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Enhancing Maternal Care: Exploring the Psychometric Properties of Antenatal Care Satisfaction Instrument

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ABSTRACT

Background: The quality of antenatal care dispensed to pregnant women is vital for her adherence to antenatal schedules and compliance. However, most of the instruments currently used in India are either non-validated or reflect fragmented models of care. **Objective:** To develop an "Antenatal Care Satisfaction Instrument" to assess the satisfaction of pregnant women regarding the care received in a public health care facility. **Methods:** The initial instrument was developed after reviewing the relevant literature and referring the standards developed by various agencies. This was then given to subject matter experts for ensuring the content validity, subsequently, field testing was done in a sample of 300 pregnant women. Further, the exploratory factor analysis was done to confirm the construct validity. Principal component method and Varimax rotation method were used to extract the items, Internal reliability was assessed by Cronbach Alpha. **Results:** Initially developed 42 items were reduced to 32 after assessing the content validity by CVI –I (>0.78) and CVI –S (0.8). The items were reduced to 20, under five factors as determined by the exploratory factor analysis. Factor V was omitted as Cronbach alpha is 0.45. Thus, the final instrument contains 18 items with four factors, respectful maternity care, interpersonal behaviour, antenatal education, structural aspects of OPD, and preparation for motherhood. **Conclusion:** The Antenatal Care Satisfaction Instrument (ACSI) can be used as a valid and reliable instrument for assessing the satisfaction of pregnant women and thus to enhance antenatal care.

Keywords: Antenatal Care; Antenatal Satisfaction; Assessment Tools

INTRODUCTION

Antenatal care (ANC) is one of the essential concepts of pregnancy, as proper and routine antenatal care is associated with a positive pregnancy experience. ANC aims to provide pregnant women with respectful individualized, person-centred care at every contact, with the implementation of effective clinical practices and the provision of relevant and timely information. Additionally, ANC serves as a platform for delivering timely information to the mother and family and engaging the family in health care decisions, which makes antenatal care inevitable. According to WHO (2016), ANC Model, psychosocial and emotional support by practitioners are included along with good clinical and interpersonal skills within a well-functioning health system. The evaluation of antenatal care is the primary barometer for ensuring maternal and foetal healthcare, especially in developing nations (Hsai *et al*., 2020)

Antenatal care is one of the earliest interactions of a pregnant woman with health care professionals to get access to various health care services. These interactions help to identify, prevent, and manage complications along with the promotion of health and preparation for childbirth (Moller *et al.*, 2017). This also facilitates timely immunizations and screening for STDs, and fatal viral infections. Thus, continuum of reproductive care and antenatal care provides a platform for important health care functions including, the communications of

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healthcare workers with family members to ensure a woman and family-Centered care (WHO, 2016). Therefore, antenatal care (ANC) becomes crucial to reduce complications from pregnancy and childbirth. It not only helps to reduce still births and perinatal deaths but also contributes to integrated care delivery throughout pregnancy. Good quality and regular ANC can reduce maternal mortality by 20% and can convince expectant mothers about the health benefits (Kebede *et al.*, 2020)

Even though ANC is a crucial component, multiple barriers have prevented the increased utilisation of ANC Services Gamberini, Angeli & Ambrosino, 2022. The low utilization of ANC services is associated with the facilities at the setting and the attitude of health care providers towards pregnant women, which eventually lead to low satisfaction and further the decreased utilisation of ANC services (Hibusu *et al*., 2024). Periodic evaluation of ANC is essential for further quality improvements and to provide high-quality healthcare services to pregnant women (Ayalew *et al.*, 2021).

