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Original Research Article

A study on existing gaps in current antenatal care and new WHO model of routine antenatal care: need for implementation of new WHO guidelines on antenatal care

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ABSTRACT

Background: Antenatal care is essential for ensuring good maternal and neonatal health outcomes, yet significant gaps remain in its delivery. In 2016, the WHO introduced new antenatal care guidelines increasing the number of antenatal contacts to 8, from the old 4 visit approach. The new model focuses on strengthening the connection between health care workers and pregnant women receiving antenatal care. However, utilization rate for the level of recommended antenatal care is still low especially in developing countries like India, thus further highlighting the need for identifying and bridging the gaps in antenatal care delivery. This study critically assessed the current challenges with antenatal care delivery by healthcare workers, aiming to identify gaps in existing practices and evaluate the need for implementing the New WHO antenatal care guidelines (2016).
Methods: A qualitative type of cross-sectional study was conducted at a tertiary care hospital in western Maharashtra, India among 128 mothers who were admitted to the post-natal ward of the hospital. Data collection was done using a pretested, prevalidated questionnaire, descriptive statistics were used to summarise the data.
Results: The study found that while 92% of women had recommended number of antenatal care contacts in the first and second trimester, while none had five antenatal care contacts in the third trimester. 50% of mothers had below recommended IFA consumption. Regarding nutritional counselling and non-pharmacological management of common pregnancy symptoms only 5.46% received guidance on nausea and 29.68% on heartburn management. All participants received respectful maternal care aligning with the WHO guidelines.
Conclusions: The findings demonstrate the need for active implementation of the new 2016 WHO's guidelines on antenatal care to enhance the quantity and quality of antenatal care delivered. Ensuring that healthcare workers provide recommended education, immunization, supplementation, and maternal support throughout pregnancy. Identifying and bridging these gaps will help improve maternal and neonatal health outcomes, aligning practices with global standards and contributing to positive pregnancy experiences for pregnant women.

Keywords: Antenatal care, Neonatal health, Pregnancy

INTRODUCTION

Antenatal care is the care provided by medical professionals and health care workers to all women during pregnancy, delivery, puerperium and newborn care. It plays a pivotal role in promoting maternal and neonatal health. Its aim is to be health-promoting and life-saving when used to the fullest by all pregnant women.[1]

Efforts are being made by the WHO to improve antenatal care provision to mothers in developing countries like India which led to a decrease in the maternal deaths from

47,528 in the year 2010 to 23,753 in the year 2020 which is approximately a 50.05% decrease.[2] Yet significant disparities persist in its access, quality and outcome contributing to approximately 35,000 maternal deaths (12% of global maternal deaths) in India in the year 2017.[3] Most of the maternal deaths in India in the year 2020 occurred in poorer states (63%) and among women aged 20-29 (58%).[4] The WHO recognizes the necessity for a change in the antenatal care conductance and delivery methods to improve global maternal and neonatal health outcomes which complements the preexisting WHO guidelines.

The WHO developed the focused antenatal care (FANC) model in the 1990s, which has interventions carried out at four critical times in pregnancy and is evidenced to be associated with more perinatal deaths thus the WHO in the year 2016, introduced new guidelines on antenatal care which complements the existing guidelines while enhancing the importance of increased number of 'contacts' rather than the obsolete word 'visits', it replaces the '4 visit' guidelines with the new '8 contact' approach designed to improve maternal and neonatal health outcomes while developing a more active and humanitarian link between mothers receiving antenatal care and their health care providers.[5,6] The new WHO guidelines also highlight the importance of mothers having a positive pregnancy experience.[6]

The World Health Organization (WHO) envisions a world where 'every pregnant woman and newborn receives quality care throughout pregnancy, childbirth and the postnatal period'.[7] via health promotion, disease prevention, screening and treatment.[8]

A woman's positive pregnancy experience is key to transforming antenatal care and creating thriving families and communities, thus further highlighting the need for a holistic, person-centered approach that prioritises effective communication, emotional support and respectful maternal care tailored to needs and preferences of expectant mothers.[9,10] A positive pregnancy experience, includes four sub-themes: maintaining physical and sociocultural normality; maintaining a healthy pregnancy for mother and baby (including preventing and treating risks, illness and death); effective transition to positive labour and birth; and achieving positive motherhood (including maternal self-esteem, competence, autonomy).[11]

Thus, the health care provided should be safe, effective, patient-centered, timely, efficient and equitable to maximise the benefits to patients receiving it.[12]

This study critically assessed the current challenges with antenatal care delivery by healthcare workers, aiming to identify gaps in existing practices and evaluate the need for implementing the New WHO antenatal care guidelines (2016) to improve maternal and neonatal health outcomes.

