



**International Journal of TROPICAL DISEASE
& Health**

41(24): 33-46, 2020; Article no.IJTDH.65292
ISSN: 2278-1005, NLM ID: 101632866

Equity and Accessibility of Antenatal Care Utilization in India

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Authors' contributions

This work was carried out in collaboration between both authors. Authors MS and AR designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript and managed the analyses of the study. Author MS managed the literature searches. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJTDH/2020/v41i2430431

Editor(s):

(1) Dr. Giuseppe Murdaca, University of Genoa, Italy.

Reviewers:

(1) Kshitij Karki, Purbanchal University, Nepal.

(2) Maryani Setyowati, Universitas Dian Nuswantoro, Indonesia.

(3) Daniele Behling de Mello, Catholic University of Pelotas (UCPel), Brazil.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/65292>

Review Article

Received 22 October 2020

Accepted 28 December 2020

Published 31 December 2020

ABSTRACT

Aims and Objectives: In this paper, we examine the determinants at both the person and household level, and the connexion of the population to health facilities in childcare, wealth, caste, education and others are responsible for the stability found in Antenatal Care utilization. For this study, data used from the Indian National Family Health Survey (NFHS-4 2015-2016) three rounds are available. The findings of the analysis are given in three parts. First, at least 1 Injection of tetanus toxoid (TT), the Iron Folic Acid tablets (IFA), identified as four or more prenatal visits at least 100 days. Second, state profiles of NFHS-4 antenatal care usage are provided to compare patterns. Third, the impact of demand and access variables calculated from multi-level logistics.

Methods: In India, we analyzed a group of 190, 898 women in the Nationwide Family Health Study 4. In order to measure Equity for the maximum ANC usage, concentration and index curves were employed. The multivariable logistic regression model has used to analyze the relevant variables to the usage of complete ANC.

Results: 21% of pregnant women in India use complete ANC, which is 2.3-65.9% throughout the world. 51.6% received four or more ANC visits, 30.8% had at least 100 days of IFA and 91.1% had

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tetanus toxoid in one or two doses. Complete usage of the ANC in the family, caste and maternal education were unequal. The utilization of the Integrated Child Development Services (ICDS) government register, birth registration and health care coverage has related to improved chances of complete ANC utilization. Lower maternity schooling, lower-income, father intrusiveness during prenatal visits, a higher birth order, puberty and accidental pregnancy were related to lower odds of maximum ANC use.

Keywords: Healthcare; utilization; NFHS-4; antenatal care; safe motherhood.

1. BACKGROUND

Antenatal care (ANC) promotes positive pregnancy and better survival of mothers and infants. Antenatal care is also an essential aspect of a vital "1000 days" timeframe for fostering the children's long-term growth and development [1-3]. It strengthens the links between women and their households to the health care system and will contribute to increased utilization of critical resources such as breastfeeding and dietary therapy, planning an extended infant vaccine [4,5]. Globally, the WHO has proposed a minimum number of 4 antenatal visits in 2010-2016 for 62 per cent of women who were pregnant [6]. Recent studies have shown a declined birth rate among women who obtained at least a minimum of 8 prenatal visits, which has now risen from 4 to 8 the lowest recommended number of prenatal visits [7].

The number of pregnant women in India rises from 37 on a minimum of 4 prenatal visits, 0 per cent in 2006–2016 to 51.2 per cent [8]. It is comparatively less compared to the rise in the institutional distribution pace, which was primarily guided by government cash payment schemes, which doubled from 38.7 per cent to 79 per cent over the same period. This disparity represents a lost opportunity since approximately 1/4 of maternal death are attributed to antenatal visits that can be detected and handled during pre-eclampsia, eclampsia and antepartum haemorrhage [9].

Antenatal care often gives a window in which harmful birth outcomes may be found and hopefully avoided. The information shows that access to critical health care, including maternity and delivery services, is substantially unequal. In Low- and Medium-Income Countries (LMIC) [10,11], differences in the utilization of maternal health care services have recorded. In India, Antenatal treatment is accessible in public health centres at free of cost. Home families, however, are expending out of pocket because the

provision of maternity facilities in India is a vital part of private health care providers [8].