Satisfaction is the extent of the client's experience compared with expectations, or individuals state of being pleased with the situation. Women's satisfaction with ANC services is crucial for improving quality of care and thus to ensure optimal maternal and neonatal outcomes (Belachew *et al*., 2024). The WHO recommends monitoring and evaluation of maternal satisfaction with public health care services as necessary to improve the quality and efficiency of health care during pregnancy. However, patient satisfaction is a complex multidimensional construct that is highly subjective and hard to measure accurately (Wang, Liu & Wang, 2023). The attributes chosen to evaluate should be the essential elements associated with satisfaction and be considered thoroughly when selecting those items. Having accurate and useful tools for measuring women's childbirth experience is essential to improve the provision of respectful, high-quality maternal health care for every woman (Hodin, 2017). Hence, evaluating women's satisfaction during antenatal care is crucial as a clinical component of care quality evaluation. However, mothers' satisfaction with antenatal services received has been rarely studied in India (Pricilla *et al*., 2016).

Since the conceptualization of satisfaction with health care is complex and multidimensional, it is imperative to have a consistent measurement tool, and a structured instrument can potentially help to evaluate satisfaction unbiased. Although the satisfaction with maternity services is an important measure of quality, most instruments still reflect the fragmented models of care (Perriman & Davis, 2016). Whereas some questionnaire used have limited the perception of satisfaction (Kebede *et al*., 2020). So, it is essential to develop consistent tools for this context, and each instrument should follow specific applications, settings, and populations. In the end, no instrument was found that ensured the construct validity through Psychometric analysis. Hence it is important to develop comprehensive validated tools with psychometric adequacy that encompass all aspects of antenatal care. This study aims to create a valid and reliable instrument that can be used beyond contextual differences to assess antenatal satisfaction in public health care facilities.

METHODOLOGY

For the development of this tool, the approach described by Polit and Beck (2018) was adopted. According to them in order to develop a valid and reliable instrument the development process has to undergo Conceptualisation, item generation, preliminary evaluation of the items, filed testing, data analysis, and final refinement of items. The details of each domain are described below.

Conceptualization and Item Generation

For the conceptualisation and item generation, two comprehensive literature reviews have been done. The first review aimed to identify concepts and constructs of antenatal care satisfaction, whereas the second review aimed to focus on the development of validated tool to assess the antenatal satisfaction. The original articles and systematic reviews from various data base (PubMed, CINAHL, Cochrane Library) were searched to identify the components affecting antenatal satisfaction and to formulate relevant questions. Further Lancent reviews were also searched to assess the determinants of women's satisfaction with antenatal care particularly in low-middle-income group countries. The information was retrieved by the keywords: Antenatal care, antenatal satisfaction, determinants, and validated tools.

Scope of Literature Review

With this extensive review of literature, the determinants of antenatal care satisfaction are categorized across the structure, process and outcome components. Subsequently, the structural components of antenatal satisfaction were identified, which include the physical setup, waiting time, infrastructure, cleanliness and professional workforce. Further, the process components were determined as interpersonal behaviour, promptness of care, privacy, and ensuring safety in antenatal OPDs (Srivastava *et al*., 2015). Finally, the outcome determinants are found as accessibility when needed and satisfaction of pregnant women (Heri *et al*., 2023). Evidence illustrates that the explanation of procedure by the health care provider and maintaining privacy have a positive impact on antenatal care satisfaction. This increases the confidence and satisfaction of pregnant women with the services from the health care facility. Further, the full information and knowledge regarding the danger signs are also a component of having confidence in Antenatal care (Emiru, Alene & Debelew, 2020). Besides this, the interpersonal behaviour and technical aspects of the provider have a crucial role in ensuring satisfaction by the antenatal mothers (Pricilla *et al*., 2016). Thus, the positive behaviour of the health care providers and the warm reception received in the unit feel them more comfortable along with the probable explanation which also feel them respected, that make to continue the regular antenatal visits. Hence development of a positive relationship between the care provider and the pregnant woman helps to increase maternal satisfaction with antenatal care services. Similarly, regular physiological antenatal assessments like Weight, physical examinations, abdominal examinations, immunizations, and laboratory services also have an impact on antenatal care services. Thus, receiving better clinical examination with promptness of care is also positively associated with higher satisfaction among pregnant women (Hibusu *et al*., 2024)

