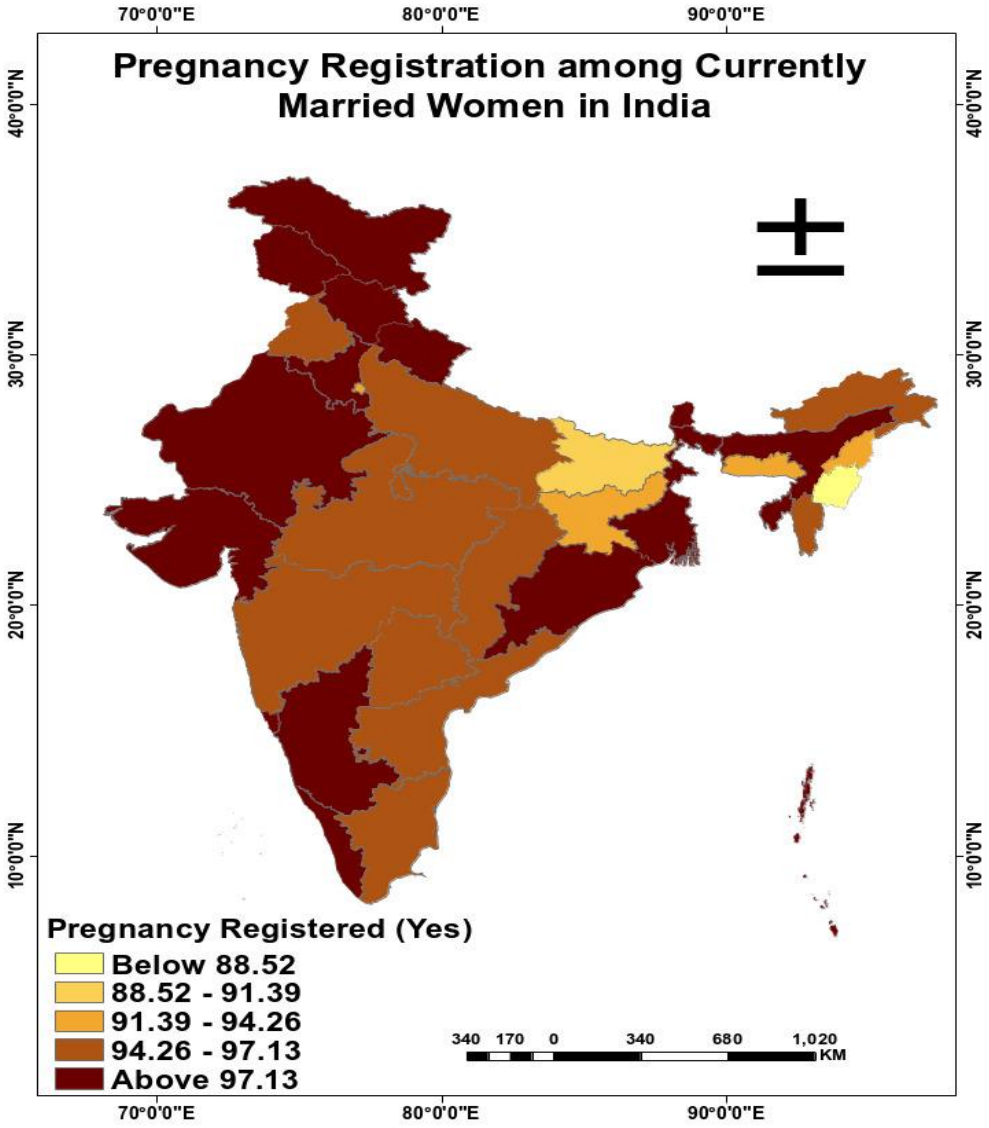

Fig. 2 State-wise distribution of pregnancy registration among currently married women, NFHS-5 (2019–21)

Differentials in the pregnancy registration among currently married mothers

The percentage of married mothers who are currently pregnant, broken down by their background characteristics, is shown in Table 2. The findings show notable differences in pregnancy registration across several categories of pregnancy intention, 1st ANC checkup, ANC visits, mother's education, mother's age, caste, religion, region of residence, wealth index, parity and mass media exposure.

Table 2 Percentage of currently married women with pregnancy registration by background characteristics in India, NFHS 5 (2019-21)

Background Characteristics	%
Pregnancy Intension	
Not Wanted or Wanted Later	95.26
Wanted	95.49
1st ANC Check up	
No	93.80

Yes	95.83
ANC Visits	
1 to 3 visits	93.92
At least 4 ANC	96.37
Mother's Age	
21-24	95.15
25-30	95.57
<32	94.75
Education	
No Education	93.54
Primary	95.37
Secondary	96.35
Higher	93.88
Religion	
Hindu	95.56
Muslim	94.25
Others	93.88
Social Group/ Caste	
SC	95.60
ST	96.29
OBC	95.09
Others	94.74
Place of Residence	
Urban	95.58
Rural	95.21
Wealth Index	
Poorest	93.22
Poorer	95.79
Middle	96.39
Richer	97.13
Richest	94.36
Parity	
1 Child	95.38
2-3 Children	94.17
3 or More Children	94.72
Mass media Exposure	
No Exposure	93.75
Low Exposure	96.19
Medium Exposure	95.52
High Exposure	96.37

All percentages of pregnancy registration are weighted

Overall, 95.49% of mothers with intended pregnancies registered their pregnancies, compared to 95.26% of those with unwanted or later-wanted pregnancies. A total of 95.83% of mothers who had an ANC check-

up registered their pregnancy, compared to 93.8% of those who did not have a first ANC check-up. Among mothers with at least four ANC visits, 96.37% registered their pregnancies, compared to 93.92% of those with 1–3 visits.