There is no systematic awareness of determinants in the usage of antenatal care services in India. Recently, the government of India emphasis on antenatal care programmes, a dependent cash transfer mechanism is a key to understanding the element that drives the usage of Pradhan Mantri Matru Vandana Yojana [12] in helping to establish an informed strategy. This scheme entitles a pregnant woman to take Iron-Folic Acid Tablets and TT injections (Tetanus Toxoid), when, within four months of childbirth, she reports at the embarrassment Anganwadi Center (AWC). The study involves a review of secondary data. The latest issue of the National Family Survey (NFHS-4) to analyze coverage and equality in the utilization of antenatal care in India. We have measured the determinants that are responsible for the complete utilization of antenatal care. These policy implications of these outcomes have also been addressed about current recommendations and programmes in the field of public health.

2. METHODS

2.1 Data Source

This study uses the data from the 4th round of the India NFHS 4 survey conducted during 2015–2016 [8]. The data is used for person stages. NFHS is a collection of cross-sectional nationally representative research that provides evidence on various results in the fields of social, socio-economic, maternal and infant welfare, sexual and preparing for the family. In the fourth step, about 700,000 women aged between 15 to 49 years have evaluated with a second stage stratified 97% sample design in 601,509 households. Another location is accessible for descriptions of the sampling and tools used [8]. For this study, children's recode file (IAKR73FL) has used. The code file contains details, with common variable names and coding categories in a regular simple to analyze format for better

comparability between countries, with description variables and indices measured for post data collection [13]. The new pregnancy has details about the utilization of antenatal care, live birth in the pre-examination five years.

2.2 Definitions and Analysis

At least one tetanus injection, a notified use of Tablet or syrup containing iron-folic acid for 100 days minimum was defined as complete, or more than four antenatal appointments prenatal care variable [8]. The resulting explanatory variables are the position of the family, castes, quintiles of the income, acceding to health insurance, maternity duration, kindergarten, birth registration, the timing of the first visit to the ANC, use of centralized government child welfare services (Integrated Child Development Services). You will find additional information and sub-categories of this variable in Fig. 1.

The analysis was limited to antenatal care for the last five years, progressing to live birth during the last pregnancy. Information regarding the last live birth for 190,898 births was accessible from the overall survey of 259,627. In Fig. 2, you can find that the proportion of pregnant women utilizing full ANC at national and sub-national (states and territories) has measured. In India, there are 36 states/union territories. In order to verify the relation between explanatory and complete ANC focus, we have used binary logistic regression. The multivariable model [14] included the variables with p-value < 0.20 in invariable medical or contextual diagnosis and factors of diagnosis. The p-value of < 0.05 was found to be statistically crucial in both analyses.

Fig. 2, the magnitude of wealth-based disparities for the usage of complete ANC in India and States/union territories was explored via concentration curves and concentration indexes. It evaluates the difference in health among people identified by some socio-economic status indicators [15]. This study indicates the total percentage of maximum utilization of the antenatal care relative to the overall, and population percentage classified by an indicator of profits. When the degree graph is over the 45° axis (equality axis), it is more concentrated for lower-income and vice versa. Two times the region between the concentration curve and the equivalent line is known as the index of concentration. It is from - 1 to + 1 and there is no socio-economic disparity in the 0 concentration index.

For the purpose of the study was used STATA © 15.1 (StataCorp LLC, College Station, TX, USA). In order to change the sample weight, clustering and stratification the Stata survey command (svyset) design. For the estimation of the concentration index the Stata package "conindex" was used by users. Strictly followed the guidelines on the usage of data—the DHS program [16] as needed.

It applies to the SC / ST / OBC (Fig. 3a-c) socially challenged categories. With a concentration index of 0.31 and - 0.11 to 0.67, complete ANC usage was too unaffordable in states. In general, there was greater inequality in usage in states with lower use of complete ANC (Fig. 4).

3. RESULTS

We record results for 190,898 women, who had at least one live birth in the five years preceding the survey. Table 1 shows the history features of these women.

3.1 Full ANC Utilization

Twenty-one per cent of pregnant women in the last birth had full ANC of 2.3–65.9 per cent (median 30.7, IQR 14.8–39.0). The percentage of women who visited at least 4 ANCs was 51.6%, varying from 14.4 to 96.7% in states, while IFA consumed 30.8% of women for at least 100 days, varying from 4.5% to 85.5% in states. 91.1% of females in states varying from 70 to 98.6% obtained at least one dose of tetanus toxoid (Fig. 1 and Fig. 2). The total number of prenatal visits was 4 (IQR 2–7).

3.1.1 Inequity in full ANC utilization

In the rural areas, inequality has higher among women without schooling or illiterates in ANC utilization. Lower chances of complete ANC usage were correlated with lack of involvement from father during the ANC visits (AOR 0.72; 95% CI 0.68–0.77). Females lacking ICDS advantages had lower probabilities of complete ANC usage (AOR 0.93; 95% CI 0.88–0.98). Caste factor has not connected to the ANC utilization.