METHODS

Study design and setting

This cross-sectional study was conducted at Krishna Hospital and Medical Research Center, KVV, Karad a Tertiary Care Hospital in Western Maharashtra, India from 27th June 2024 to 27th January 2025.

Sample size calculation

As it is a qualitative type of study sample size was calculated using the formula- $4pq/L^2$

Where- p=71.90%- rate of antenatal care services utilization in a tribal area of north Maharashtra.[18]

q=100-70.90= 28.1.

L=8.

Thus, the sample size calculated was 126. Therefore 128 study subjects were selected randomly from the post-natal ward of the hospital.

Inclusion criteria

Mothers with history of uncomplicated delivery.

Exclusion criteria

Mothers with severe medical conditions like diabetes, pre-eclampsia, etc. Mothers of neonates with complications like low birth weight, jaundice and NICU admissions.

Data collection tool

Data was collected using a pretested, prevalidated questionnaire. The questionnaire was designed to assess various aspects of current antenatal care practices, focusing on:

Socio-demographic factors

Age, type of family, education level, occupation, socio-economic status of mothers.

Antenatal care utilization

Number of contacts made in each trimester, investigations and immunization done in each trimester and basic maternal assessments.

Care provided by health care workers

counselling for extra calorie, protein intake and physical activity during pregnancy, supplementations required during pregnancy and counselling for non-

pharmacological treatment and prevention of common physiological symptoms during pregnancy.

Procedure

Interview process

Conduction of face-to-face interviews with the participants. Each interview lasted approximately 15-20 minutes.

Data recording

Responses were recorded electronically to ensure accuracy and facilitate data analysis. Patient confidentiality was maintained throughout the data collection process.

Ethical considerations

The study adhered to the Declaration of Helsinki principles. Informed consent was obtained from all participants. The study protocol was reviewed and approved by institutional ethical committee.

Data analysis

Data entry was done in MS Excel Sheets. Descriptive statistics were used to summarize the data. Frequencies and percentages were calculated for categorical variables, and means were computed for continuous variables.

RESULTS

The mean age of women was 24.79±3 years (range 19-32 years). The majority of the women being from the age group 27-30 (n=46, 35.9%) with maximum women having secondary education (n=50, 39%) and 5 (3.9%) having no education at all.

Most of the women were homemakers (n=81, 63.28%) with 45 (35.15%) belonging to social class IV (Table 1).

Table 1: Distribution of sociodemographic variables of study subjects (n=128).

Sociodemographic variables	N	Percent
Age of mother in years		
19-22	40	31.25
23-26	40	31.25
27-30	46	35.93
>31	2	1.56
Total	128	100
Education of the mother		
Illiterate	5	3.90
Primary	6	4.68
Secondary	50	39.06
Higher secondary	30	23.43
Graduation	35	27.34
Post graduation	2	1.56
Total	128	100
Occupation of the mother		
Homemaker	81	63.28
Skilled worker	25	19.53
Unskilled worker	22	17.18
Total	128	100
Socio-economic status of family		
I (upper class)	12	9.37
II (upper middle class)	25	19.53
III (middle class)	42	32.811
IV (lower middle class)	45	35.15
V (lower class)	4	3.12
Total	128	100
Type of family		
Nuclear	40	31.25
Joint	57	44.53
Third generation	31	24.21
Total	128	100

Table 2: Distribution of study subjects according to obstetric score and number of contacts made with the health care delivery system.

Obstetric score	N (n=128)	Percentage
G-≤G2	95	74.21
≥G3	33	25.78
P-≤P2	101	78.90
≥P3	27	21.09
L-≤L2	101	78.90
≥L3	27	21.09
Abortions	18	14.06
No. of contacts		
1st trimester- no contact	10	7.81
≥1 contact(s)	118	92.18
2nd trimester- no contact	8	6.25
<2 contacts	2	1.56
2 contacts	68	53.12
>2 contacts	50	39.06
3rd trimester- <5 contacts	128	100
Contacts were made at	**Private hospitals (%)**	**Public hospitals (%)**
1st trimester	68 (53.12)	99 (77.34)
2nd trimester	89 (69.53)	90 (70.31)
3rd trimester	126 (98.43)	30 (23.43)

The majority of women (n=69, 53.9%) were multiparous out of which 33 (25.78%) are gravida three or more with 27 (21.09%) having three or more live children. Most of the women had history of at-least one antenatal care contact (n=118, 92%) made in the first trimester while 10 (7.8%) had no contact made with the health care delivery system in the first trimester, 8 (6.25%) had no contacts made with the health care delivery system in the second trimester. All of the study subjects had below recommended antenatal care contacts (5 contacts) in the third trimester according to the new WHO guidelines, 2016. The majority of women (n=99, 77%) have a strong initial preference for public hospitals for utilisation of health care services provided by the government in the first trimester which equalises during the second trimester culminating in a substantial preference for private hospitals (126, 98.43%) in the third trimester of pregnancy.

