

## Systematic Review

DOI: <https://dx.doi.org/10.18203/2394-6040.ijcmph20240931>

# Antenatal care quality assessment methods in India: a systematic review

Priya Kataria<sup>1\*</sup>, Naresh Kumar<sup>1</sup>, Mahendra Singh<sup>2</sup>

<sup>1</sup>Department of Community Medicine, University College of Medical Sciences, Delhi, India

<sup>2</sup>Department of Community and Family Medicine, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India

**Received:** 17 March 2024

**Revised:** 31 March 2024

**Accepted:** 02 April 2024

**\*Correspondence:**

Dr. Priya Kataria,

E-mail: priya.myselfpriya@gmail.com

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## ABSTRACT

Antenatal care (ANC) is one of the most important pillars in improving maternal health. There is a considerable gap between the coverage of ANC and quality of ANC in India. Although monitoring the number of visits or contacts remains important, the WHO ANC guidelines' focus is on the quality and content of the care received. We did a review of literature regarding the quality of ANC assessment in India from 2017 to 2023. The literature review was done by two researchers independently on electronic databases: PubMed/Medline, PubMed central, Embase and ScienceDirect, to search the methods that are used to assess the quality of ANC in India. We included the studies that have done assessment of the quality of ANC with specific 'content' and 'criteria' to define quality ANC (QANC). There are two dimensions for assessing ANC quality. ANC Visits (their number and time of registration) and the services received during ANC visits. We found three types of approaches to ANC quality assessment: 1) making categories depending on content of ANC visits and/or number of ANC visits; 2) scoring system where score is assigned to each service and a particular cut off is set to be called QANC and 3) combination of both (using scores to form categories). The literature on quality assessment of ANC is scarce. There is a need for a standard quality of care method and terminology to assess the quality of ANC that can be applied throughout the country.

**Keywords:** ANC, Prenatal care, Quality care, Maternal health, Quality assessment

## INTRODUCTION

Antenatal care (ANC) is one of the most important pillars in improving maternal health. Within the continuum of reproductive health care, ANC provides a platform for important health-care functions, including health promotion, screening and diagnosis, and disease prevention. In addition, ANC also provides the opportunity to communicate with and support women, families and communities at a critical time in the course of a woman's life.<sup>1</sup> The World Health Organisation (WHO) gave positive pregnancy experience the guidelines in 2016.<sup>1</sup>

Recently the need for quality improvement of ANC has been identified and is being considered as a priority. The basic ANC should not just be limited to the number of visits but the quality of care in those visits as well as patients' experience during the entire antenatal period should be a priority to achieve the goals set for maternal health outcomes. WHO has also very recently highlighted emerging priorities and unfinished agenda for improving the quality of care in low and middle-income countries, regarding maternal, newborn and child health.<sup>2</sup>

Improving the ability to consistently provide good quality care-care that is effective, safe, people centered, timely,

equitable, integrated, and efficient-is fundamental to universal health coverage.<sup>2</sup> Quality of care is dependent on the provision and content of ANC, as well as women's experiences of ANC, which rely on the availability of the health provider and physical resources.<sup>3</sup> Continuous monitoring of ANC visits is necessary to monitor the overall quality of antenatal services that are being provided by the health care facilities. Although monitoring the number of visits or contacts remains important, the new WHO ANC guidelines' focus is on the quality and content of the care received.<sup>4</sup>

While increased ANC coverage is a welcome development, ANC coverage alone cannot guarantee success of ANC services. Besides increase in coverage, provision of Quality ANC (QANC) services will have the greatest impact on women accessing these services.<sup>5</sup> There is a considerable gap between the coverage of ANC and quality of ANC in India. The words coverage and quality cannot be used interchangeably, as coverage does not provide any detail of quality of services provided by the health system. Furthermore, achieving minimum number of ANC visits also does not ensure that necessary routine services have been provided in terms of good quality as well as timeliness. It is not mere contact that results in better outcomes; it is actual substance of care delivered.<sup>6</sup> ANC quality (ANC-Q) is not one-dimensional. Therefore, while assessing the ANC-Q, content and quality of services must be considered, not just number of visits.

We did review of literature regarding quality of ANC assessment in India published from 2017 (after WHO's positive pregnancy guidelines recommendations in 2016) to 2023.

## METHODS

Literature review done by 2 researchers independently, to search quality assessment studies for ANC in India with the aim to identify methods (tools or criteria or scoring system) that are being followed for assessment.