3.1.2 Determinants of full ANC

Table 2, summarizes the findings of the multivariable logistic regression model. The

model has also been adapted to the state of residence of the respondent. The income quintiles revealed a gradient in complete usage of ANC, the highest usage are among the wealthiest and vice versa. Lower chances of complete usage of ANC are present among the women living in the rural areas (adjusted odds ratio, AOR 0.90; 95% CI 0.84–0.96). The odds of maximum use of ANC by health insured women were higher (AOR 1.18; CI 95% 1.11-1.26). The lower odds (AOR 0.86; 95% of CI 0.79–0.93) for complete ANC usage were present for maternal age below 19 years. There has also been a degree of complete ANC usage throughout the levels of schooling, with the lowest use of those lacking formal schooling. With rising birth rates, the probability of complete ANC decreased. The lower chances of complete ANC implementation are correlated with an unwanted pregnancy (AOR 0.83; 95% CI 0.76–0.92). Lower chances of complete usage of ANCs (AOR 0.78; 95 percent CI 0.71–0.85) is correlated with unregistered birth. Women who visited the first ANC in the second or third quarter were less inclined to visit the complete ANC.

Pregnancy certification, usage of ICDS benefits and life care benefits from the government are both linked to better chances of maximum use of ANC. Mother's bottom schooling, a higher order

of birth, dad, lower quintile(s), who was not followed by a pregnancy and unintended visit to ANC mainly lower pregnancy, were associated probabilities for usage of complete ANC. The utilization of ANC, which has been verified by previous literature [17–19], has been closely connected to the economy and maternal education. These women often have a younger maternal age at childbirth. Women from the wealthiest quintiles of LMICs like South East Asia have greater financial and social housing in the general population for health care facilities, which may contribute to greater usage of complete ANC, as the latest study shows [6]. Unintentional pregnancy attributable to lack of information or reflections of insufficient or unavailable family planning resources was previously related to lower ANC utilisation, and our results are also similar [20,21]. Increased trust in pregnant and birth experience, time- and money limitations, worst past health care experiences, and financial obstacles to the usage of ANCs may be attributed to lower ANC use by women of higher parity [17]. Equity is projected to be smaller in states of poor utilization of ANC because many of that were more qualified to access the facilities more often. This result is important for redeveloping national and subnational policies to maximize the utilization of the ANC.

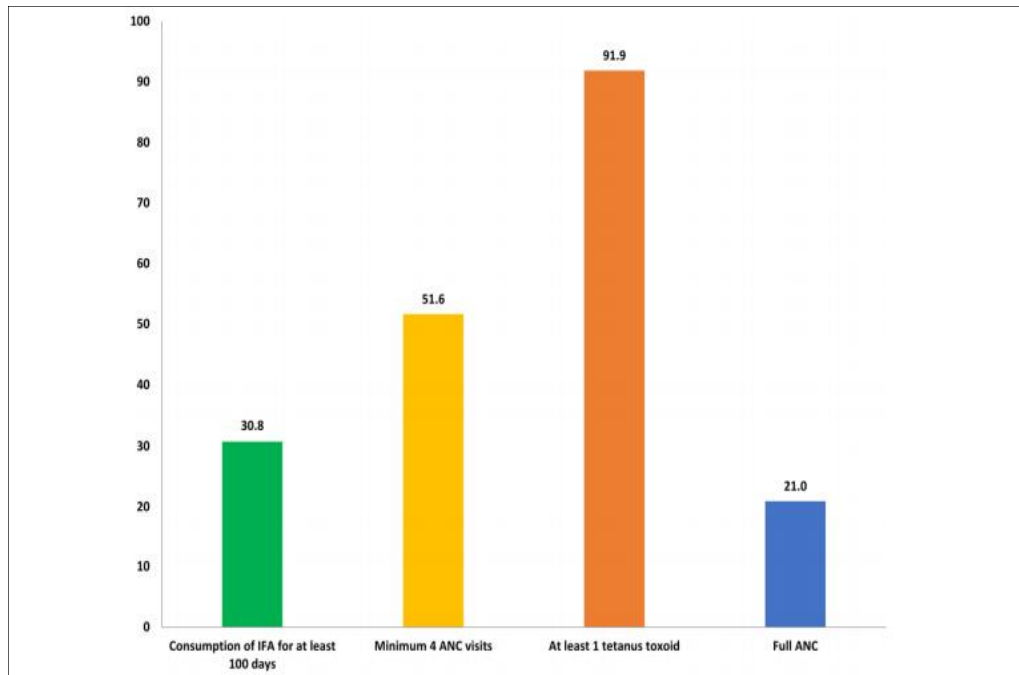


Fig. 1. Utilisation (%) of full antenatal care and different components in India, NFHS-4(2015-16)

