Radius: Journal of Science and Technology
Vol. 2, Issue 2, (2025) 252007 (15pp)

Structured antenatal teaching and its effect on knowledge enhancement among primigravid mothers

Seema Rojaria[1,*] | Nemi Chand Jat[1]

[1]S. N. Institute of Nursing Sciences, Nirwan University Jaipur, Jaipur – 303305, Rajasthan (India)

*Corresponding author: seemachoudhary14615@gmail.com

Abstract: This research evaluated how useful a structured health education intervention would be in developing sound knowledge of Antenatal Care (ANC) in first-time pregnant (primigravid) mothers from selected hospitals in Jaipur, Rajasthan, India. Despite increasing efforts to improve maternal health, there still exists a significant lack of awareness regarding ANC among primigravid mothers. A pre-experimental, one-group pre-test-post-test design was implemented, and 300 primigravid mothers were recruited through purposive sampling. ANC knowledge was assessed using a validated structured questionnaire prior to intervention and at 90 days after the end of the structured health education program. A statistically significant improvement in ANC knowledge was found after delivery of the structured health education program, with the mean score after 90 days (34.38, SD = 3.11) significantly exceeding the mean score prior to the structured program (22.74, SD = 2.09), $p < 0.001$. Following the structured education program, improvements were found in all domains of ANC knowledge for the first-time mothers. Based on our findings, we believe that structured health education is an effective method to enhance the ANC knowledge of first-time mothers and, as such, should be included in routine ANC service delivery to improve maternal and fetal health outcomes.

Keywords: Primigravida, Antenatal care, Structured teaching, Knowledge assessment, Maternal health

1. Introduction

Pregnancy represents an exceptional physiological event with complex physiological, hormonal, anatomical, and psychological changes that facilitate the growth and development of the baby within the mother's body. Although pregnancy itself does not constitute a disease or condition in its own right, the many changes in a woman's body that accompany her pregnancy can often be accompanied by the development of discomforts such as nausea, constipation, heart burn, morning sickness, and potentially extremely dangerous complications in both the mother's and baby's health **[1-3]**. As a result, the receipt of timely antenatal care (ANC) is one way to assure the safety of mothers during this period, by identifying complications early, providing preventive support services, and encouraging women to share their knowledge of safe lifestyle behaviours with others.

The importance of maintaining a consistent lifestyle and eating a balanced diet during pregnancy is supported by traditional medical systems, including the Unani System of

https://doi.org/10.5281/zenodo.17953327
Received: 19 November 2025 | **Revised:** 13 December 2025
Accepted: 15 December 2025 | **Published Online:** 18 December 2025

Medicine, and has long been a part of the cultural practices of women from various parts of the world **[4]**. Contemporary research has reaffirmed the validity of these beliefs that having a good quality diet, complemented with the necessary micronutrients such as calcium and folic acid, is essential not only for optimal fetal growth and development during pregnancy, but also for preventing congenital birth defects, neural tube defects, anaemia, and pre-term birth **[5]**. Despite this overwhelming evidence, however, many low- and middle-income countries continue to experience a significant gap in the awareness of the importance of ANC among women.

Maternal Mortality (MM) remains a serious global public health issue: nearly 810 women die every day around the world as a result of complications from pregnancy; most deaths could be easily prevented **[6]**. While maternal mortality in India has come down significantly, with the latest MM ratio (MMR) being 88 per 100,000 births between 2020 and 2022, it still exceeds the SDG target of 70 per 100,000 by 2030 **[7-9]**. National Family Welfare Programs (NFWPs) have prioritised increased access to regular ANC services as a core strategy to address this issue, using the term "Full ANC" to denote the minimum of three ANC visits, one tetanus toxoid vaccination and 100 iron-folic acid tablets during pregnancy.

Evidence shows, however, that there remains a substantial gap in ANC access and use. Globally, from 2010-2016, only 62% of pregnant women received all four recommended ANC visits **[9, 10]**. Likewise, studies in India have shown inconsistent levels of ANC awareness among first-time mothers. For example, the majority of mothers surveyed in Chennai were aware of iron-folic acid supplements (82.9%) and tetanus toxoid vaccinations (70.4%), but very few mothers were aware of government-sponsored maternal health care schemes, like Janani Suraksha Yojana (12.5%) **[11, 12]**. Similar findings were reported in Mehsana, where the study also revealed a significant increase in the knowledge scores of women after participating in a structured teaching program aimed at improving knowledge about ANC services **[2]**.