The second literature review focused on the development of validated tools for assessing the quality of care in clinical settings, including antenatal care. It emphasized that the items of an instrument should accurately and comprehensively cover the construct in order to elicit genuine responses from respondents. (Hajizadeh *et al*., 2023). Since the literature related to the antenatal satisfaction tool was limited, the process of developing tools in other healthcare settings was also reviewed (Sinclair *et al*., 2021; Halek, Holle & Bartholomeyczik. 2017; Zamanzadeh *et al*., 2015; Sixma *et al*., 1998). Consequently, exploratory factor analysis was found effective in identifying underlying constructs and to ensure the construct validity (Dabbagh *et al*., 2023)

Based on these literature reviews, existing instruments and clinical observations, the initial draft of the instrument that contains 42 items was developed, in which the words are used in such a way that everyone understands and strives to have the same conclusion about what the words mean. In order to draw a clear response negative and double-barrelled questions are not included.

Preliminary Evaluation of the Items

As it is crucial to ensure the content validity of items the developed, the tool was given to Nine experts to ensure the content validity which includes two rounds of evaluation. In the first round, the experts are asked to focus on the relevance and clarity of items whereas in the second round is done to formally assess the content validity of items as well as the scale.

External Review by Experts

The panel of experts included people with strong credentials in the subject matter, such as practicing midwifery/ nursing professionals, obstetricians, neonatologists, clinical researchers and quality consultants. Subsequently, some major modifications are executed in the items as per their suggestions. Further, the second review was carried out with five experts from the same panel who had a clear idea about the target population and the underlying constructs in the instrument. As per their suggestions and opinions, the content validity index of each item was assessed separately in relevance, clarity, simplicity, and appropriateness. After ensuring the scale's content validity field testing was done to ensure construct validity and reliability.

Field Testing

In order to refine the items, it was administered to the target population for quantitative assessment. Subsequently, the psychometric adequacy of the scale was assessed.

Sampling Plan and Data Collection

Since a large sample is required to ensure the psychometric adequacy of the scale, ten people per item were planned to be selected for the study. As the instrument contains 32 items, 320 pregnant women were recruited from the ANC OPD of a public health care facility in, India by convenience sampling. The pregnant women who had at least four antenatal visits at the setting were included for the study. Informed consent was taken from each participant. Proper information through filled questionnaire were obtained from 300 samples which is an adequate sample size for factor analysis (Kyriazos, 2018)

Analysis of Scale Development Data

After collecting the data from an adequate sample size, the data has been analysed to ensure construct validity and reliability for the refinement of the tool which is described as follows:

The inter-item correlation was done by Cronbach alpha to evaluate the scale empirically.

After ensuring the internal reliability of the items, the collected data was analysed through exploratory factor analysis.

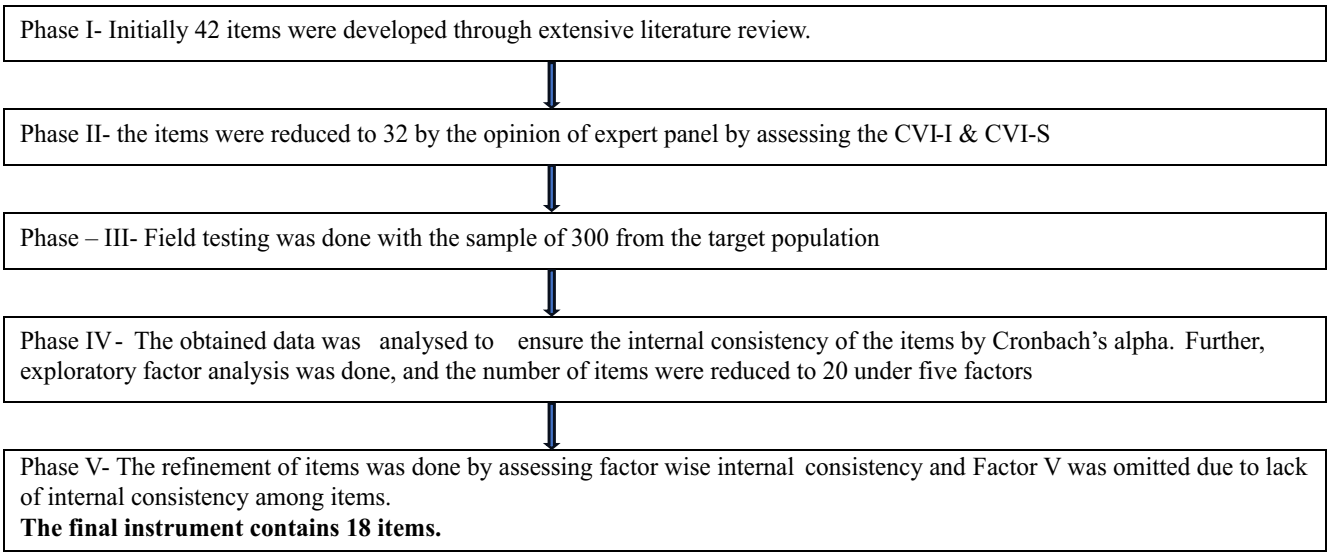
Exploratory Factor Analysis (EFA)