Table 1. Background characteristics of women who gave birth in the last five years, NFHS-4 (2015–16)

Characteristics	Categories	Frequency (Weighted %)
Wealth quintiles	Lowest	46,782 (23.4)
	Second	43,739 (21.5)
	Middle	38,393 (19.9)
	Fourth	33,212 (19)
	Highest	28,772 (16.6)
Social caste	Others	34,705 (21.1)
	Scheduled caste	35,170 (22)
	Scheduled tribe	37,889 (10.7)
	Other Backward Categories	74,060 (45.3)
Place of residence	Urban	47,833 (29.7)
	Rural	143,065 (70.3)
Health insurance cover	No	163,367 (84.7)
	Yes	27,531 (15.3)
Maternal age at conception (in completed years)	less than 19 years	16,225 (9.5)
	19–30 years	150,683 (80)
	More than 30 years	23,990 (10.5)
Maternal education	No or less than one year of formal education	
	Up to Primary (1–5 years of schooling)	55,165 (27.6)
	Secondary (6–12 years of schooling)	26,712 (13.5)
	Higher Education (more than 12 years of schooling)	88,871 (46.9)
	First	
	Second	20,150 (12)
Birth order	Third	
	Four or higher	61,807 (33.6)
	Yes	62,484 (34.5)
Intended pregnancy	Did not wanted/ wanted later	33,064 (16.6)
	Yes	33,543 (15.4)
	No	173,407 (90.8)
Previous miscarriage/ abortion/ still birth Pregnancy registered	Yes	17,390 (9.2)
	No	19,671 (10.3)

Characteristics	Categories	Frequency (Weighted %)
	1st trimester	171,227 (89.7)
	2nd trimester	160,769 (85.4)
	3rd trimester	30,028 (14.6)
Timing of first ANC visit		
Presence of child's father at any ANC visit		
	No	101,278 (63.3)
	Yes	11,701 (8.04)
Received government's Integrated Child Development Service (ICDS) benefits		
	Yes	31,291 (17.7)
	No	125,965 (82.3)
		105,980 (55.4)
		84,824 (44.6)