From a total of 128 women 10 (7.81%) had no investigations and immunizations done in the first trimester.

From a total of 128 women majority (n=120, 93.75%) had routine investigations and immunizations done except for 8 (6.25%), 120 (93.75%) had an USG done before 24 weeks of pregnancy which is in accordance with the new 2016 WHO ANC guidelines.

From a total of 128 women, 10 (7.81%) had tetanus toxoid immunization and testing for hepatitis B and HIV done in third trimester.

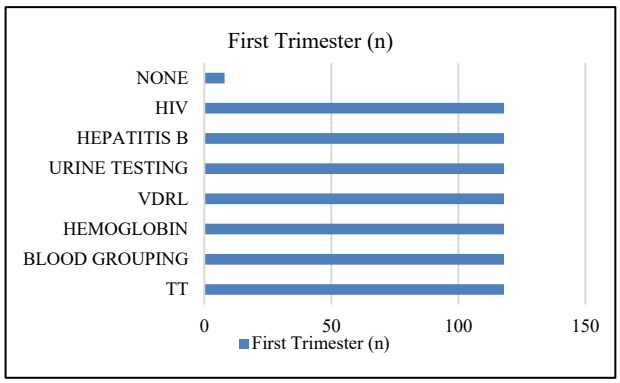

Figure 1: Investigations and immunizations done in first trimester.

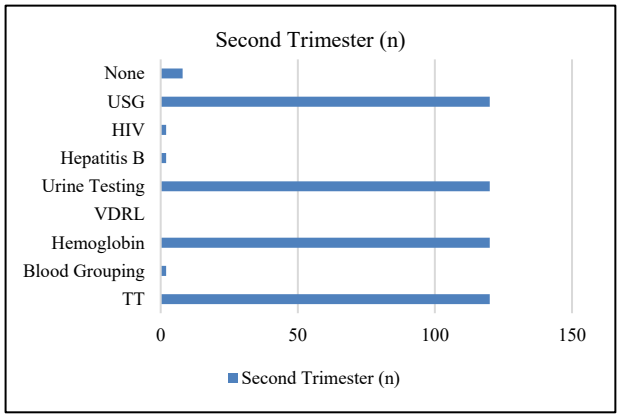

Figure 2: Investigations and immunizations done in second trimester.

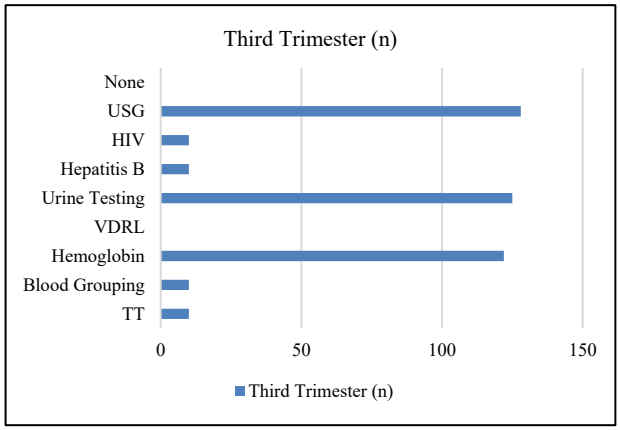

Figure 3: Investigations and immunizations done in third trimester.

Half of the mothers had IFA supplementation done in optimal doses (n=64, 50%) while the other half (n=64, 50%) had sub optimal dosing due to reasons such as first contact made late in second trimester and decreased patient compliance to recommended dosing frequency (Table 3).

Table 3: Supplements given and immunization done during antenatal period.

	In recommended dose n=128	Percentage	Not in recommended dose n=128	Percentage	Total (%)
Iron and folic acid tablets (IFA)	64	50	64	50	128 (100)
Calcium	104	81.26	24	18.75	128 (100)
Vitamin D_3	96	75.00	32	25.00	128 (100)
Zinc	104	81.26	24	18.75	128 (100)
Tetanus toxoid	118	92.18	10	7.81	128 (100)

Table 4: Education given by health care worker.

