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Antenatal/Prenatal Care-Policies and Perspectives: A Review of Selected Global Research Studies

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ABSTRACT: Maternal health care is an essential component of health systems worldwide and has a major impact on enhancing the health of mothers and their kids. In order to ensure the health of both mothers and their unborn kids, antenatal and prenatal care are crucial components of maternal health. The numerous elements that affect prenatal and antenatal care are methodically examined in this analysis, including social and economic position, education, healthcare-related influences, cultural attitudes and more. This essay aims to provide readers a thorough understanding of the obstacles and enablers that affect the quality and usage of care. English-language publications were located by utilizing reference lists and relevant keywords were thoroughly reviewed after a number of electronic databases were searched for these investigations, which were carried out in different nations and published between 2001 and 2025. Both quantitative and qualitative research were thoroughly and methodically reviewed.

Key Words: Antenatal-Prenatal care, quantitative, qualitative.

Contents

1. Introduction

The life and well-being of women and their offspring depend heavily on maternal health, which is the foundation of public health.Antenatal care (ANC) and prenatal care are crucial components of maternal healthcare because they monitor and safeguard the health of the growing fetus and the mother during pregnancy. These medical amenities seek to promote healthy pregnancy outcomes, offer vital health education and identify and treat possible issues early. Significant gaps still exist despite international efforts to progress the quality and accessibility of maternal healthcare because of a composite interaction of social, economic, cultural and healthcare-related factors.

It is impossible to overestimate the significance of prenatal and antenatal care."The World Health Organization (WHO) estimated that in 2017, almost 295,000 women lost their lives during pregnancy and delivery, with the majority of these deaths taking place in areas with limited resources (WHO, 2019)". Adequate ANC and prompt medical measures might have avoided many of these deaths. ANC provides a framework for the provision of vital services including vaccination, nutritional support, infection screening and the treatment of long-term illnesses like diabetes and hypertension. Additionally, it gives medical professionals a chance to teach pregnant mothers about postnatal care, danger indicators and delivery readiness, which lowers the risks of maternal and newborn deaths.

Access to high-quality prenatal and antenatal care is nevertheless unequal across populations and geographical areas, despite its shown advantages. The maternal healthcare systems in high-income nations are usually well-established, guaranteeing that the majority of women obtain the required number of ANC visits and medical procedures. Low- and Middle-Income Nations (LMICs), on the other hand, deal with a number of issues, such as inadequate healthcare infrastructure, a lack of qualified medical personnel, budgetary constraints and cultural norms that discourage women from seeking medical attention. For

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example, given the unusually high incidence of maternal deaths in South Asia and sub-Saharan Africa, many women might not receive the minimum of eight ANC visits advised by the WHO. This is usually due to out-of-pocket expenses, transportation issues, or the travel time to medical services. [26].

Because it synthesizes current data to give a thorough picture of maternal medical practices and results, a review article on maternal and antenatal services is significant. These studies review the usefulness of various health interventions, point out gaps in the evidence and identify important factors impacting the implementation and quality of care. Review articles teach policymakers about ways to enhance mother and child health and steer future research directions by analyzing findings in a variety of scenarios. They also make it possible to compare the approaches, demographics and medical systems employed in earlier research. By filling in the gaps found in previous studies, such as the scant attention paid to regional variances, socioeconomic and cultural issues and inequalities in the use of both public and private medical centers, the current work adds to the body of existing knowledge. In order to investigate why prenatal and antenatal services affect maternal health outcomes, it also makes use of more current data and takes a thorough analytical approach. As a result, by placing findings within regional realities and policy contexts, this study not only expands on existing information but also deepens our knowledge.

2. Methodology

This review paper's methodology uses a methodical and organized strategy to find, evaluate and compile the body of research on prenatal and antenatal care. Relevant literature was gathered using keywords like "prenatal care," "antenatal services", "maternal health" and "institutional delivery" from reliable sources including PubMed, Scopus, Google Scholar, WHO reports, etc. In this study considering the timeframe 2001-2025, were reviewed to ensure that conventional as well as contemporary research were covered. Peer-reviewed publications, national surveys and policy papers that looked at the usage, causes and results of prenatal and antenatal care were the main weight of the selection criteria. Based on their goals, research design, data sources and key findings, the collected studies were vetted and grouped. Key features of the evaluated research, including Factors Covered, author, year, study region, dependent variable, independent variables, Third Variable(Control/Adjustment/confounding) and significant factors, were compiled using tabulation to enable easy comparisons between various publications. After the material was assessed, it was thematically summarized to find commonalities, gaps and potential study areas.