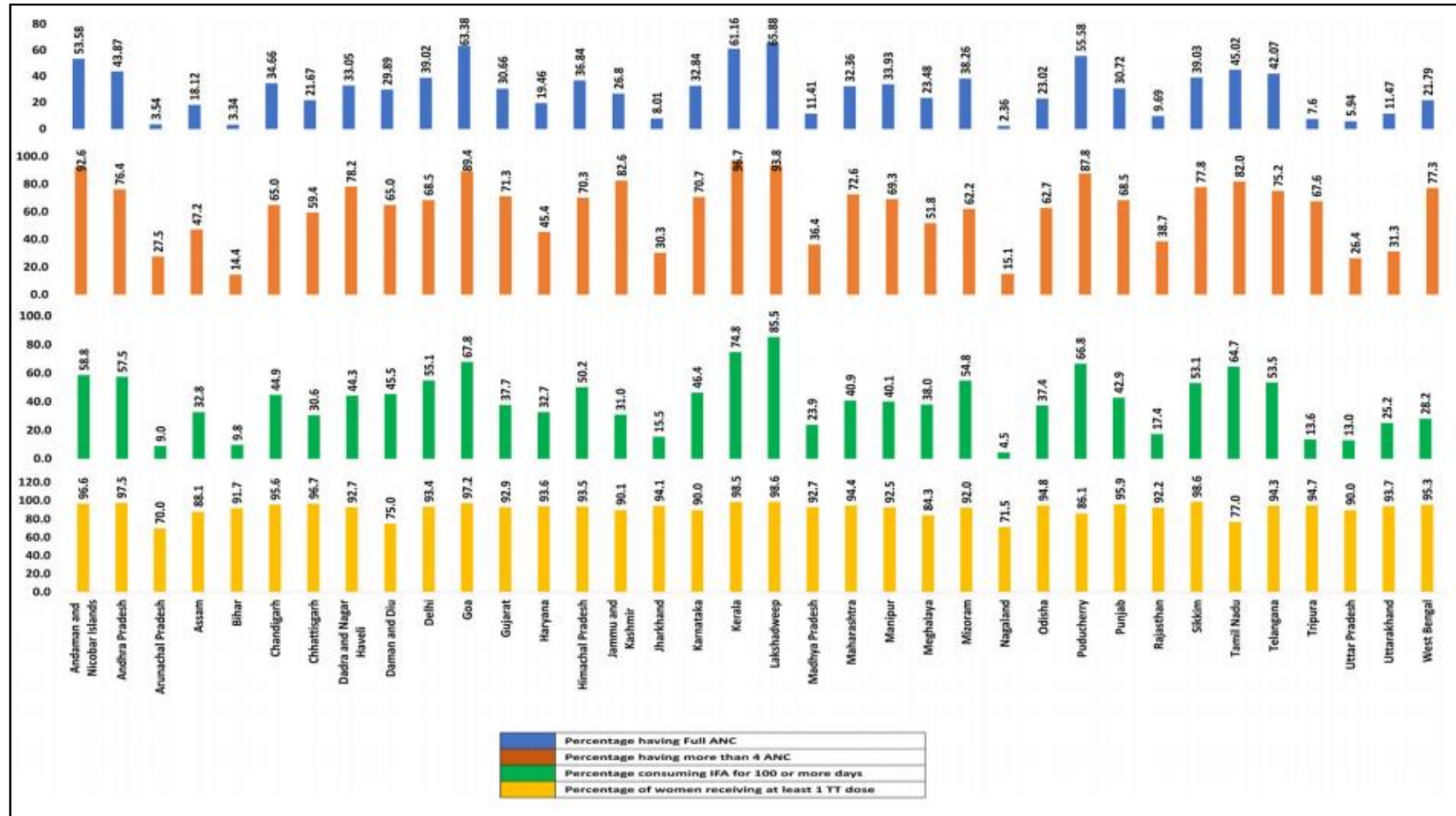


Fig. 2. State-wise utilization (%) of antenatal care and its components in India, NFHS-4 (2015-16)