### Search strategy

Searched electronic database: PubMed/Medline, PubMed central, Embase and ScienceDirect. Search terms: 'antenatal care', 'prenatal care', 'quality of antenatal care', 'quality of prenatal care', 'quality of care', 'India', 'quality assessment of antenatal or prenatal care in India'. These keywords were combined to locate the relevant literatures by using "or" to broaden the searches and using "and" to narrow down the searches specifically relevant to our aim. We searched for the articles published from January 2017 to the December 2023. Search terms could be found in title or abstract of article.

### Inclusion criteria

We included studies assessing quality of ANC specifically in India. Research articles in which a

specific-criteria or scoring system or tool for quality of ANC was mentioned and studies from January 2017-December 2023 (After WHO's positive pregnancy experience guidelines, 2016) were included.

### Exclusion criteria

Articles that had described quality of ANC in a descriptive manner and articles published in languages other than English were excluded from the study.

Routine ANC indicators are already there but what should be the value of those indicators to be called ANC as a good QANC is not clear. Therefore precisely, we did a search for criteria and not for the indicators. There was no restriction to particular study design. Primary or secondary data-based studies, both were included. Studies which had described ANC in descriptive manner (i.e. proportions of women) were excluded as main purpose of this review was to identify various tools/criteria of ANC quality assessment in India. After reviewing databases, we found 13 studies that fit in our inclusion criteria (studies from January 2017-December 2023, conducted in India, measuring quality of ANC by certain criteria).

### Analysis

The information extracted included title, author, year of publication and specifically, method of assessment for quality of ANC (descriptive explanation, specific criteria or scoring system). Two authors extracted the information independently. Both created a separate collection/folder of articles titled, 'ANC-Q papers' in their PubMed accounts. We used the Mendeley reference manager to keep track of references. We differentiated the services that are being considered for assessment and the criteria that is describing the ANC-Q. After discussion among authors, it was decided to present results under headings 'author and year of publication', 'content of ANC' and 'quality assessment criteria' in a tabular form.

## RESULTS

Results have been presented in the form of a Table. Separate columns have been made for 'content' of ANC and the quality assessment 'criteria' in Table 1.

### Key findings

This review identified the ANC quality assessment methods in India. We have differentiated the 'content' considered and 'criteria' set of defining QANC. The studies mentioned in Table 1 provide a comprehensive overview of the assessment of ANC in terms of both quantity and quality across different regions of India.

*Dimensions of ANC-Q:* We found two dimensions for assessing ANC Quality: 1) ANC visits-their number and time of registration. 2) The services provided during ANC visits (their quality, timing etc.)

In reviewed studies, the authors have assessed ANCQ in both dimensions.

**Quality assessment criteria:** We found broadly three types of approaches for quality assessment of ANC: 1) Making categories depending on the content of ANC visits and number of visits. (e.g. adequate ANC, inadequate ANC, no ANC etc.).<sup>7,9,17</sup> 2) A scoring system

approach where authors have given scores to various ANC services and then set a particular cut off to be called as QANC.<sup>8,11,16</sup> 3) Combination of both (categories formed on the basis of a range of score).<sup>18,19</sup>

Some studies have assessed in the form of quality and quantity, as presented as 'low quantity-low quality', 'low quantity-high quality' and so on.<sup>12,18</sup>