3. Factors Affecting Antenatal and Prenatal Care

The consumption of antenatal care (ANC) amenities has been extensively researched across different countries and socio-economic settings, particularly in relation to education, socio-economic status and access to healthcare. This review synthesizes the findings from a series of studies examining the factors that influence ANC amenities and the quality of care across diverse contexts.

Financial Despite structural impediments, such budgetary limitations and and income inconsistency, are significant obstacles to prenatal care utilization in European nations. However, after controlling for confounding factors, research suggests that perceived financial challenges may not significantly influence access to ANC services, indicating that other factors play a more decisive role [1]. The quality of ANC services is equally crucial, as merely promoting a specific number of check-ups does not guarantee effective care. Comprehensive health promotion, improved training for healthcare providers like midwives and nurses and addressing socio-economic, cultural and communication barriers are essential, particularly in developing countries [2]. Socio-economic factors also heavily influence ANC utilization. For instance, in North Goa, India, 78.8 percent of pregnant women accessed to ANC services, with education, religion, proximity to health centers and media exposure emerging as key determinants [3]. Similarly, in Indonesia, rural residence, lower wealth indices and lower maternal education levels were strongly associated with underutilization of ANC services [4].

Maternal education and household in order to increase access to prenatal care (ANC) services, affluence is essential with higher education levels consistently linked to increased ANC utilization, skilled delivery and postnatal care (PNC). Urban residence further enhances maternal health service use, though

PNC remains underutilized. In Rajasthan, India, both maternal and paternal education were found to significantly influence ANC utilization [5,6,7,18,25].

Women's empowerment and male contribution are also critical factors. In sub-Saharan Africa, mixed results were observed regarding male participation in ANC, suggesting that initiatives should promote male involvement while respecting women's autonomy and enhancing their socio-economic engagement [8]. In Nepal, women's decision-making power, along with their husbands' education and occupation, emerged as key factors in improving ANC utilization [9]. Additionally, mass media exposure has a significant impact, with women in Nepal and Assam, India,Individuals were exposed to television and radio programming and were more likely to get vaccinated, attend ANC checkups, and take necessary supplements with iron-folic acid pills while pregnant. [10,11].

Cultural and regional differences significantly influence the consumption of antenatal care (ANC) services. In Indonesia, rural areas outside the Java-Bali region experience pronounced underutilization of ANC services, highlighting geographic disparities. Similarly, in Syria, variations in ANC quality are largely attributed to differences in healthcare organization and cultural preferences, emphasizing the need for tailored interventions that consider local contexts and cultural nuances [4,12]. The interplay between education and wealth further complicates maternal healthcare utilization, particularly in Africa. While education is a critical factor, it is insufficient on its own to address the underutilization of maternal health care services. These findings underscore the importance of combining educational initiatives with strategies aimed at improving household wealth to enhance maternal healthcare access, especially in underserved regions [13]. In addition to the impact of wealth status, some other studies have emphasized the role of education as another factor contributing to inequalities in the use of maternal healthcare services, with those who are more educated benefiting the most [22,23,25].

Higher mother education, prosperity and media exposure were significant factors in complete ANC usage, according to the socioeconomic and demographic determinants of maternal healthcare in India's Empowered Action Group (EAG) states. They recommended policy interventions focusing on female education, employment and media engagement to improve maternal health outcomes [14,15,16]. Similarly, the need for grassroots efforts and political support to enhance access to maternal healthcare in disadvantaged states of India [17,15]. Additionally, several other writers demonstrate the strong correlation that was discovered in numerous earlier research between the respondent's level of education and the use of MHC services [17,19,20,21,24].

Only 41.6 percent of women in Uttar Pradesh obtained enough ANC visits, and the use of care was positively correlated with education, affluence, urban residency, lower parity, and husband's level of education. Similar to this, Indigenous women in Mexico had consistently poorer maternity healthcare coverage than non-Indigenous women. This disparity grew worse during and after the Covid-19 pandemic and was mostly caused by systemic discrimination rather than visible traits [25,27].