Global studies show that not all women have access to the same quality of ANC. Based on a facility-based study conducted in Ghana examining ANC quality provided to postpartum women, only 31.2% were provided with high-quality ANC service provision. The study also found that a delay in the initiation of ANC services and less than eight follow-up visits after initial intake was associated with lower levels of ANC quality **[13]**. Thus, the research provides evidence for the need for something other than global education to improve regional levels of knowledge regarding ANC, particularly among first-time mothers who have not previously been pregnant.

In India, many maternal health programs targeting pregnancy and birth have been launched; however, women living in Rajasthan register for ANC services later than women in other states, and they also typically attend ANC services less frequently than women in other states. Most research on ANC services delivered to women in India so far has focused on women participating in research using relatively small sample sizes or conducted in tertiary-care facilities. Thus, it is unclear whether the results from these research studies can be utilized to inform practices for women receiving ANC services in primary-care settings. There has also been very limited research on the effectiveness of using a structured, module-based health teaching program specifically designed for primigravida mothers in Jaipur. Many primigravida women experience increased anxiety, uncertainty, and lack of knowledge

regarding ANC services due to their lack of experience receiving such services; therefore, they represent an important population for targeting education-based interventions **[3]**.

Due to the gaps identified above, it is imperative to assess whether a structured and cultural health teaching program can lead to an increase in ANC (Ante-Natal care) knowledge among first-time pregnant women (primigravida) in Jaipur, India. Therefore, the objectives of this study will be to assess the baseline awareness of these women regarding the royal guidance that has been provided for their care during pregnancy, to implement a structured teaching intervention on that subject, and to determine how effective this intervention was when applied to a diverse group of 300 women who were seen at various clinics and hospitals in Jaipur (both public and private).

2. Objectives of the Study

- Assess baseline antenatal-care knowledge among primigravida mothers.
- Develop and administer a structured health-teaching program on antenatal care.
- Evaluate the effectiveness of the structured teaching program via pre/post-test comparison.
- Examine association of knowledge scores with demographic variables.

3. Research Methodology

3.1 Research Approach and Design

The effectiveness of a structured health teaching program for antenatal care knowledge among primigravida mothers was quantitatively evaluated using a pre-experimental one-group pre-test-post-test research design. The design of this study was chosen because it took place in "real" clinical settings and neither randomization nor establishing a control group was possible because of ethical and administrative barriers. Pre-experimental designs may have limitations on internal validity related to an inability to establish causality, but they do establish a basis for the evaluation of the effectiveness of an intervention in naturalistic settings.

The one-group pre-test-post-test pre-experimental design was found to be an appropriate research design for this study because it would provide for a preliminary evaluation of an educational intervention before investing a lot of time and resources into more complex controlled trials. In the case of antenatal clinics, this design was seen as a practical and ethical means for assessing the immediate increase in knowledge of primigravida mothers. The design had the following structure:

$$O_1 \text{ (Pre-test)} \rightarrow X \text{ (Structured Teaching Program)} \rightarrow O_2 \text{ (Post-test)}$$

Knowledge changes were measured by comparing pre-test and post-test scores.

3.2 Setting of the Study

The research took place in several private and government-run hospitals located in Jaipur (Rajasthan). Data were gathered in the antenatal outpatient department (ANC OPD) of 1 community health centre (Government), 1 medical college hospital (Government) and 1 private multispecialty hospital; all three types of facilities were included to better capture primigravida mothers with diversity in terms of economic status and access to health care services.

3.3 Population and Sample

The target population for the overall study consisted of primigravida mothers who presented for medical care at the ANC OPDs of all four hospitals in the study. The accessible population included all mothers who came to the study hospitals during the data collection period and who qualified based on the eligibility criteria.

A total of 300 primigravida mothers were enrolled in the study; this sample size was judged to be adequate based on previous similar studies regarding maternal health education; it also provided sufficient statistical power for analysis of the differences in scores between pre- and post-intervention in Maternal Knowledge.

3.4 Sampling Technique

A non-probability purposive sampling technique was employed. This method was appropriate because the study required participants who specifically met predetermined characteristics, first-time pregnant women who could understand the teaching module and answer the questionnaire. Operational constraints of ANC-OPDs also made probability sampling impractical. While purposive sampling limits generalizability, it ensured feasibility and relevance of the selected participants to the research objectives. Participants were selected using purposive sampling with a consecutive recruitment approach, wherein all eligible primigravida mothers attending the ANC outpatient department during the data collection period were approached and invited to participate until the required sample size was achieved.