Nutritional education done regarding	Done (n=128)	Percentage	Not done (n=128)	Percentage	Total (%)
Daily calorie and protein intake in pregnancy	44	34.37	84	65.62	128 (100)
Tea and coffee consumption	38	29.68	90	70.31	128 (100)
Iron and calcium rich foods	6	4.68	122	95.31	128 (100)
Maternal assessment done by health care worker					
Per-abdominal examination for fetal movements	22	17.18	106	82.81	128 (100)
counselling regarding daily fetal movement counting	20	15.62	108	84.37	128 (100)

Table 5: Counselling for common physiological symptoms by non pharmacological methods done by health care worker.

	Given n=128	Percentage	Not given n=128	Percentage	Total (%)
Relief of nausea	7	5.46	121	94.53	128 (100)
Antacids to prevent and treat heartburn	38	29.68	90	70.31	128 (100)
Fibre supplementation to prevent and treat constipation	-	-	128	100	128 (100)
Management of leg cramps, low back and pelvic pain	-	-	128	100	128 (100)
Management of varicose veins and edema	-	-	128	100	128 (100)

From a total of 128 women majority (n=84, 65.62%) of the study subjects were not educated regarding extra daily calorie and protein intake during pregnancy and regarding importance of consumption of iron and calcium rich foods (122, 95.31%).

In most of the mothers (106, 82.81%) no per-abdominal examinations were done by health care workers for assessment of fetal movement and no counselling was given on the importance of daily fetal movement counting.

From a total of 128 women, majority of them had no counselling done by health care workers regarding non-pharmacological treatment or prevention of common physiological symptoms like relief of nausea (n=121, 94.53%) and heartburn (n=90, 70.31).

None of the mothers were counselled for prevention or treatment of constipation, leg cramps, pelvic and low back pain and varicose veins.

DISCUSSION

The present study revealed that the majority of participants were between 23 and 30 years old, with only 1.56% over 31 years. In contrast, a study conducted in Ethiopia Deresa et al reported a higher proportion of women aged 35 and above (30.8%) and a significant percentage being between 25 and 29 years (24.8%).[1] This variation may reflect regional differences in reproductive age trends and indicates that antenatal care programs should be adaptable to address the needs of both younger and older pregnant women in different contexts. A significant portion of participating women had secondary education (39.06%) and graduation (27.34%), with only 3.90% being illiterates. In contrast, a study conducted in a district of Uttar Pradesh Singh et al reported a higher illiteracy rate (31%) and more women with only primary education (32.4%).[13] This indicates that the present study population generally had better educational attainment, which could improve health literacy and engagement with antenatal

care. Yet there remains a need for ongoing educational efforts to ensure all women are well-informed and effectively utilize antenatal services. This study found that 63.28% of participants were homemakers, with 19.53% as skilled workers and 17.18% as unskilled workers. In contrast, Metgud et al reported that 53.08% were housewives, 34.61% agricultural labourers, and smaller percentages in other occupations.[14] The higher proportion of agricultural labourers in their study indicates different regional economic contexts, which affects women's engagement with antenatal care services. These variations highlight the need for tailored antenatal care programs that consider the diverse occupational backgrounds of women. The current study found 9.37% of participants in the upper class, 19.53% in the upper middle class, 32.81% in the middle class, 35.15% in the lower middle class, and 3.12% in the lower class. In comparison, Metgud et al reported fewer in the upper classes and a higher proportion in the lower classes.[14] These differences suggest varying regional economic conditions, impacting access to antenatal care. Customizing interventions to these socio-economic disparities is crucial for ensuring equitable care. The current study revealed that 31.25% of participants lived in nuclear families, 44.53% in joint families, and 24.21% in third-generational families. The predominance of joint families suggests strong extended family support structure, which may influence antenatal care practices and decision making.

The new 2016 WHO ANC model states that there should be a minimum of 1 contact made in the first trimester, 2 contacts made in the second trimester and 5 contacts made in the third trimester for maximal beneficial impact.[6] This study found that 92.18% of women had at least one antenatal contact in the first trimester, and 92.18% had more than two contacts in the second trimester, with all having fewer than five contacts in the third trimester. These results are consistent with the high antenatal care utilization reported by Narayana et al and Vasuki and Kalaiselvi, who found that 93% and 94.95% of women, respectively, received comprehensive antenatal care.[15-17] In contrast, a study conducted in tribal areas of north Maharashtra Mumbare and Rege reported a lower rate of full service utilization at 71.90%, which may reflect regional differences in healthcare access.[18]

The findings of this study also align with high registration rates noted in rural Puducherry and north Karnataka Metgud et al.[14] However, the lower first-trimester registration rates in these regions (59.4% in Puducherry and 30% in north Karnataka) highlight ongoing challenges in early engagement with antenatal care delivery systems.