Across multiple contexts, education, wealth, and media exposure consistently emerge as significant factors influencing ANC utilization. However, cultural, regional and structural barriers also play critical roles in shaping access to maternal healthcare. While improving women's education remains a fundamental strategy, comprehensive, multifaceted approaches that address economic inequalities, healthcare infrastructure and cultural norms are essential to enhance maternal healthcare utilization globally. Future research should focus on longitudinal and qualitative studies to explore the nuances of maternal healthcare access, particularly in under served populations.

Methods seen, used in the studied papers: To investigate antenatal and prenatal care outcomes, the examined studies used a variety of statistical and analytical approaches. Cross-sectional surveys, structured interviews and secondary data sources such the NFHS, Census and IDHS datasets were used in the majority of research. Descriptive statistics [1,2], logistic regression models [5,6] and bivariate and multivariate regression [7,9] were often used analytical techniques to determine the factors that influence

maternal healthcare usage. To take into consideration hierarchical data structures and regional variances, a number of studies used multilevel or appropriate variable modeling, stratified and sequential modeling and adjusted odds ratios [6]. The indirect impacts of demographic and socioeconomic determinants on maternal health indicators were investigated using behavioral models and mediation. Program efficiency and women's healthcare preferences were also evaluated using advanced methods including thematic synthesis, policy assessment and discrete choice modeling [1,2]. In order to quantify inequality and contextual factors, some studies also included concentration inequality (CI) curves, variance partition coefficients (VPC) [5,6] and decomposition indices. When regarded as a whole, these various statistical methods made it possible to fully understand the variables affecting prenatal and antenatal care in many locations and populations.

Table 1: Summary of different factors having function in the use of maternal health care

Sl. No.	*Factors Covered*	*References(2001-2025)*
1	Age	Nielsen et al. (2001), Delvaux (2001), Kulkarni and Nimbalkar (2008), Chipmaker and Sahoo (2011), Jat et al. (2011), Chauhan (2012), Jenning et al. Ali and Chauhan (2020), Kakati et al. (2016), Yaya et al.(2016), Dimbuene et al.(2017), Mourtada et al.(2019) Barman et al.(2020), Yadav et al.(2021), Zaveri et al.(2023), Annu (2024)
2	Education	Nielsen et al. (2001), Delvaux(2001), Kulkarni and Nimbalkar (2008), Titaly et al. (2010), Chimankar and Sahoo(2011), Jat et al. (2011), Chauhan(2012), Jenning et al.(2014), Joshi(2014), Acharya(2014), Kakati et al.(2016), Yaya et al.(2016), Dimbuene et al.(2017), Mourtada et al.(2019), Barman et al. (2020), Ali and Chauhan(2020), Yadav et al.(2021), Zaveri et al.(2023), Annu (2024), Serván-Mori et al.(2025)
3	Parity	Nielsen et al. (2001), Delvaux(2001), Kulkarni and Nimbalkar (2008), Titaly et al. (2010), Kakati et al.(2016), Dimbuene et al.(2017), Mourtada et al.(2019), Annu (2024), Serván-Mori et al.(2025)
4	Marital Status	Delvaux(2001), Kulkarni and Nimbalkar (2008), Dimbuene et al.(2017)
5	Religion	Kulkarni and Nimbalkar (2008), Titaly et al. (2010), Chimankar and Sahoo(2011), Jat et al.(2011), Chauhan(2012), Jenning et al.(2014), Joshi(2014), Acharya(2014), Kakati et al.(2016), Dimbuene et al.(2017), Barman et al.(2020), Ali and Chauhan(2020), Yadav et al.(2021), Zaveri et al.(2023)
6	Caste	Chimankar and Sahoo(2011), Chauhan(2012), Acharya(2014), Kakati et al.(2016), Barman et al.(2020), Ali and Chauhan (2020), Yadav et al.(2021), Zaveri et al.(2023)
7	Place of residence	Delvaux(2001), Kulkarni and Nimbalkar (2008, Chimankar and Sahoo (2011), Jat et al.(2011), Chauhan(2012), Jenning et al.(2014), Joshi(2014), Yaya et al.(2016), Dimbuene et al.(2017), Mourtada et al.(2019), Barman et al.(2020), Yadav et al.(2021), Zaveri et al.(2023), Annu (2024), Serván-Mori et al.(2025)
8	Wealth Status	Chimankar and Sahoo(2011), Chauhan(2012), Jenning et al.(2014), Joshi(2014), Yaya et al.(2016), Dimbuene et al.(2017), Mourtada et al.(2019), Barman et al.(2020), Ali and Chauhan(2020), Yadav et al.(2021), Zaveri et al.(2023), Annu (2024)
9	Income	Delvaux(2001), Nielsen et al. (2001)
10	occupation	Delvaux(2001), Jat et al.(2011), Joshi(2014), Acharya(2014), Kakati et al.(2016), Dimbuene et al.(2017), Yadav et al.(2021), Cicekliogluet al.(2005)
11	Unplanned Pregnancy	Delvaux(2001)
12	Mass Media	Kulkarni and Nimbalkar (2008), Titaly et al. (2010), Chimankar and Sahoo (2011), Joshi (2014), Acharya(2014), Dimbuene et al.(2017), Barman et al.(2020), Ali and Chauhan(2020), Yadav et al.(2021), Zaveri et al.(2023),
13	Health Insurence	Delvaux (2001), Dimbuene et al.(2017),Cicekliogluet al. (2005)
14	Others(Standard of living, Poverty index, birth order, Quality of care, Health Complications. . . etc.)	Nielsen et al. (2001), Delvaux(2001), Kulkarni and Nimbalkar (2008), Titaly et al. (2010), Jat et al.(2011), Acharya(2014), Kakati et al.(2016), Dimbuene et al.(2017), Mourtada et al.(2019), Barman et al.(2020), Ali and Chauhan(2020), Yadav et al.(2021), Zaveri et al.(2023), Ethnic status (Indigenous vs. non-Indigenous), health insurance coverage,