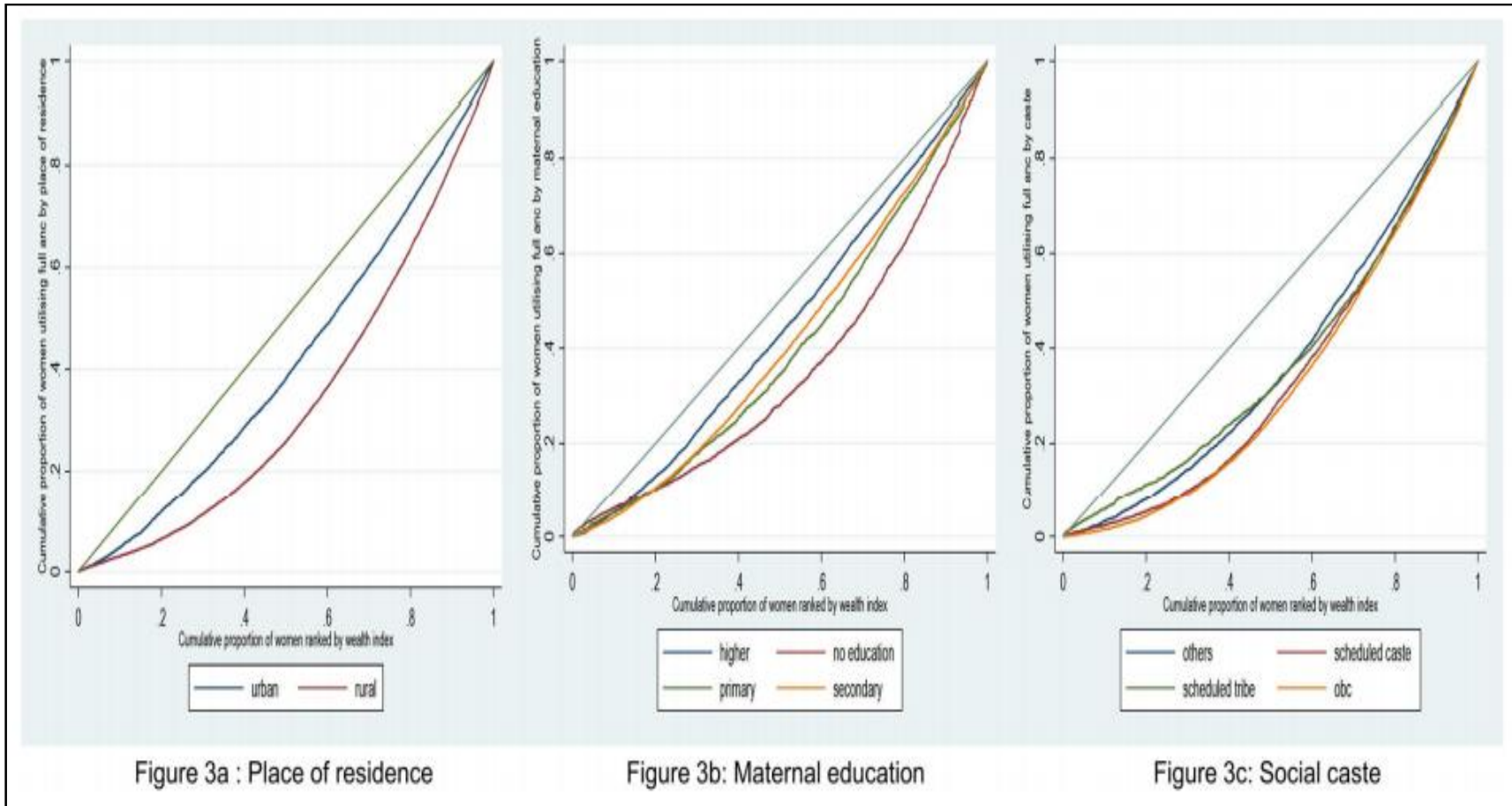


Fig. 3. Concentration curves for full antenatal care utilization across place of residence (a), maternal education (b), social caste (c)