**Table 1: Studies with their method for assessing quality of ANC in India.**

Author and year of publication	Content of ANC	Quality assessment criteria
<b>Dixit et al<sup>7</sup>, 2017</b>	Number of ANC visits and specific health care check-ups that women receive during the ANC visit	'Full ANC' was considered as combination of at least eight ANC visits and procedures like-tetanus vaccination, collection urine, and blood, weight, height and blood pressure measurement, counseling on pregnancy-related complications and breastfeeding
<b>Pricilla et al<sup>8</sup>, 2017</b>	The quality of ANC was assessed by a checklist adapted from the WHO. A questionnaire assessed the quality of ANC using a checklist consisting of five main domains: 1) Interpersonal interaction, 2) physical examination, 3) diagnostic tests, 4) prophylactic drugs, and 5) health education.	There was a total of 25 parameters in the quality of ANC questionnaire. The assigned score was 1 if a parameter was performed and it was 0 if it was not performed. Each of the parameters had the same system of scoring and was given equal weightage. The minimum potential score was 0 and the maximum overall potential score was 25.
<b>Singh et al<sup>9</sup>, 2019</b>	(1) weight measurement, (2) blood pressure measurement, (3) urine testing, (4) blood sample taken to test for possible morbidities such as anaemia, parasite infestations/infectious diseases, (5) at least 2 tetanus toxoid vaccinations, (6) iron and folic acid tablets consumption for at least 100 days, (7) abdominal exam, and (8) whether counseling was given regarding specific symptoms of pregnancy complications and information about the place to approach if any complications arise. In this study, women, who received at least 7 out of 8 procedures mentioned above were considered to be receiving appropriate content.	Quality of care was categorized as adequate ANC, inadequate ANC and no ANC. -Adequate ANC (care delivered by skilled health personnel, registration of pregnancy and first ANC visit within the first trimester, sufficient number of ANC visits (four or more) and with appropriate content) -Inadequate ANC (care delivered to women not strictly adherent to the above-mentioned criteria). -No ANC (where care was either not received by the woman or failed at adhering to even one criteria of adequate ANC)
<b>Kumar et al<sup>10</sup>, 2019</b>	Antenatal visits, Td immunisation and IFA supplements	'Full ANC' was defined as 4 or more antenatal visits, at least one tetanus toxoid (TT) injection and consumption of iron folic acid (IFA) for a minimum of 100 days.
<b>Silverman et al<sup>11</sup>, 2020</b>	Assessed both quantity and quality of ANC For quantity: Number of ANC visits For quality: A continuous variable indicating quality of ANC received was developed based on the reported number of the six WHO recommended ANC tests (1) weight, (2) BP, (3) abdomen, (4) ultrasound, (5) hemoglobin, and (6) urine	Adequate quantity of ANC was assessed based on women's report of receiving at least four ANC visits during their recent pregnancy. The quality of ANC, as measured by the number of tests received, averaged 4.25 across the sample. (In the form of average number of tests done)
<b>Neupane et al<sup>12</sup>, 2021</b>	This study considered both ANC visits and ANC quality For quality, a set of 11 health and nutrition intervention indicators (e.g., weight and blood pressure measurement, urine sample collection, ultrasound, nutrition education).	Categorized ANC into 4 groups: 1) low quantity (<4 ANC visits) and low quality, 2) high quantity ( $\geq 4$ ANC visits) and low quality, 3) low quantity and high quality, 4) high quantity and high quality.

Continued.

Author and year of publication	Content of ANC	Quality assessment criteria
<b>Rustagi et al<sup>13</sup>, 2021</b>	Timing of registration of pregnancy, number of ANC visits, Td immunization and IFA supplementation. Used the term 'comprehensive ANC'	'Comprehensive ANC' was defined as early registration of pregnancy (within 12 weeks), at <4 ANC visits, 2 doses of tetanus toxoid, and at least 100 days of iron/folic acid supplementation.
<b>Dandona et al<sup>14</sup>, 2022</b>	Weight, blood pressure and abdomen check, urine and blood sample taken, and were given iron and folic acid and calcium tablets.	QANC services were considered if a woman received all of these services in that visit.
<b>Singh et al<sup>15</sup>, 2022</b>	(1) Weight measurement, (2) blood pressure measurement, (3) urine testing, (4) blood sample taken to test for possible morbidities such as anaemia, parasite infestations or infectious diseases, (5) at least two tetanus vaccinations, (6) iron and folic acid tablets were consumed for at least 100 days (7) abdominal examination, and (8) whether counseling was given regarding specific symptoms of pregnancy complications and information about the place to approach for, if any complications arise. Seven out of eight of these procedures were considered for ANC service to be considered as appropriate.	QANC considered the following dimensions, a. Skilled: Care received from auxiliary nurse midwives, lady health visitors, doctors, nurses or midwives. b. Timely: Completion of first ANC visit and registration of the pregnancy within first trimester of the pregnancy. c. Sufficient: At least four ANC visits to be completed during the period of pregnancy. d. Appropriate: Indicator summarizing procedures and processes of care provided during at least one ANC visit. Inadequate ANC was ascertained when the dimensions did not strictly meet the criteria set out by each of the above-mentioned dimensions (for instance, ANC received from unskilled health personnel) and a woman was considered to have received no ANC when the services provided under each dimension were either absent or did not meet even one criteria.
<b>Lee et al<sup>16</sup>, 2022</b>	This study evaluated maternal reports of ANC and immediate postnatal care (PNC) components for women who had used the formal health system for each service. 7 components for ANC (weighing pregnant mothers, taking blood pressure, taking a urine sample, taking a blood sample, giving or prescribing iron tablets or syrup, giving tetanus injection, and giving ultrasound testing), (rest 4 components were for PNC).	Each woman was assigned a composite quality score ranging from 0 to 100, defined as the percentage of components of care received of the total 11 components of care.
<b>Nagdev et al<sup>17</sup>, 2023</b>	The frequency of ANC visits, and the recommended essential receipts of ANC components during pregnancy. Created a composite score of receipts of ANC components which comprises a simple count of the receipts of ANC components a pregnant mother received in her most recent birth.	Outcome variables for this study were divided into 3 categories: No ANC-women who never attended any ANC visits during pregnancy, inadequate ANC-<4 ANC visits during pregnancy and used <9 receipts of ANC components, and adequate ANC-women who attended 4/more ANC visits during pregnancy, used all 9 receipts of ANC components.
<b>Neupane et al<sup>18</sup>, 2023</b>	1) Weight assessment, 2) blood pressure measurement, 3) blood sample collected, 4) urine sample collected, 5) consumed 100+ iron folic acid (IFA) supplements, 6) consumed calcium supplements, 7) ultrasound conducted, 8) received counseling on danger signs, 9) received two tetanus shots, 10) received preventive deworming, 11) received food supplements, and 12) received health and nutrition education.	Authors standardized number of interventions received on a scale of 10 (divided proportion of interventions received by number of interventions received and multiplied by 10). Women with standardized score of 5 or more out of 10 categorized as having "high quality" ANC and women with standardized score below 5 had "low quality" ANC. Finally, women were grouped into 4 quantity/quality categories based on their ANC experience: 1) low quantity and low quality, 2) low quantity and high quality, 3) high quantity and low quality, and 4) high quantity and high quality.