Table 2: Significance status of the factors(Note: Only papers that used statistical models in their analysis are included in this table

Authors/ Country	**Dependent Variables**	**Independent Variables**													**Third Variable**	**Significant Factors**
		Age	Education	Parity	Marital	Religion	Caste	Residence	Wealth	Income	Occupation	Unplanned Preg.	Mass Media	Others		
Nielsen et al. (2001), India	Antenatal care attendance	✓	✓	✓	✓	×	×	×	×	✓	×	×	×	Land ownership, House type, Family type, Cash income	Maternal obstetric history, Education level, Land ownership, Marital status, Family type	Parity (high), Women's education, Husband education
Delvaux et al. (2001), Europe	Access to prenatal care / number of visits	✓	✓	✓	×	×	×	✓	✓	✓	✓	×	×	Cultural beliefs, Social support, Health insurance	Access to health services	Income, Education, Geographical location, Health insurance coverage
Letamo & Rakgoasi (2003), Botswana	Non-institutional delivery, No prenatal check-up, No tetanus injection, No postnatal check-up	✓	✓	✓	✓	×	×	✓	✓	×	×	×	×	×	Marital status, Socioeconomic status, Residence, Parity	Age, Education, Residence, Parity, Socioeconomic status
Kulkarni and Nimbalkar (2008), India(North Goa District)	Use of antenatal care: pregnant women registered with a health facility or health worker at home before 12 weeks of pregnancy, received 5 or more visits during entire period of gestation, received two doses of tetanus toxoid vaccine	×	✓	✓	×	✓	×	×	×	×	×	×	✓	Quality of care, distance to health center from home	×	Women's education, Religion, Quality of care, Mass media, Parity.

Note: × denotes a variable that was not utilized in the study;✓ denotes a variable that was.

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		Age	Education	Parity	Marital	Religion	Caste	Residence	Wealth	Income	Occupation	Unplanned Preg.	Mass Media	Others		
Titaly et al. (2010),Indonesia	Underutilization of antenatal care services. i.e.Infants whose mothers never attended antenatal care services. Mothers who attended fewer than the four recommended antenatal visits during pregnancy	×	✓	×	×	×	×	✓	✓	×	×	×	✓	Birth Rank, Distance to Healthcare Facilities, Financial Barriers	Maternal Age, pregnancy Complications, Time Since Last Pregnancy, Knowledge of Obstetric Complications	Rural Residence, Low Household Wealth Index, Low Maternal Education, Birth Rank, Exposure to Mass, Media, Financial Barriers.
Chimankar and Sahoo(2011), India (Uttarakhand)	Full antenatal care, Safe delivery, Postnatal care	✓	✓	×	×	✓	✓	✓	✓	×	×	×	✓	Household structure, birth order etc	×	Full ANC: Place of residence, educational level (secondary, higher), birth order, age. Safe delivery : religion, educational level (primary, secondary, higher), household structure(non-nuclear), wealth index(richer, richest), birth order age, Postnatal care: religion, educational level (secondary, higher), age.
Jat et al.(2011), India(Madhya Pradesh)	use of any antenatal care during pregnancy, skilled attendance at delivery and receiving any postnatal care	✓	✓	×	×	✓	✓	✓	✓	×	✓	×	×	Poverty index	×	Wealth Index, Mother's Education, Husband's Education, Poverty Index, Place of Residence etc.