Exploratory factor analysis was performed to measure the common underlying constructs among set of items or factors (Polit & Beck, 2008; Indrayan & Malhotra, 2018). Subsequently, three basic decision points are considered as (1) deciding the number of factors, (2) choosing an extraction method, and (3) choosing a rotation method. Number of factors was decided by using a scree plot which is a two-dimensional graph with factors on the X – axis and Eigenvalues on the Y – axis. Further, the principal component method was used to extract items and Varimax rotation was used for the rotation matrix for identifying the factor loadings (Armitage, Berry & Matthews, 2013). After removing the cross loaded items, the reliability among factors was assessed.

Internal Consistency Analysis and Refinement of the Tool

Internal reliability among factors was ensured by Cronbach Alpha and subsequently, the refinement of the tool was done.

The Process of Development of ACSI



Ethical Consideration

The researchers obtained ethical clearance from VMMC & Safdarjung Hospital, New Delhi, India with reference number IEC/VMMC/SJH/Project/2022-06/CC263 on 6th September, 2022.

RESULTS

Measurement of Content Validity Index

The content validity Index for Items (I-CVI) and the Content validity Index for Scale (S-CVI) were assessed separately. I- CVI was calculated by counting the number of experts providing a score of 3 or 4, divided by the total number of experts. The items with CVI -I more than o.78 were considered as valid. The S-CVI was calculated by the proportion of items on the scale that the expert scored as valid. The acceptable standard for the S- CVI was considered as 0.8. Further, the items were carefully scrutinized and deleted or modified accordingly. Hence 42 items were reduced to 32 items as per the suggestions of the experts.

Checking the assumptions of EFA

Before conducting Exploratory Factor Analysis (EFA), it was verified that the correlation matrix was factorable by performing Bartlett's test of sphericity. After that, the Kaiser-Meyer-Olkin measure of sampling adequacy was applied, and values of 3611.061 and 0.810 were obtained, which are highly significant. Therefore, it is appropriate to use factor analysis for this dataset. Subsequently, the internal consistency was assessed using Cronbach's alpha, which yielded a value of 0.869, indicating good internal consistency.

Further, the collected data was analysed through exploratory factor analysis.

Exploratory factor analysis (EFA)

Table 1: Total Item Statistics, Internal Reliability and Communalities

Sl. No.	Items	Mean	SD	Scale mean if item deleted	Scale variance if item deleted	Corrected Item total correlation	Squared Multiple Correlation	Cronbach Alpha if item deleted	Initial	Extraction
1	I feel free to ask my doubts /concerns to my health care provider	3.45	1.314	102.96	307.554	0.299	0.257	0.870	1.00	0.502
2	My background, culture, and beliefs were asked by the health care provider during antenatal counselling	3.41	1,244	103.1	309.485	0.275	0.212	0 .870	1.00	0.564
3	The people involved my care always listened my complaints.	4.07	0.951	102.34	315.001	0.212	0.197	0.871	1.00	0.454
4	My health care provider spent 15-30 minutes in each antenatal visit.	3.79	1.097	102.62	312.657	0.237	0.206	0.871	1.00	0.575
5	I was very well informed about the next visit during each visit.	3.75	1.188	102.66	308.518	0.315	0.267	0.869	1.00	0.444
6	I was greeted by the health care provider in each interaction	2.99	1.201	103.42	305.282	0.390	0.356	0.868	1.00	0.452