3.5 Inclusion and Exclusion Criteria

Inclusion Criteria

- Primigravida mothers attending ANC-OPDs of selected hospitals in Jaipur city.
- Mothers who could understand and respond to the questionnaire in Hindi or English.
- Mothers who provided informed consent and were willing to participate.

Exclusion Criteria

- Multigravida women, as prior pregnancy experience could influence baseline knowledge levels.
- Mothers unable to comprehend the questionnaire due to language or cognitive limitations.
- This ensured a homogeneous sample and enhanced validity of pre-post knowledge comparison**.**

3.6 Description of the Tool

Data were collected using a structured questionnaire developed by the researcher after an extensive review of literature and national ANC guidelines. The tool consisted of two sections:

a) **Demographic Profile**

Age, duration of marriage, gestational weeks, number of antenatal visits, trimester in which patient registered, income level, education level, occupation, religion, lifestyle/habits, family structure, nearest health facility location, distance from nearest health facility, and transportation method are all included as variables in this survey instrument.

b) **Knowledge Questionnaire on Antenatal Care**

Comprised items across key ANC domains including:

(a) antenatal registration and check-up,
(b) medications,
(c) diet and harmful habits,
(d) investigations,
(e) birth preparedness,
(f) rest and exercise,
(g) warning signs,
(h) minor ailments,
(i) breast care and feeding, and
(j) family planning.
Each item was scored, and higher scores indicated better ANC knowledge.

3.7 Validity and Reliability of the Tool

Fifteen health care experts reviewed the survey for content validity. The panels consisted of community health nurses and professional obstetricians and gynaecologist nurse clinicians; all suggestions were incorporated into the final instrument to enhance clarity, appropriateness and completeness of the instrument.
Reliability was established using the test-retest method. The test-retest coefficient was r=0.82 indicating that the survey was stable over time with good internal consistency.

3.8 Data Collection Procedure

Prior to collecting data, written informed consent was obtained from all participants. All participants completed the pre-test to assess their baseline knowledge before being taught through lectures, visual aids, and interactive discussion on the key components of antenatal care (ANC) in a structured health education program. Knowledge retention was evaluated by conducting a post-test eight days after the teaching intervention. The data collection process was free of interruptions with the cooperation of all study participants.

3.9 Plan of Data Analysis

Data were analyzed using both descriptive and inferential statistics. Frequency and percentage distribution were used to analyze demographic variables. Mean and standard deviation were computed for pre-test and post-test knowledge scores. The effectiveness of the structured teaching program was evaluated using the paired t-test**.** Association between knowledge scores and selected demographic variables was assessed using the chi-square test**.** Statistical significance was set at $p < 0.05$.

4. Results and Discussion

4.1 Analysis of demographic characteristics

The demographic information has been systematically presented and interpreted by using frequency distribution and percentage methods in Table 1, which provide a clear and comprehensive picture of the study sample.
The evaluation of the age information indicates that most of the participants, i.e., 201 mothers (67.0%), were a part of the18-25 age in years group, showing that most of the women in the sample were present in the younger reproductive age. A smaller proportion, comprising 73 mothers (24.3%), were located in the 26-35 age in years group. Only 26 mothers (8.7%) were found to be 35 years and above, representing the least frequent age category in the study.
The data analysis shows that 200 mothers, or 66.7% of the participants, had been married for one to three years. Of the 96 mothers included in this subset analysis, relatively few (32.0%)

have been married for 4 - 6 years. Those responding as married for 7 - 10 years represents the smallest portion of the data collected at 4 mothers (1.3%). Overall, the data collected shows that most of the primis recommend moms included in this study were married recently. The largest portion of this sample (66.0%) fell into the 1 - 3 year range. This indicates that in this geographic region (Jaipur), mothers are having their first pregnancies during the very early stages of their marriages.

Table 1: Frequency and percentage distribution of selected demographic, obstetric, socioeconomic, and health-care related characteristics of the study participants (N = 300).