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		Age	Education	Parity	Marital	Religion	Caste	Residence	Wealth	Income	Occupation	Unplanned Preg.	Mass Media	Others		
Chauhan,2012, India(Rajasthan)	ANC visits, consumption iron and folic acid tablets, TT vaccination	✓	✓	×	×	✓	✓	✓	✓	×	×	×	×	×	Social Interaction, Economic Factors, Cultural Norms, Healthcare Access, Family Structure	Age at Marriage, Education, Wealth Index, place of residence, religion, caste.
Jenning et al.(2014), Eight Sub-African countries (Burkina Faso, Burundi, Malawi , Mozambique, Rwanda, Senegal, Ugand, Zimbabwe)	Male Partner Accompaniment to Antenatal Care (ANC)	✓	✓	×	×	✓	×	✓	✓	×	×	×	×	Women's Empowerment Status, Economic Empowerment, Socio-familial Empowerment, Legal Empowerment	Socioeconomic status, Education level, Cultural factors, Age difference between partners, Residence	Economic Empowerment (in Burkina Faso), Composite Empowerment Scores(in Burkina Faso and in Uganda), Mixed Associations(in Burkina Faso and in Uganda).
Joshi(2014), Nepal	Attendance at 4 or more ANC visits, Good quality ANC	✓	✓	✓	×	✓	×	✓	✓	×	✓	×	✓	smoking status of women, history of previous pregnancies, use of modern family planning method, ecological zones etc.	×	Age of Women, Education Level, Husband's Education and Occupation, Smoking Status, Type of Health Worker and Place of residence, Media Exposure etc.

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		Age	Education	Parity	Marital	Religion	Caste	Residence	Wealth	Income	Occupation	Unplanned Preg.	Mass Media	Others		
Acharya(2014), Nepal (Dhanusha district)	Frequency of ANC, nutritional supplementation, de-worming, Tetanus and Toxoid(TT) immunization, rest and sleep, physical and laboratory examination and ANC provider	✓	✓	×	×	×	✓	×	×	×	✓	×	✓	Standard of living	×	Rest and sleep during pregnancy, TT immunization. Exposure to Mass Media, Maternal Education, Standard of Living Index (SLI).
Deo and Bhaskar (2014), Eastern Nepal	Utilization of Antenatal Care Services (measured as the number of visits, specifically whether women received four or more ANC visits)	×	×	×	×	×	×	×	✓	×	×	×	✓	Ethnicity, Women's autonomy ,Knowledge about maternal health services etc	×	Media Exposure, Women's Autonomy, Wealth Rank, Knowledge of Maternal Health Services, Knowledge on Transportation Incentives.
Kalule et al. (2014), Uganda	Utilization of Maternal Health Care Services: Number of antenatal clinic visits, Receipt of tetanus toxoid injection, Place of delivery	✓	✓	×	✓	✓	×	✓	✓	×	×	×	×	Birth order	Birth order, Education, Wealth index, Age	Urban residence, Higher education (Secondary and above), Birth order (especially second or third births), Wealth index (especially for delivery location).