7	I was always called by name	4.13	0.947	102.28	312.458	0.290	0.324	0.870	1.00	0.499
8	Curtains were used for my examination to ensure my privacy	4.17	1.020	102.24	313.186	0.245	0.346	0.870	1.00	0.504
9	I have been told about my rights to have dignified care	3.12	1.145	103.29	302.061	0.495	0.364	0.865	1.00	0.517
10	My consent was sought for any procedure	4.07	1.003	102.35	311.124	0.309	0.374	0.869	1.00	0.569
11	I was informed about my reports and findings	4.16	0.928	102.26	311.703	0.321	0.307	0.869	1.00	0.490
12	I was encouraged to have a birth companion of my choice during labour.	3.72	1.214	102.70	307.791	0.324	0.345	0.869	1.00	0.559
13	I have been told about the nutritious diet during pregnancy and lactation	3.28	1.256	103.14	299.276	0.511	0.703	0.865	1.00	0.842
14	I have been taught about the antenatal exercises.	2.05	1.359	104.36	292.185	0.625	0.823	0.862	1.00	0.856
15	I have been told about the importance of personal hygiene during pregnancy.	3.86	1.274	102.55	306.302	0.340	0.395	0.869	1.00	0.571
16	I was informed about the relaxation techniques during pregnancy to ensure a stress-free life.	2.76	1.480	103.66	296.882	0.470	0.503	0.865	1.00	0.406
17	I was well informed about the warning signs during pregnancy and was told to report immediately in the hospital.	3.37	1.435	103.04	299.988	0.423	0.441	0.867	1.00	0.604
18	I have been told where to report in the hospital in case of emergency.	3.37	1.324	103.04	299.787	0.470	0.414	0.866	1.00	0.609
19	I was taught to count the daily fatal movements	3.23	1.405	103.19	301.343	0.405	0.604	0.867	1.00	0.368

20	I was informed about the importance of IFA & Ca tablets during pregnancy	3.75	1.285	102.66	305.663	0.351	0.282	0.868	1.00	0.512
21	I have been informed about the duration of normal labour process.	2.60	1.280	103.82	299.314	0.499	0.434	0.865	1.00	0.461
22	I have been informed about the JSSK, JSSY schemes of GOI	1.96	1.257	104.46	296.503	0.577	0.776	0.863	1.00	0.836
23	I was told to prepare two bags with necessary articles for me and newborn in the hospital.	3.58	1.277	102.84	310.391	0.246	0.253	0.871	1.00	0.571
24	I was well informed about the early initiation of breast feeding	3.47	1.302	102.95	306.733	0.321	0.278	0.869	1.00	0.526
25	I have received information regarding family planning methods	3.57	1.290	102.84	303.758	0.393	0.301	0.867	1.00	0.477
26	OPD rooms were clean	3.65	1.484	102.77	304.975	0.307	0.199	0.870	1.00	0.572
27	Wash room facilities were adequate in OPD area	2.12	1.413	104.30	294.524	0.548	0.775	0.863	1.00	0.822
28	My waiting time in the hospital is less than one hour	2.05	1.336	104.37	295.825	0.554	0.801	0.863	1.00	0.844
29	All my needs were fulfilled during my antenatal visits.	4.20	1.022	102.21	310.316	0.325	0.370	0.869	1.00	0.443
30	I have been very well informed that when to report in this hospital in case of any emergency during my pregnancy.	2.35	1.388	104.06	297.571	0.492	0.446	0.865	1.00	0.432
31	I was told to contact my care provider in case of emergency.	3.18	1.485	103.24	303.459	0.336	0.604	0.869	1.00	0.818
32	I was well acquainted with my care provider.	3.22	1.248	103.19	300.993	0.474	0.689	0.866	1.00	0.823

Table 1 shows that items with low extracted values—specifically items 1, 3, 5, 6, 7, 11, 16, 19, 21, 25, 29, and 30—have been removed from the tool.