S. No.	Demographic Variables	F	%
1	**Age in years**		
	18 years- 25 years	201	67.0
	26 years - 35 years	73	24.3
	35 years and above	26	8.7
	Total	300	100
2	**Duration of marriage in years**		
	1yr- 3 years	200	66.7
	4 years – 6 years	96	32.0
	7 years - 10 years	4	1.3
	Total	300	100
3	**Gestational weeks at pregnancy**		
	4 – 12 weeks	91	30.3
	13 - 24 weeks	102	34.0
	24 -36 weeks	53	17.7
	36 and above	54	18.0
	Total	300	100
4	**No. Of antenatal visits**		
	1 – 3 visits	178	59.3
	4 – 6 visits	95	31.7
	7 and above visits	27	9.0
	Total	300	100
5	**Trimester of registration**		
	First trimester.	171	57.0
	Second trimester.	109	36.3
	Third trimester.	20	6.7
	Total	300	100
6	**Monthly Family Income**		
	Rs.1000-3000.	50	16.7
	Rs.4000-6000.	58	19.3
	Rs.7000-9000.	151	50.3
	Rs.10000 and above	41	13.7
	Total	300	100

7	**Level of education of mothers**		
	Up to SSC.	143	47.7
	Up to HSC	85	28.3
	Graduate and above.	72	24.0
	Total	300	100
8	**Occupation of mothers**		
	House Wife	227	75.7
	Business	50	16.7
	Service	23	7.7
	Total	300	100
9	**Religion**		
	Hindu	94	31.3
	Christian	38	12.7
	Muslim	87	29.0
	Other	81	27.0
	Total	300	100
10	**Habits**		
	None	276	92.0
	Pica	10	3.3
	Tobacco	6	2.0
11	**Type of family**		
	Joint family	155	51.7
	Nuclear family	122	40.7
	Extended family	23	7.7
12	**Health care centre closest to home**	**F**	**%**
	Sub centre	28	9.3
	Primary Health centre	34	11.3
	Civil Hospital	27	9.0
	Medical college and Hospital	76	25.3
	Private Hospital	135	45.0
13	**Distance of health care facility from Hospital**		
	Within 10km	55	18.3
	Within 30km	131	43.7
	Within 50km	107	35.7
	More than 50 km	7	2.3
14	**Transportation from home to the medical facility**		
	Walk	44	14.7
	Two-wheeler	31	10.3
	Auto / Taxi	140	46.7
	Bus	59	19.7
	Own car / Vehicle	26	8.7

A significant number (n=102; 34.0%) of mothers included in the study were in the second trimester of pregnancy (gestational age 13 - 24 weeks) at the time of data collection. The next largest group were those in the first trimester (gestational age 4 - 12 weeks; n=91; 30.3%). A smaller group of mothers at the end of pregnancy were included in this study (n=54; 18.0%); these mothers were at least 36 weeks in gestational age. The last group of mothers were in the mid-to-late stage of pregnancy (n=53; 17.7%); these mothers were between 24 - 36 weeks gestational age. In general, the results highlight that the majority of primigravida mothers were concentrated in the early to mid-trimester period of pregnancy, with relatively fewer participants in the advanced stage. This distribution is significant as it provides insights into the timing at which mothers generally seek antenatal. care in the selected hospitals of Jaipur city.

The results indicate that most of mothers, i.e., 178 participants (59.3%), reported having made only 1-3 antenatal visits. Only 27 moms (9.0%) had finished seven or more prenatal appointments, which is the least common category in this variable, while a lesser percentage of 95 mothers (31.7%) had attended four to six visits. A small number of mothers who are having their first baby (primigravida) had prenatal appointments when they should have had more of them. More than half of the mothers (60%) in the sample had only 1-3 appointments before their delivery date. Should this trend continue, it appears likely that these women may not have sufficient access to or use of prenatal care, thereby impacting the health of both the mother and baby. It is critical to ensure that women are informed about and stressed the significance of having regular and timely prenatal appointments. Fewer than 10% of mothers had at least 7 prenatal visits.

For those who have completed the study, 171 of the mothers (57.0%) registered for their pregnancies in the first trimester, 109 (36.3%) registered in the second and only 20 (6.7%) registered in the third trimester.

Of the 300 mothers in the study, 151 (50.3%) reported having a monthly household income of ₹7,000 to ₹9,000, placing them in the middle-income range. The low-income group consisted of the following: 58 (19.3%) with a monthly household income of ₹4,000 to ₹6,000; 50 (16.67%) making ₹1,000 to ₹3,000; and 41 (13.7%) who reported earnings of ₹10,000 or more monthly.

Analysis of educational status data shows that a majority of respondents, or 143 mothers, or 47.7% of participants, obtained an education until completion of their secondary school certificate (SSC). 72 women (24.0%) graduated or completed higher education, with an additional 85 mothers (28.3%) having completed an education through their higher secondary certificate (HSC).