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		Age	Education	Parity	Marital	Religion	Caste	Residence	Wealth	Income	Occupation	Unplanned Preg.	Mass Media	Others		
Kakati et al.(2016), India (Jorhat.Assam)	Utilization of antenatal care services i.e. place of conduction of ANC, timing of registration, number of antenatal visits, immunization status, intake of IFA tablets	✓	✓	✓	×	✓	×	×	×	×	✓	×	×	Type of families, household decision making autonomy	×	Age of the women, religion, caste, socioeconomic class, place of delivery, mode of delivery, parity.
Yaya et al.(2016), Malawi	Antenatal care, Skilled birth attendance, Postnatal care	✓	×	✓	✓	✓	✓	×	×	✓	✓	✓	✓	✓	Age, Religion, Region	Wealth Index, Education Level, Urban and Rural residence, Region (Southern).
Dimbuene et al.(2017), Africa	Antenatal care provider, timing of first antenatal care visit, frequency of antenatal care visit, place of delivery, presence of a birth attendant	×	✓	×	×	×	×	×	×	×	×	×	×	×	Age, parity, employment status, marital status, access to health facility, health insurance, media exposure, occupation, place of residence. . . .	Women's Education, Partner's Education, Age and Parity, Access to Health Facilities, Health Insurance, Religion and Ethnicity.

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		Age	Education	Parity	Marital	Religion	Caste	Residence	Wealth	Income	Occupation	Unplanned Preg.	Mass Media	Others		
Azimi et al.(2019), Afghanistan	Number of ANC visits	✓	✓	✓	×	×	×	✓	✓	×	✓	×	✓	Literacy status, Ethnicity	age, ethnicity, residence, parity, education, husband's education, literacy, job, wealth, decision-making, and permission to healthcare	Husband's Education, Wealth Status(middle and rich wealth quintiles), Ethnicity(Uzbek Turkman,Tajik Hazara ethnic groups), Women's and Husband's Education (Having education increases), Literacy(literate women), Decision Maker for Healthcare.
Mourtada et al.(2019), Syria	Adequacy of ANC Content	×	✓	×	×	×	×	×	✓	×	×	×	×	Health-Related Variables, Regional Characteristics, Provider Characteristics, Usage of Services	Travel and Geographic Accessibility, Cultural and Social Norms, Fragmentation of Healthcare System, Economic Factors, Health System Organization	Regional disparities, health system infrastructure, provider gender availability and women's perceptions of diagnostic importance.

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		Age	Education	Parity	Marital	Religion	Caste	Residence	Wealth	Income	Occupation	Unplanned Preg.	Mass Media	Others		
Ali and Chauhan (2020), India	Full Antenatal Care, Skilled Birth Attendance, Postnatal Care	✓	✓	×	×	✓	✓	×	✓	×	×	×	✓	Birth order	Wealth Index, Caste, Religion, Mass Media Exposure	The strongest beneficial indicators are wealth, education, and exposure to the media.
Barman et al.(2020)	At least 4 ANC visit, ANC visit within 1st Trimester, Skilled health personnel for ANC, 2 or more tetanus toxoid Injection, Institutional Delivery, PNC within 42 days of delivery	×	✓	×	×	×	×	×	×	×	×	×	×	×	Maternal age, Age at marriage, Birth order, Caste, Religion, Place of residence, Wealth index, Exposure to mass media, Region.	Education, Wealth index, Place of residence, Mass media exposure, Birth order, Maternal age.
Yadav et al.(2021), India	Four or more ANC (ANC4+) visits, skilled birth attendants (SBA) and postnatal care PNC	✓	✓	×	×	✓	✓	✓	✓	×	✓	×	✓	Birth order, women's autonomy	×	Higher levels of education, Mass Media,higher wealth quintiles, Women's Autonomy.

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		Age	Education	Parity	Marital	Religion	Caste	Residence	Wealth	Income	Occupation	Unplanned Preg.	Mass Media	Others		
Zaveri et al.(2023), India	full ANC, delivery assisted by skilled birth attendants (SBA) and postnatal care (PNC)of mothers within 2 days of delivery	✓	✓	×	×	✓	✓	✓	✓	×	×	×	✓	✓	Birth order,Seeking permission to visit health services, getting money to pay health services, Distance to health facility. etc	Women's age, age at marriage, birth order, women's education and wealth quintile, mass media, contraceptive use.
Annu (2024), India(Uttar Pradesh	Adequate ANC visits ($\geq$4) vs. Inadequate (<4)	✓	✓	✓	×	×	×	✓	✓	×	×	×	×	×	Socioeconomic and demographic variables	Higher education, wealthier status, urban residence, fewer children, husband's education, age (25-29).
Serván-Mori et al.(2025), Mexico	Effective coverage of maternal health care (ECMH)	×	✓	✓	×	×	×	✓	×	×	×	×	×	Ethnic status (Indigenous vs. non-Indigenous), health insurance coverage	history of perinatal losses, and period (pre/post-Covid)	Ethnic/ racial discrimination accounts for over 50 percent of the gap in maternal health coverage between Indigenous and non-Indigenous women; other factors include education, socioeconomic position, residence, and health coverage).