Regarding age, 95.57% of mothers aged 25–30 registered their pregnancies. Additionally, 96.35% of mothers with secondary education registered their pregnancies, compared to 93.54% of those with no education. Among Hindu mothers, 95.56% registered their pregnancies, compared to mothers of other religions. Similarly, 96.29% of mothers from Scheduled Tribes (ST) registered their pregnancies, compared to 94.74% from other groups.

In rural areas, 95.58% of mothers registered their pregnancies, compared to urban mothers. Mothers in the middle wealth quintile were less likely to register their pregnancies compared to the poorest mothers. Among mothers with one child, 95.38% registered their pregnancies, compared to 94.17% of mothers with 2–3 children. Lastly, 96.37% of mothers with high exposure to mass media registered their pregnancies, compared to 93.75% of mothers with no exposure.

Table 3 Unadjusted odds ratios and 95% confidence intervals for pregnancy registration among currently married women in India, NFHS-5 (2019-21)

Background Characteristics	Odds Ratio	p-value	95% CI	
			Lower	Upper
Pregnancy Intension				
Not Wanted or Wanted Later*				
Wanted	1.054	0.740	0.771	1.439
1st ANC Check up				
No*				
Yes	1.519	0.001	1.197	1.928
ANC Visits				
1 to 3 visits*				
At least 4 ANC	1.718	<0.001	1.365	2.162
Mother's Age				
21-24*				
25-30	1.101	0.434	0.864 1.402	
<32	0.921	0.658	0.641 1.323	
Education				
No Education*				
Primary	1.422	0.055	0.992	2.040
Secondary	1.823	<0.001	1.392	2.386
Higher	1.059	0.756	0.735	1.527
Religion				
Hindu*				
Muslim	0.762	0.076	0.565	1.029

Others	0.712	0.148	0.450	1.127
Social Group/ Caste				
SC*				
ST	1.196	0.363	0.813	1.759
OBC	0.891	0.426	0.673	1.181
Others	0.829	0.312	0.578	1.191
Place of Residence				
Urban*				
Rural	0.919	0.594	0.674	1.253
Wealth Index				
Poorest*				
Poorer	1.655	0.001	1.231	2.225
Middle	1.940	<0.001	1.390	2.707
Richer	2.458	<0.001	1.679	3.597
Richest	1.216	0.311	0.832	1.778
Parity				
1 Child*				
2-3 Children	0.781	0.171	0.549	1.111
3 or More Children	0.868	0.836	0.228	3.305
Mass media Exposure				
No Exposure*				
Low Exposure	1.680	<0.001	1.290	2.188
Medium Exposure	1.422	0.024	1.048	1.929
High Exposure	1.771	0.027	1.066	2.942

* -Reference category, CI - Confidence interval

Determinants of pregnancy registration among currently married mothers

The individual impact of different factors was examined using a multivariable logistic regression. Odds ratios were used to display the dependent variable. The final (adjusted) regression model did not include the pregnancy intention, mother's age, religion, caste, place of residence, and parity because the unadjusted odds ratios indicated these were not significant predictors. (see Table 3) The completed model displayed the ANC trimester, ANC visits, education, wealth index and mass media exposure were the statistically significant elements that defined the pregnancy registration among the currently married women (see Table 4).

Table 4 Adjusted odds ratios and 95% confidence intervals (CI) for pregnancy registration among currently married women in India, NFHS-5 (2019-21)

Variable	Odds ratio	p-value	95 % CI	
			Lower	Upper
ANC Trimester				
No*				
Yes	1.428	<0.001	1.175	1.736
ANC visits				
1 to 3 visits*				

at least 4 ANC	1.485	<0.001	1.229	1.794
Education				
No Education*				
Primary	1.119	0.456	0.831	1.508
Secondary	1.277	0.048	1.002	1.628
Higher	0.789	0.191	0.554	1.124
Wealth Index				
Poorest*				
Poorer	1.248	0.079	0.974	1.600
Middle	1.329	0.054	0.994	1.776
Richer	1.792	0.001	1.261	2.548
Richest	1.031	0.867	0.717	1.482
Mass media Exposure				
No Exposure*				
Low Exposure	1.307	0.024	1.036	1.648
Medium Exposure	1.179	0.273	0.878	1.583
High Exposure	1.236	0.350	0.792	1.931

* - Reference category, CI - Confidence interval

Mothers who had registered their pregnancy were one time more likely to do so (OR = 1.42862, CI = 1.17522–1.736657) compared to those who had not registered. Mothers who had received at least four ANC visits were one time more likely (OR = 1.485135, CI = 1.229271–1.794254) to register their pregnancy compared to those who had received only 1 to 3 visits. Mothers with secondary education were one time more likely (OR = 1.277594, CI = 1.002606–1.628003) to register their pregnancy in contrast to mothers who no education. Mothers from the wealthier quintile became more likely to (OR = 1.792612, CI = 1.261122–2.548096) to register their pregnancy compared to People in the lowest quintile of wealth. Additionally, mothers with low exposure to mass media were one time more likely (OR = 1.307429, CI = 1.036617–1.64899) to register their pregnancy compared to mothers with no exposure.