This study showed that antenatal care utilisation was higher in public hospitals compared to private hospitals, particularly in the first trimester. This trend likely reflects the availability of free services and government schemes offered by public hospitals, which make them more accessible for a larger proportion of women. Later in the third trimester most mothers (n=126, 98.43%) delivered in private hospitals due to quality of care provided or referral services by health care workers. Private hospitals, despite offering quality care, may be less frequented during first and second trimester due to associated costs.

This study found that 50% of participants consumed iron and folic acid (IFA) tablets in the recommended dose, while the other 50% did not. In contrast, Rustagi et al reported 100% provision of IFA tablets, although 86% of participants had consumed them for at least 100 days in their previous pregnancy, with 18.4% having irregular intake, a study conducted in Romania Popa et al reported higher adherence to Iron and folic acid consumption.[19,20] Regarding other supplements, our study showed that 81.26% of women received calcium and zinc in the recommended dose, and 75% received vitamin D_3. For tetanus toxoid vaccination, 92.18% received it as recommended. These figures are comparable to the nearly complete ANC services reported by Rustagi et al, who also found high rates of tetanus toxoid coverage.[19] The higher compliance in this study for calcium, zinc, and tetanus toxoid, compared to the variable intake of IFA tablets in Rustagi et al study, suggests that while supplementation and immunization are generally well-covered, there are still gaps in consistent IFA consumption. Addressing these gaps is crucial for improving overall maternal and fetal health outcomes.

This study found that 93.75% of women had an ultrasound (USG) done before 24 weeks of pregnancy which is in accordance with the 2016 WHO ANC guidelines, while 6.25% did not. This high rate of early USG utilisation contrasts sharply with the 60.7% utilisation reported by Yetwale et al.[21] The difference suggests that this study area has better access to and utilisation of early prenatal ultrasound screening services. Early and frequent use of USG is crucial for monitoring fetal development and identifying potential issues, which may contribute to better maternal and fetal outcomes. The higher rate of early USG in our study highlights the effectiveness of local healthcare practices in ensuring timely prenatal care.

This study found that non-pharmacological counselling for common physiological symptoms of pregnancy was below recommended standards. Specifically, only 5.46% of women received guidance on relieving nausea, and 29.68% were advised on antacids to manage heartburn. Notably, no participants received counselling for fibre supplementation to prevent and treat constipation, management of leg cramps, low back and pelvic pain, or varicose veins and edema. Effective management of these symptoms through non pharmacological methods is crucial for improving comfort and quality of life during pregnancy. The absence of counselling in these areas suggests a gap in comprehensive prenatal education and support provided to pregnant mothers. This highlights the need for enhanced training of healthcare workers for providing adequate counselling and education and better integration of non-pharmacological approaches into

routine antenatal care practices to address these common symptoms and support overall maternal well-being and building a positive pregnancy experience for the mothers.

This study also demonstrated that all of the mothers (n=128, 100%) had received respectful antenatal care given by the healthcare workers which is recommended in the new 2016 WHO ANC model.[6]

Limitations of this study are:

Single-centre study

The study was conducted in a single tertiary care hospital in western Maharashtra, which may limit the generalizability of the findings to other regions or rural/urban healthcare settings across India.

Limited sample size

The sample size of 128 postnatal mothers may not be large enough to reflect the diverse experiences and challenges faced by all pregnant women, especially those outside the tertiary care system.

Exclusion of healthcare providers' perspectives

The study focuses solely on the mothers' experiences and does not incorporate the viewpoints of healthcare providers, which could provide deeper insight into systemic barriers in implementing the WHO guidelines.

CONCLUSION

The study highlighted significant gaps in the current antenatal care delivery practices compared to the new 2016 WHO ANC guidelines. While a substantial proportion of women received the recommended antenatal care contacts, notably in the first and second trimesters, there was a drastic fall in the third trimester contacts, where the WHO guidelines recommend a minimum of five contacts. The study also uncovered several gaps in the delivery of nutritional education and counselling of pregnant mothers regarding daily calorie and protein intake, counselling regarding importance of daily physical activity during pregnancy, indicating areas where the antenatal care delivery system can be improved. Notably, while investigations and immunizations were generally well-covered, the provision of non-pharmacological counselling for treatment and prevention of common physiological symptoms in pregnancy was below recommended standards.

These findings further enhance the need for comprehensive implementation of the new WHO guidelines to improve maternal and neonatal health outcomes and ensure that the antenatal care provided by health care workers is holistic, person-centered, respectful, and aligns with global standards to give mothers a positive pregnancy experience.

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