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4. Conclusion

Research conducted in many international contexts has shown that "the use of prenatal care (ANC) services is impacted by a complex interaction of socioeconomic, educational, cultural and healthcare-related factors. Disparities in ANC access cannot be entirely explained by perceived financial limits alone, even when structural and financial barriers provide serious difficulties, especially in areas with limited resources. Instead, it is frequently recognized that mother education, household wealth and media exposure are significant determinants of ANC usage, accentuating the need for comprehensive tactic"s.

Higher literacy levels are linked to more ANC visits, competent delivery attendance and postnatal care, demonstrating the critical role that education plays in empowering women to seek maternal healthcare. However, without further steps to alleviate economic disparities, education is insufficient on its own. Women who live in homes that have more incomes are more likely to use ANC services, indicating that wealth status has a considerable impact on healthcare access. Furthermore, media exposure via digital, television and radio channels raise health consciousness and encourages good maternal health practices.

Cultural and regional variations further shape ANC utilization, with rural-urban disparities, traditional beliefs and male involvement influencing healthcare-seeking behaviors. In some contexts, male participation in ANC has shown mixed effects, suggesting that interventions should balance spousal engagement with women's autonomy. Geographic disparities, such as those observed in Indonesia and India, highlight the need for localized, culturally sensitive healthcare policies.

To enhance maternal healthcare results, it is essential for governments and policymakers to implement cohesive strategies that incorporate education, economic empowerment, development of healthcare infrastructure and community involvement. Local initiatives, commitment from political leaders and focused media campaigns can aid in closing the gaps in access to antenatal care, especially in underserved areas. Future studies should investigate longitudinal and qualitative aspects to gain a deeper insight into the changing obstacles to maternal healthcare and evaluate the lasting effects of policy measures.

Ultimately, achieving equitable access to quality ANC requires a holistic approach that addresses not only medical and financial barriers but also deep-rooted socio-cultural and systemic challenges. Global maternal health programs may make progress toward promising safe and effective pregnancies for all women, regardless of socioeconomic or geographic limitations, by placing higher priority on women's education, economic solidity and culturally passable healthcare delivery.

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References

1. T Delvaux, P Buekens, I Godin, M Boutsen, *Barriers to prenatal care in Europe* American journal of preventive medicine,Elsevier. **21(1)** (2001) 52-59.

2. B Simkhada, ER Teijlingen, M Porter, P Simkhada, *Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature,* Journal of advanced nursing,Wiley Online Library. **61(3)** (2008) 244-260.

3. M Kulkarni, M Nimbalkar, *Influence of socio-demographic factors on the use of antenatal care,*Ind J Preventive Soc Med . **39(3)** (2008) 98–102.

4. CR Titaley, MJ Dibley, CL Roberts, *Factors associated with underutilization of antenatal care services in Indonesia: results of Indonesia Demographic and Health Survey 2002/2003 and 2007,* BMC public health,Springer. **10(1)** (2010) 485.

5. DA Chimankar, HS Harihar Sahoo, *Factors influencing the utilization of maternal health care services in Uttarakhand,* (2011) 209-216.

6. TR Jat, N Ng, M San Sebastian, *Factors affecting the use of maternal health services in Madhya Pradesh state of India: a multilevel analysis,International journal for equity in health,Springer .* **10(1)** (2011) 59.

7. A Chauhan, *Antenatal care among currently married women in Rajasthan, India,*Asian Pacific Journal of Tropical Disease,Elsevier . **2** (2012)S617-S623.

8. L Jennings, M Na, M Cherewick, M Hindin, B Mullany, S Ahmed, *Women's empowerment and male involvement in antenatal care: analyses of Demographic and Health Surveys (DHS) in selected African countries,BMC pregnancy and childbirth,Springer* **14(1)** (2014) 297.

9. C Joshi, S Torvaldsen, R Hodgson, A Hayen , *Factors associated with the use and quality of antenatal care in Nepal: a population-based study using the demographic and health survey data,BMC pregnancy and childbirth,Springer* **14(1)** (2014) 94.