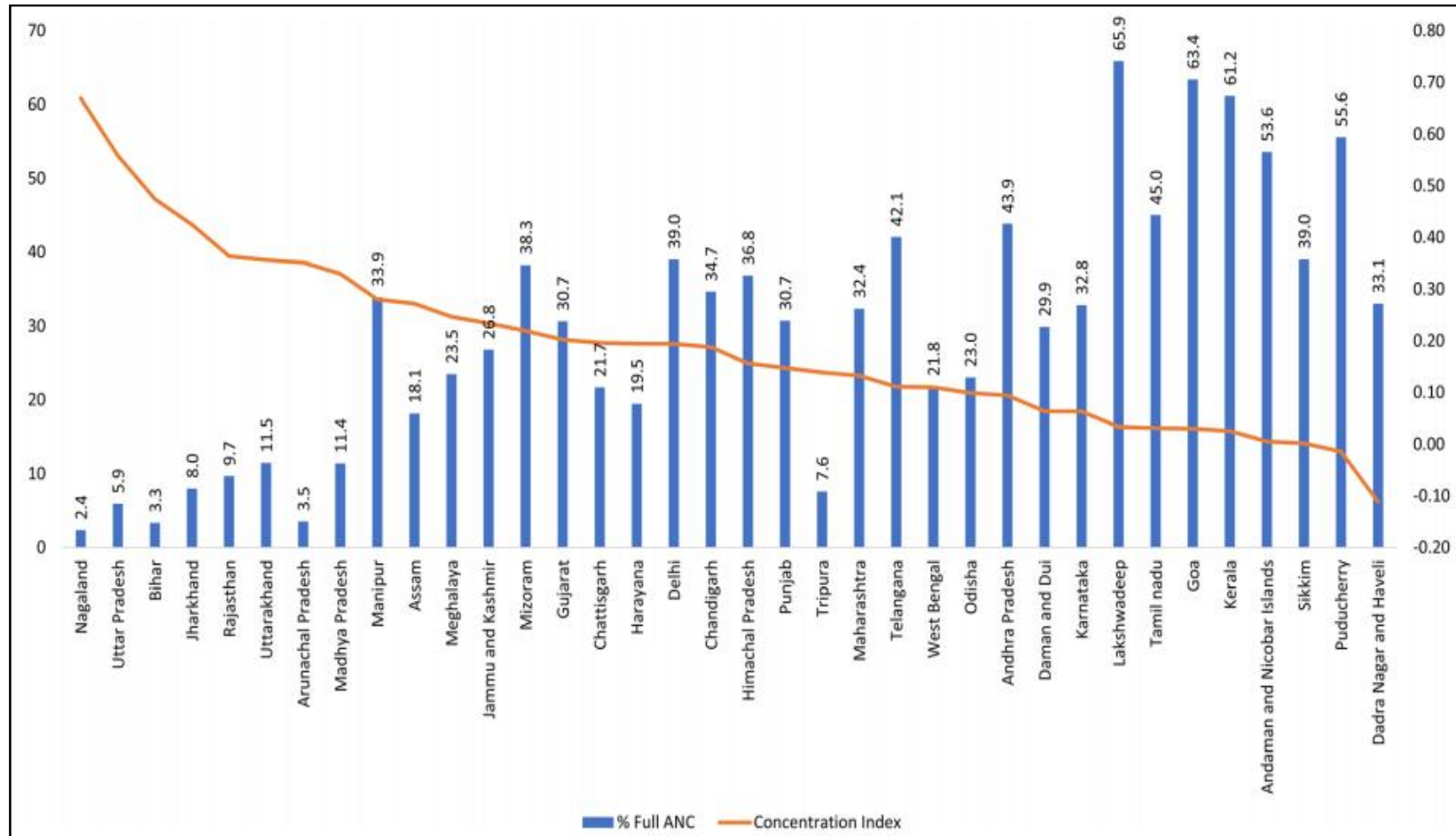


Fig. 4. State-wise inequity in full antenatal care utilization in India, NFHS-4(2015-16)

Table 2. Determinants of full antenatal care utilization in India, NFHS-4 (2015–16) d

Determinants (Weighted N)a	Proportion of women with Full ANC % (weighted n)b	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Wealth Quintiles			
Lowest (46782)	3126 (6.7)	0.12(0.11–0.13)	0.47 (0.42–0.52)
Second (43739)	5531 (14.2)	0.27(0.25–0.29)	0.56 (0.52–0.62)
Middle (38393)	7567 (22.6)	0.48(0.45–0.51)	0.66 (0.61–0.71)
Fourth (33212)	8675 (29.2)	0.67(0.63–0.71)	0.75 (0.70–0.81)
Highest (28772)	9967 (38.1)	(Reference)	(Reference)
Social caste			
Others (34,705)	8373 (26.2)	(Reference)	(Reference)
Scheduled caste (35,170)	5686 (19.3)	0.67(0.62–0.73)	0.95 (0.87–1.03)
Scheduled tribe (37,889) Other	6288 (16.3)	0.55(0.51–0.60)	0.92 (0.84–1.01)
Backward Categories (74,060)	13,037 (20.7)	0.74(0.69–0.78)	0.94 (0.88–1.00)
Place of Residence			
Urban (47,833)	13,074 (31.1)	(Reference)	(Reference)
Rural (143,065)	21,792 (16.7)	0.44(0.42–0.47)	0.90 (0.84–0.96)
Health insurance cover			
No (163,367)	27,733 (18.8)	(Reference)	(Reference)
Yes (27,531)	7133 (32.8)	2.11(2.00–2.22)	1.18 (1.11–1.26)
Maternal age at conception (years)			
Less than 19 years (16,225) 19–30 years (150,683)	2594 (18.7)	0.83(0.77–0.88)	0.86 (0.79–0.93)
More than 30 years (23,990)	28,367 (21.7)	(Reference)	(Reference)
	3905 (17.3)	0.75(0.71–0.80)	1.16 (1.07–1.27)
Maternal Education			
No or less than one year of formal education (55,165)	4103 (8.2)	0.14(0.13–0.15)	0.56 (0.51–0.62)
Up to Primary (1–5 years of schooling) (26,712)	3401 (14.8) 0.64	0.27(0.25–0.29)	0.64(0.58–0.70)
Secondary (6–12 years of schooling) (88,871)	20,117 (25.6)	0.54(0.50–0.57)	0.75 (0.70–0.80)
Higher education (20150)	7245 (39.1)	(Reference)	(Reference)
Birth order			
First (61807)	14,756 (26.4)	(Reference)	(Reference)
Second (62484)	12,985 (24.2)	0.89(0.85–0.93)	0.93 (0.88–0.98)
Third (33064)	4618 (15.7)	0.52(0.49–0.55)	0.84 (0.78–0.90)
4 or more (33543)	2507 (7.2)	0.22(0.20–0.23)	0.68 (0.62–0.75)
Intended pregnancy			