In terms of economic status, the majority of respondents, 227 (75.7%), were identified as housewives, indicating that this demographic made up a large part of the sample population that did not work outside the home. In contrast, only 23 (7.7%) were found working in various service-related jobs, while a smaller sample of 50 (16.7%) reported engaging in business-related activities.

Religious identification was also assessed, with 94 mothers (31.3%) identifying as Hindu, followed closely by 87 mothers (29.0%) identifying as Muslim. Christian respondents accounted for 38 mothers (12.7%), while 81 mothers (27.0%) identified with other religions, including Sindhi, Buddhist, Parsee, and other smaller groups.

Of the 276 respondents (92.0%), who completed the questionnaire 92% reported that they did not practice any habits that could be considered harmful or unhealthy. There were many other habits that were reported, but to a much lesser extent than were indicated by those that reported no such habits. There were 10 mothers (3.3%) who said they had a habit of engaging in "pica," which is characterized as consuming non-food items; 6 mothers (2.0%) said they practiced using chewing tobacco; and 8 mothers (2.7%) reported using "mishri," which is an act of applying a tobacco-based powder to the teeth and gums, and is commonly practiced among those that live in this area.

The data also showed that 155 mothers (51.7%) were living in joint family households, which consist of multiple generations living together or families that consist of extended families. A smaller group (122 mothers or 40.7%), were living in a nuclear family setting, which consists of a husband, a wife, and children. Additionally, 23 mothers or 7.7% of the respondents, indicated that they lived in an extended family household, which could consist of relatives living outside of their immediate joint family household. The data from this study indicates that joint family households are the predominant living arrangements amongst participants. However, the significant proportion of nuclear family households indicates that there is a movement toward smaller family units, while the considerable proportion of joint family households indicates that the traditional family structure continues to be evident in the study area.

The analysis of the data reveals that the largest percentage of mothers, or 76 participants (25.3%), lived near a hospital or medical college, indicating simpler access to cutting-edge medical services. Just 34 moms (11.3%) said they lived close to a primary health care centre (PHC), whereas 28 mothers (9.3%) said they lived close to a sub-center. The Civil Hospital was the closest medical institution to their residence, according to the remaining 27 moms (9.0%). These results make it clear that a sizable percentage of moms resided near tertiary-level medical facilities, which often offer specialised maternity and child health services. Nevertheless, the distribution also reveals that a significant proportion of women depended on primary and secondary healthcare institutions, including PHCs, sub-centers, and civil hospitals.

According to the data, the majority of participants, 131 moms, or 43.7%, said they lived 30 kilometres or less from the nearest medical institution. A significantly smaller group of 107 women (35.7%) lived within 50 km of a medical facility, and 55 moms (18.3%) lived within barely 10 kilometres. The least common category consisted of just 7 women (2.3%) who lived 50 km or more from their nearest medical institution. The majority of the study population had reasonable access to health facilities within 30 to 50 kilometres, according to these data, although comparatively fewer mothers lived extremely close (within 10 km) or at a significant distance (50 km or more). This distribution shows how different research participants' geographic access to maternal health services is.

The analysis shows that the largest proportion of participants, i.e., 140 mothers (46.7%), reported traveling by auto-rickshaw or taxi to reach their health facility. A smaller number, 59 mothers (19.7%), indicated that they used the bus as their primary means of transport, while 44 mothers (14.7%) mentioned that they walked to the facility. In addition, 31 mothers (10.3%) reported using a two-wheeler, and the remaining 26 mothers (8.7%) traveled using their own car or private vehicle.

4.2 Assessment of primigravids' knowledge of prenatal care

The mean percentage approach is used to evaluate area-specific knowledge based on pre- and post-test knowledge scores.

Table 2: Evaluation of the average prenatal care knowledge of primigravida mothers by area before and after. **N 300**

Knowledge areas	Max mean	Pre test		Post test	
		Mean	Mean%	Mean	Mean %
Antenatal registration and check up	4	1.88	47.1	3.19	79.8
Medications	4	2.77	69.3	3.37	84.3
Diet and vices	4	2.48	62.1	3.44	86.0
Investigations	4	2.18	54.6	3.52	87.9
Birth preparedness	4	2.11	52.8	3.52	88.0
Rest and exercise	4	2.21	55.3	3.46	86.4
Warning signs	4	2.20	55.1	3.55	88.8
Minor ailments	4	2.33	58.2	3.38	84.5