10. D Acharya, V Khanal, JK Singh, M Adhikari, S Gautam, *Impact of mass media on the utilization of antenatal care services among women of rural community in Nepal,BMC research notes,Springer.* **8(1)** (2015) 345.

11. R Kakati, K Barua, M Borah, *Factors associated with the utilization of antenatal care services in rural areas of Assam, India,Int J Community Med Public Health.* **3(10)** (2016) 2799-805.

12. Mourtada, Rima and Bottomley, Christian and Houben, Fiona and Bashour, Hyam and Campbell, Oona MR, *A mixed methods analysis of factors affecting antenatal care content: A Syrian case study,Plos one,Public Library of Science San Francisco, CA USA.* **14(3)** (2019) e0214375.

13. ZT Dimbuene, J Amo-Adjei, D Amugsi, J Mumah, CO Izugbara, D Beguy, *Women's education and utilization of maternal health services in Africa: a multi-country and socioeconomic status analysis,* Journal of biosocial science . **50(6)** (2018) 725-748.

14. B Barman, J Saha, P Chouhan, *Impact of education on the utilization of maternal health care services: An investigation from National Family Health Survey (2015–16) in India,* Children and Youth Services Review,Elsevier . **108** (2020) 104642.

15. A Zaveri, P Paul, R Roy, P Chouhan, *Facilitators and barriers to the utilisation of maternal healthcare services in empowered action group states, India,* Journal of Health Management,SAGE Publications Sage India: New Delhi, India . **25(3)** (2023) 431-447.

16. AK Yadav, PK Jena, B Sahni, D Mukhopadhyay, *Comparative study on maternal healthcare services utilisation in selected empowered action group states of India,* Health and Social Care in the Community,Wiley Online Library . **29(6)** (2021) 1948-1959.

17. G Letamo, SD Rakgoasi, *Factors associated with non-use of maternal health services in Botswana,* Journal of Health, Population and Nutrition,JSTOR .(2003) 40-47.

18. BB Nielsen, J Liljestrand, SH Thilsted, A Joseph, M Hedegaard, *Characteristics of antenatal care attenders in a rural population in Tamil Nadu, South India: a community-based cross-sectional study,* Health and Social Care in the community,Wiley Online Library. **9(6)** (2001) 327-333.

19. LM Walton, D Brown, *Cultural barriers to maternal health care in rural Bangladesh,* Journal of Health Ethics, Fall .(2012).

20. KK Deo, RK Bhaskar, *Socio-cultural factors associated with antenatal services utilization: a cross-sectional study in Eastern Nepal,* Clin Mother Child Health . **11(2)** (2014) 166.

21. I Kalule-Sabiti, AY Amoateng, M Ngake, *The effect of socio-demographic factors on the utilization of maternal health care services in Uganda,* African Population Studies. (2014) 515-525.

22. B Ali, S Chauhan, *Inequalities in the utilisation of maternal health care in rural India: Evidences from National Family Health Survey III and IV,* BMC public health,Springer. **20(1)** (2020) 369.

23. S Yaya, G Bishwajit, V Shah, *Wealth, education and urban–rural inequality and maternal healthcare service usage in Malawi,* BMJ global health,BMJ Specialist Journals. **1(2)** (2016) e000085.

24. MW Azimi, E Yamamoto, YM Saw, T Kariya, AS Arab, SI Sadaat, F Farzad, N Hamajima, *Factors associated with antenatal care visits in Afghanistan: secondary analysis of Afghanistan Demographic and Health Survey 2015,* Nagoya journal of medical science . **81(1)** (2019) 121.

25. J Annu, *Determinants Associated with Frequency of Antenatal Care Visits in Uttar Pradesh: Results from Demographic Health Survey,* International Journal of Health Sciences and Research . **14(11)** (2024) 10-52403.

26. World Health Organization, *Trends in maternal mortality 2000 to 2020: estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division,.* (2023).

27. E Serván-Mori, S Meneses-Navarro, R García-Díaz, D Cerecero-García, D Contreras-Loya, *Ethnic and racial discrimination in maternal health care in Mexico: a neglected challenge in the search for universal health coverage,* International Journal for Equity in Health,Springer . **24(1)** (2025) 10.

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