Continued.

Author and year of publication	Content of ANC	Quality assessment criteria
<b>Girotra et al<sup>19</sup>, 2023</b>	<p>Frequency of ANC visits and the quality of ANC services utilized.</p> <p>For QANC, as per WHO guidelines, a core set of ANC services includes blood pressure measurement, a urine test, a blood test, tetanus vaccines (at least 2 doses), and administration of deworming, iron-folic acid, and anti-malaria medication during the pregnancy.</p>	<p>Composite quality score was generated. Every 'yes' response was coded as +1 and the 'no' or missing response was assigned 0 with total score ranging from 0-5. A score of 5 defined as utilization of an adequate quality of ANC services and a score below 5 was considered as an inadequate quality of ANC services.</p> <p>Finally, 3 groups were made: Adequate quality-inadequate quality and <math>\geq 4</math> ANC visits, inadequate quality and <math>&lt; 4</math> ANC visits</p>

## DISCUSSION

ANC is a multidimensional concept. It is much more than the minimum number of visits. The overall experience of women and services being provided by healthcare facility during those ANC visits are equally important. We have divided the discussion in three subheadings-ANC visits, content of ANC and terminology used during ANCQ assessment.

### *ANC visits*

ANC visits are essential for keeping an eye on the developing fetus's health as well as the pregnant woman's. During these appointments, medical professionals can evaluate the mother's health, identify any possible issues early on, and administer the required treatments to guarantee a safe pregnancy and birth. Different health systems propose different numbers of ANC visits. Nonetheless, the majority advise a minimal quantity of visits to guarantee sufficient observation during the entire pregnancy. For instance, certain country guidelines may suggest fewer ANC visits than the WHO's minimum recommendation of eight visits.

The number and timing of ANC visits both equally matter. Among the studies included, only one study has considered 8 or more antenatal visits<sup>7</sup> (which is suggested in WHO guidelines for positive pregnancy experience, 2016). There is still a need for improvement in the number of routine ANC visits in India, where 4 or more visits are considered as the minimum number of visits required in the antenatal period. Apparently, because of this reason, all other studies have considered 4 or more visits for quality assessment. The timing of registration of pregnancy is also an important factor in ANC. Rustagi et al and Singh et al considered early registration of pregnancy as content for ANC-Q assessment.<sup>13,15</sup>

Number of ANC visits cannot be used as proxy for ANC-Q. Quality of care provided during these visits (e.g. how the patient was attended, counselling services, timing of immunization services, ultrasounds etc.) should be considered for better quality assessment. Almost every study included services during ANC visits which we have summarized under heading 'content of ANC' (Table 1).