Discussion

Using nationally representative data, the study's goal was to investigate the factors that influence pregnancy registration, with an emphasis on the significance of pregnancy intention and ANC visits. Maternal and child health would be improved by early pregnancy registration, which would guarantee proper ANC, vaccination, institutional delivery, supplemental foods from ICDS, and PNC [2]. Pregnancy registration is not common in India, according to the study. The factors influencing pregnancy registration differed significantly depending on socioeconomic status, demographic characteristics, and the last birth's intention to become pregnant. There is a significant association between the pregnancy registration and the last birth's pregnancy intention. Other important factors influencing pregnancy registration included education, wealth index, ANC visits, ANC trimester, and media exposure [2]. In our study, the use of prenatal care was also substantially correlated with birth order and pregnancy intention. ANC underutilization was more likely to occur in women who did not want their pregnancy or who want it later. These results align with global trends observed in both developed and developing nations [11].

One important factor influencing pregnancy registration is the last child's wish to become pregnant. Women who had an unexpected or mistimed last child were more likely to fail pregnancy registration. The

findings of previous studies, which indicated that unexpected births had a lower likelihood of Pregnancy registration and additional adverse impacts on women's mental and reproductive health, are in line with that result [2, 11]. The majority of new mothers believed that the first-trimester prenatal care appointments were intended for pregnant women who were suffering from illnesses like HIV/AIDS, headaches, or pain in the back [13]. In order to minimize pregnancy-related problems and lower maternal mortality, it is important to receive ANC in the early stages of pregnancy and to complete the recommended number of visits during the pregnancy [14].

Women who are illiterate or have low levels of education are less likely to begin getting an initial ANC checkup during the first trimester [15].

The first ANC visit was four months later than the WHO's recommended ANC checkup for pregnant women in the nation, which is a significant delay. Thus, the study suggests that early detention is necessary to prevent pregnancy and delivery difficulties [15]. Prenatal services are found to be inadequate in reaching coastal areas of Kerala, which has the highest human development index in the nation [16]. The findings of this study indicate that early ANC initiation is necessary to acquire the recommended number of ANC visits. Therefore, it is essential to provide ANC in the early stages of pregnancy as part of prenatal treatment [14].

Most of them (70.0%) had an MBBS with a gynaecological specialization. Of the group, about half (53.3%) had worked on gynaecology wards for 10 to 15 years [17]. In relation to the mothers' educational statistics, it was found that women with more schooling (78.3%) used antenatal care services more frequently than those with lower educational status (56.7%) [18]. The majority of adolescent moms were Hindu, and about 28% of them lacked literacy [19].

This study those women who had approximately 4.6% and 9.2% of mothers in the poorest and poorest wealth quintiles, respectively [19]. In contrast to those in the wealthiest quintile, who reported utilizing full ANC at a rate of 40%, mothers in the quintile with the lowest income were far less likely to do so (10%) [9].

Similarly, the lowest frequency (4.9%) occurred among women who were exposed to any media [2]. On the other hand, a study on health literacy and its relationship to Internet use suggested that if access and skill levels had proven equal for both groups development, there might not have been a significant difference in between health-literate and poor pregnant women [20].

Strengths and limitations of the study

There are multiple benefits and drawbacks to this study. Because they are based on a sizable nationally representative sample of women covered by the NFHS-5 using a rigorous sampling approach, these findings are pertinent to policy and activities. Second, according to what we know, this is the first study to look into a number of socioeconomic and demographic factors that affect pregnancy registration nationally. However, the causal relationship between pregnancy registration and covariates derived from this analysis is limited by the cross-sectional form of the survey. Furthermore, because NFHS data did not include them, other sociocultural factors that can affect pregnancy registration were not able to be included in this research. However, in order to improve early and overall pregnancy registration, the study's results would support the current service delivery system. The results of the study would, however, contribute to the improvement of the nation's mother and child health by fortifying the current system of service delivery to boost early and general pregnancy registration.

Conclusion

The pregnancy registration among currently married women is influenced by various socio-demographic, economic, and healthcare-related factors. Education, ANC visits, and media exposure emerge as critical determinants of higher registration rates. Efforts to improve registration rates should focus on enhancing access to antenatal care, increasing educational opportunities for women, and leveraging mass media campaigns to target underrepresented groups. Addressing disparities based on wealth and ensuring targeted support for middle-income and less-educated mothers can further improve maternal healthcare utilization.

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