Total Variance

Table 2: Total Variance Explained

Component	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1.	5.790	30.474	30.474	5.790	30.474	30.474	3.127	16.458	16.458
2.	2.271	11.953	42.428	2.271	11.953	42.428	2.553	13.439	29.898
3.	1.419	7.469	49.896	1.419	7.469	49.896	2.383	12.542	42.440
4.	1.187	6.250	56.146	1.187	6.250	56.146	1.187	6.250	56.146
5.	1.119	5.887	62.034	1.119	5.887	62.034	1.350	7.104	62.034
6.	0.943	4.965	*66.998*						
7.	0.878	4.622	71.621						
8.	0.793	4.173	75.794						
9.	0.704	3.705	79.498						
10.	0.613	3.225	82.723						
11.	0.599	3.155	85.878						
12.	0.552	2.905	88.783						
13.	0.470	2.474	91.257						
14.	0.421	2.214	93.471						
15.	0.375	1.973	95.445						
16.	0.305	1.606	97.051						
17.	0.234	1.230	98.280						
18.	0.172	0.903	99.184						
19.	0.155	0.816	100						

Extraction Method: Principal Component Analysis

In table 2, the Eigenvalues mentioned in the first part show all possible factors, followed by the cumulative variance. The second part explains squared loadings with Eigen values greater than 1, after extraction. Thus, only five factors with Eigenvalue greater than 1 are identified, which explains 62.034 % cumulative variance.

Scree Plot

Scree plot is also used for identifying the number of useful factors. This sharp break in the sizes of the eigenvalue results in a change in the slope of the plot from steep to shallow.

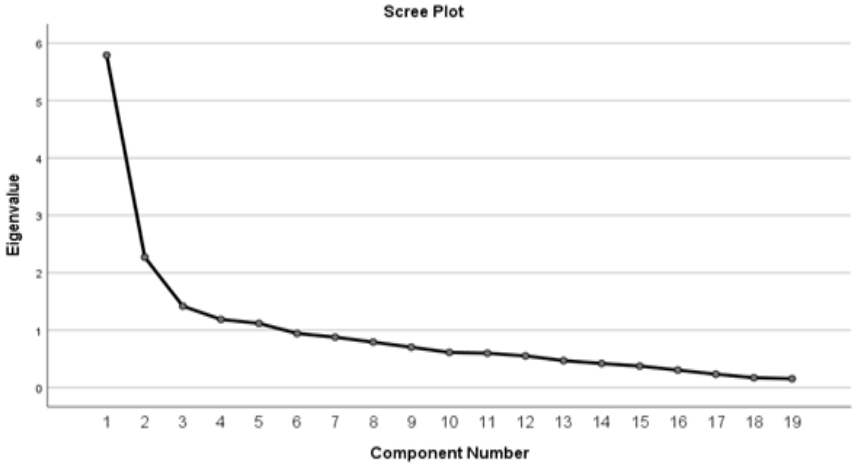


Figure 1: Scree Plot

Figure 1 shows the slope of the scree plot changes from steep to shallow after the first five factors.

This suggests that a five-factor solution may be the right choice.

Further, Principal Component analysis was used, and rotation converged in 6 iterations. A rotated component matrix was conducted to assess the loading. Subsequently, five components are extracted through varimax Kaiser Normalisation.

Internal consistency of items in each factor was done by Cronbach Alpha

Table 3: Factor Wise Reliability of Items

Factors	Determinants	Items	Mean	Variance	Standard Deviation	Cronbach Alpha
I	Comfort and safety	14,22,27,28	7.52	35.133	5.927	0.92
II	Antenatal education	15,17,18,20	12.76	27.427	5.263	0.797
III	Privacy and preparation for motherhood	8,12,23,24	14.15	24.462	4.946	0.728
IV	Respectful maternity care	9,10,13,26,31,32	19.41	47.941	6.924	0.748
V	Attitude of Nurse midwife/ health care provider	2,4	6.92	5.198	2.280	0.441

Table 3 explains the Cronbach's Alpha of the factor V is 0.441 only, which indicates that the items are not reliable and hence the factor to be removed from the tool. Thus, the item Numbers 2 and 4 are removed and the final tool contains 18 items.