### *ANC content*

Here, the term "ANC content" describes the particular services offered during antenatal visits. These elements usually consist of a variety of interventions, screenings, tests, and preventive measures meant to improve the health of both the mother and the fetus. Physical examinations (such as blood pressure monitoring and weight measurement), diagnostic tests (such as collecting urine and blood samples), preventive measures (such as tetanus toxoid immunization and iron/folic acid supplementation), and health education and counseling on pregnancy-related topics (such as breastfeeding, nutrition, and complications) are considered as ANC content. However, different studies have considered different groups of these elements as content of ANC visits for quality assessment. For example, Rustagi et al has called early pregnancy registration, tetanus toxoid immunization, and iron/folic acid supplementation for at least 100 days, as 'complete ANC' where as Dixit et al has included a set of services, where 'full ANC' was considered as the combination of at least eight ANC visits and procedures like- tetanus vaccination, collection urine, and blood, weight, height and blood pressure measurement, counseling on pregnancy-related complications and breastfeeding for quality assessment.<sup>7,13</sup> One factor that only few studies have included is the counselling services with mention of specific areas like mental health, breast feeding, nutritional counselling etc. E.g. Singh et al considered whether counseling was given regarding specific symptoms of pregnancy complications and information about the place to approach for, if any complications arise.<sup>15</sup> Number of ultrasounds done in the antenatal period was also missing in the 'content' of some studies.<sup>9</sup>

### *Terminology*

Terms like, 'full ANC', 'complete ANC', 'comprehensive ANC', 'appropriate ANC', 'adequate ANC', 'quality ANC' are being used in the literature. To keep things simple and uniform, we believe that a standard term should be set which is then used uniformly throughout the country regarding quality of ANC services. Furthermore, the researchers must have clarity on the term 'coverage', 'utilisation' and 'quality' regarding ANC.

Though there can be some overlap between terms 'utilisation' and 'quality' of ANC, quality of care is more related to the healthcare system. It tells the performance from the provider's end. Contents like working of the equipments, record keeping etc. are more relevant for ANC quality assessment as compared to utilisation.

Overall, most of the studies have considered a particular set of services suggested by WHO guidelines, though the set of services varies among studies. Furthermore, every group of authors have made their own criteria and terminology for defining ANC-Q. This is apparently because there is no standardized criteria and definition for antenatal quality assessment in India.

### **Strengths and limitations**

The strength of this review is a systematic search of studies for a clearly defined aim. We were very specific regarding inclusion of studies that measure 'quality' of ANC and not the 'coverage' and 'utilisation'. We have reviewed and presented the quality assessment approaches in a comprehensive yet concise way. However, there are several limitations to this review. As there may be an overlap between the terms 'utilisation' and 'quality', this review may not have captured studies that have indirectly measured quality but were titled as 'utilisation of ANC services'. In addition, because of being country specific, the key findings do not represent other low-and middle-income countries. This review also suffers from language bias as studies published in English language only were included.

### **CONCLUSION**

The literature on quality assessment of ANC in India is scarce. Quality of care has been one of the top priorities in healthcare. A number of studies are done on ANC 'coverage' and ANC 'utilisation', both of which are different from ANC 'quality'. More studies should be done specifically on ANC-Q assessment using a standardized criterion. Other than routine services, infrastructure of health facilities, working equipment and record maintenance should also be included while assessing the quality of ANC services. Furthermore, we believe that there should be a standard quality of care assessment method to assess ANC-Q that can be applied to the country in both public as well private sectors. A uniform standard criterion that is applicable throughout India shall be a simpler way for quality assessment. It will be quick and easy to compare and interpret.

This systematic review has summarised several quality assessment methods of ANC in India. It shall help other researchers to consult the approaches mentioned in this article for further quality assessment studies. It clearly is evidence that emphasizes need for setting a standard terminology and criteria that can be used and followed throughout country (public as well as private sectors). A standard criterion shall help in assessment and monitoring

of ANC-Q in a simpler manner. This will be a great step in raising quality of ANC standards in the country.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

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**Cite this article as:** Kataria P, Kumar N, Singh M. Antenatal care quality assessment methods in India: a systematic review. *Int J Community Med Public Health* 2024;11:2030-6.