Determinants (Weighted N)a	Proportion of women with Full ANC % (weighted n)b	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Yes (173,407)	32,904 (21.8)	(Reference)	(Reference)
Did not want/later (17,390)	1962 (12.5)	0.51(0.47–0.50)	0.83 (0.76–0.92)
Previous miscarriage/abortion/still birth			
Yes (19,671)	3975 (22.6)	1.12 (1.04–1.18)	1.13 (1.06–1.21)
No (171,227)	30,891 (20.8)	(Reference)	(Reference)
Care during the antenatal period			
Pregnancy registered	32,675 (23.0)	(Reference)	(Reference)
Yes (160,769) (Reference)	2191 (8.8)	0.32(0.30–0.35)	0.78 (0.71–0.85)
No (30,028)			
Timing of first ANC visit	14,322 (36.0)	(Reference)	(Reference)
1st trimester (43,776)	19,016 (21.3)	0.48(0.46–0.51)	0.72 (0.69–0.76)
2nd trimester (101,278)	1514 (16.9)	0.36(0.33–0.40)	0.47 (0.42–0.53)
3rd trimester (11,701)			
Presence of child's father at any ANC visit			
No (31,291)	4538 (15.7)	0.50 (0.47–0.53)	0.72 (0.68–0.77)
Yes (125,965)	30,328 (27.1)	(Reference)	(Reference)
Received ICDS benefits			
Yes (105,980)		(Reference)	(Reference)
No (84,824)		0.86(0.83–0.90)	0.93 (0.88–0.98)

As India braces itself for universal health care, equity results are focused on a wider nationally representative sample of the most recent survey and are focused upon a more complete measure, namely, complete ANC (minimum In comparison to the previous number of ANC visits, 4 ANC visits, 100 days or longer and at least one injection of toxoid tetanus. Any deficiencies are like follows. Failure to include evidence of births that do not end in life, miscarriage, suicide or born restriction comments on the application of the ANC, with harmful outcomes in this subset. The responses to each portion of the entire ANC were separately recorded and hence likely to reminisce, but in a year preceding the survey, the study of this subgroup was limited to births with identical outcomes. We can not elaborate on such causes, such as behavioural treatment, health awareness, distance from the health centre, prejudice against providers and other side factors that have not been established in NFHS-4.

4. DISCUSSION

The implications of this study are troubling since only a quarter of people who are expecting have used full ANC, prompting attempts in the last two decades, the Indian administration. The World Health Organization's (WHO) median of eight visits is contrasted with the new advice. were obtained in part, with minimum 4 ANC visits being proposed, that is a conservative dream. Less than 30% of pregnant women in 17 out of 36 countries / UTs earned complete ANC. In countries with limited ANC coverage rates, inequities of total ANC usage were greater. The percentage of women attending four or more ANC is slightly smaller than the global average of 61.8 percent, and it is a big obstacle for the national initiative to submit a recent WHO guideline of at least eight ANC visits [6]. The amount of ANC visits can be important to other elements of ANC and to ensure that pregnant women are properly followed up to their delivery. Even a single appointment in every trimester makes the vast number of Moms have been immunized with at least one tetanus toxoid. By comparison, only if several visits are made in 100 days of IFA consumption feasible.

Supplies are usually issued for one month on each visit and the lower amount of visits for 100 days of IFA could be a cause for low usage.

5. STRENGTHS AND LIMITATIONS

In consideration of the following strengths, the conclusions of this review shall be viewed. This study acknowledges that pregnant women are in need of urgent care [22–24]. Given the reasons for poor and inequitable utilization, it is important to establish methods such that the WHO guidelines can be accomplished as early as possible. Young married couples should build a more informative channel for parenthood arranged. Sending critical communications in conjunction with antenatal care will lead towards an improved awareness of related wellbeing, education and mainstream media at the group level [25-29]. Information on higher granularity antenatal care can be obtained in future surveys to explain the degree of attention given on any visit. Low ANC countries usage can find it more necessary to develop ANC facilities and take advantage of country-wide options [12]. The numerous sectors of the government engaged in maternal treatment during pregnancy need to make a concerted effort [30]. We will propose to concentrate on ambulatory, antenatal care as well as the recently introduced Ayushman Bharat scheme [25].

6. CONCLUSIONS

In India, complete ANC usage has been ineffective and unjust. Although a minimum number of visits to ANC were not obtained by half of the females, it was almost universal for the usage of TT immunization. The latest WHO recommendations on 8 visits to ANC, stress that there must be further ANC visits and (forcing us into KNIT), a Biotechnological and Biotechnology Department Grand Challenges Initiative, a nation that still has a high birth, prematurity or IUGR development limit (IUGR) and maternal mortality. The authors wish to consider the assess DHS software for the supply of DHS data sets for India.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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