Table 4: Antenatal Care Satisfaction Instrument (ACSI)

Statements	SA 5	A 4	N 3	DA 2	SDA 1
Curtains were utilized during examination to ensure my privacy					
I have been informed about my rights to receive dignified care					
My consent was obtained for any procedure					
I was encouraged to have a birth companion of my choice present during labour.					
I have received information regarding the nutritious diet during pregnancy and lactation					
I have been educated about the antenatal exercises.					
I have been informed about the importance of personal hygiene during pregnancy.					
I received thorough information about the warning signs during pregnancy					
I have been instructed where to report in the hospital in case of emergency.					
I was educated about the importance of IFA & Ca tablets during pregnancy					
I have been informed about the JSSK, JSSY schemes of Govt of India.					
I was advised to prepare two bags with necessary items for myself and the newborn during my hospital stay.					
I received comprehensive information about the importance of early initiation of breast feeding and exclusive breast feeding for 6 months.					
The Outpatient Department (OPD) rooms were kept clean					
Washroom facilities were adequate in the OPD area					
My waiting time in the hospital was less than one hour					
I was instructed to contact my care provider in case of emergency.					
I was well acquainted with my care provider.					

Table 4 is the final version of the tool which is developed and explains the interpretation of scores.

DISCUSSION

The purpose of this study was to develop an instrument to evaluate the satisfaction of pregnant women with their antenatal care received from the hospital. The psychometric analysis of the study revealed four factors are important in assessing the level of antenatal satisfaction. The factors are I. Respectful maternity

care (Table 8, ICSI-items- 2,3,5,1617,18) II. Comfort and safety (Table 8, ACSI items- 6,11,145,15), III. Antenatal education (Table 8, ACSI item's- 7,8,9,10), and IV. Privacy and preparation for motherhood (Table 8, ACSI items-1,4,12,13).

The items in the instrument are based on the widely adopted Donabedian model which defines patient satisfaction is directly related to three major domains: structure, process and outcomes. The structure mainly comprises the organizational structure, infrastructure, adequate supplies and equipment's along with competent health care professionals. Whereas, the actions of the professionals are considered as the process indicators, which include the provision of care with respect and dignity. Finally, outcome is measured as health status including satisfaction.

One of the important factors identified in this study that is associated with the level of satisfaction was respectful maternity care which has a direct impact on maternal satisfaction and consists of six items under this domain (Cronbach alpha- 0.75). This is coupled with the systematic review by (Batbaatar *et al*., 2017) suggested that the interpersonal behavior between the provider and beneficiaries is the most important determinant for satisfaction. (Hibusu *et al*., 2024) This relationship has been extensively reported and supported by the WHO standards for respectful maternity care. Even though there are several factors related to assessing antenatal satisfaction level, the components of respectful maternity care are the strongest predictors. According to (Ayalew *et al*., 2021) mothers who experienced disrespectful maternity care were less satisfied with antenatal care (ANC) services. This finding is consistent with the observations made by (Gebremichael *et al.*, 2018) who identified disrespectful care as a significant barrier for seeking timely maternity services.

Another factor identified through this study is antenatal education, and subsequently, four items are included under this (Cronbach alpha- 0.8). In the same way, Seyoum (2022), in her meta-analysis, revealed a positive correlation between antenatal education and satisfaction. The item related to the importance of personal hygiene has been included, as poor hygiene leads to infections, which may be transmitted to the newborn. Furthermore, it is also vital to ensure adherence to Iron and folic acid supplementation throughout pregnancy to prevent anaemia, haemorrhagic neonatal illness, and some congenital anomalies. Hence, the item reflecting this supplement therapy is also included in the instrument. Additionally, knowledge acquired through antenatal classes regarding danger signs helps to early identification and prevention of complications (Abbas *et al*., 2023; Alshaikh *et al*., 2023). After all, it is also essential to ensure the accessibility of care in an emergency, and the item related to this concept is also included in antenatal education. Antenatal women will be more satisfied when they are empowered with knowledge as they want to be informed, have choices, and protect their rights (Lopes, Vieira & Cardoso, 2024).

The determinants of structural aspects are also included in this tool under the factor of Comfort and safety (Cronbach Alpha- 0.9), which also has a direct impact on patient satisfaction in the same way as (Birhanu *et al*., 2020) revealed. Further, the waiting time and general cleanliness in the hospital are also determinants (Heri *et al*., 2023) to assess satisfaction, which is identical to the present instrument. Subsequently, antenatal exercise is also included under this domain to ensure comfort and safety during pregnancy and labour. Antenatal exercises are crucial to reduce stress and general pain due to its positive impact on body and mind (Nor Azura *et al*., 2020). Thus, it proves to be a significant component in influencing satisfaction. Govt. of India has introduced schemes like Janani Suraksha Yojana (JSY) and Janani Shishu Suraksha Karyakram (JSSK) for promoting institutional deliveries (Gupta *et al.*, 2013; Salve *et al*., 2017). The items these schemes regarding have been included in the tool, considering the significance of these programs.

Since the transition of motherhood comes with a range of challenges, it is necessary to prepare the mothers and support them to take the new roles (Hwang, Choi & An, 2022). Hence, the items related to the preparation for motherhood are also included in this instrument after ensuring the psychometric analysis (Cronbach alpha-0.72). To obtain a more comprehensive understanding of women's expectations and

satisfaction with antenatal care, specific questions about the importance of privacy during care are included in this instrument.

The content validity of items was confirmed by the expert panel who have been involved in antenatal care as well as neonatal care which provided a strong foundation to the development process. Further, field testing done in a large sample of a target population in a public health care facility ensures the authenticity of responses. Reliability was ensured by Cronbach alpha. Furthermore, powerful statistical methods; exploratory factor analysis, and varimax rotation were used to extract the factors and sustain the relevant items to ensure the psychometric adequacy of the tool.

Limitation

The field testing of the instrument couldn't be replicated in other settings due to the delay in getting ethical permissions, which is a limitation of this study. Further, some of the structural aspects that have a great impact on satisfaction like hospital registration time, and laboratory services were not included as these policy-level components are beyond the scope of direct healthcare providers.

CONCLUSION

Satisfaction with antenatal care is an essential measure for improving the quality in maternal health care services in both current times and for future providers. For this, the scientific tool (ACSI) was developed by ensuring psychometric adequacy is a valid and reliable measurement for assessing the satisfaction level of antenatal mothers. Moreover, it is a concise tool that covers the important domains of antenatal care. Apart from this, ACSI will also enable in identification of gaps in antenatal care. Being an adequate assessment tool of quality antenatal care, it will lead to enhanced maternal health with a farfetched positive fetomaternal outcome. This tool will also add value in identifying the antenatal care elements from the perspective of care recipients. Moreover, the use of this tool will shed light on the quality of ANC and will potentially lead to improvement in care delivery. Thus, an improved care delivery system will eventually lead to enhanced maternal health and a positive impact on maternal and child health.

The ACSI, which is psychometrically adequate is an effective tool for assessing pregnant women's satisfaction with antenatal care. However, future studies can explore the benefits, impacts, and areas for improvement in various settings. Additionally, the Qualitative approach can be used to enhance future studies' findings by considering the subjective nature of satisfaction.

Recommendation

This tool will add value in identifying antenatal care elements that affect the satisfaction of pregnant women from their perspective as care recipients. Hence, the use of this tool will definitely help to assess the satisfaction of pregnant women and thus will potentially lead to improvement in quality care delivery. Thus, ACSI will help policymakers, supervisors, and health care providers in maternity services to assess antenatal care satisfaction and enhance the quality of maternity health services, especially in public health care facilities. Though the instrument was developed through quantitative methods, ACSI can provide a close picture of antenatal satisfaction within the time constraints of pregnant women.

Conflict of Interest

No competing interests and conflicts related to this work.

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