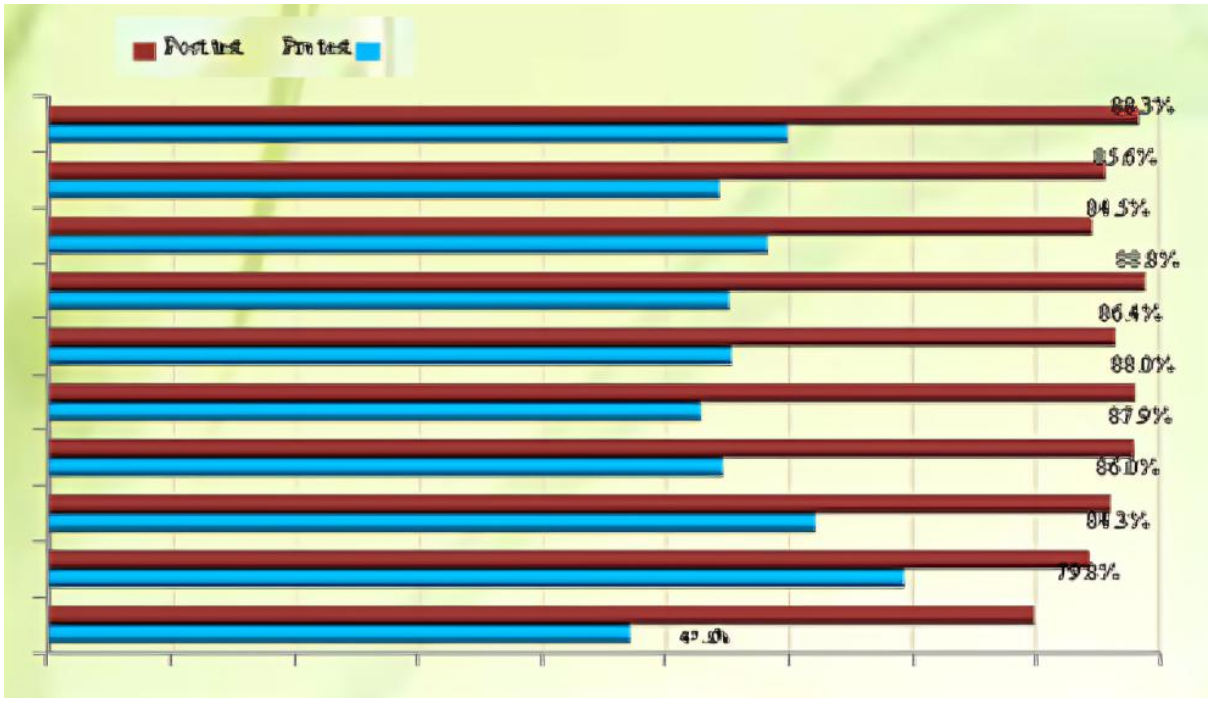

Figure 1: Area-wise comparison of pre- and post-test mean knowledge scores

Table 2 and Figure 1 present the area-wise comparison of pre-test and post-test mean scores Among primigravida moms in terms of their prenatal care knowledge. The outcomes unequivocally show that once the planned health education program was administered, all domains of knowledge consistently and significantly improved.

The mean score for the domain of pregnancy and check-up registration rose significantly from 1.88 in the pre-test to 3.19 in the post-test, indicating a greater understanding of the importance of prompt registration and consistent medical monitoring during pregnancy. In much the same way, participants' medication knowledge increased from an average pre-test score of 2.77 to 3.37 on a post-test, indicating improved understanding of recommended

prenatal medication and supplements (e.g., folic acid and iron) and their role in preventing complications. The average score of diet and avoidance of vices rose dramatically from 2.48 to 3.44, indicating that mothers have a more thorough understanding of healthy eating patterns and balanced nutrition and the potential harm of negative behaviours while pregnant. The average investigations score rose from 2.18 to 3.52, demonstrating a better understanding of prenatal tests performed routinely and their importance for early problem identification.

Likewise, mothers' mean birth preparation score increased from 2.11 at pre-test to 3.52 at post-test, indicating that mothers realised the necessity to prepare prior to childbirth; this includes plans for transportation, money, and facility for childbirth. Mean scores for rest and exercise increased from 2.21 to 3.46, indicating a greater understanding regarding the importance of proper rest and safe physical activity for the health of both the mother and the developing child.

Participants demonstrated an ability to recognise signs of complications during pregnancy which prompted mothers-to-be to seek medical attention for themselves or their unborn child, with a rise in score from an average of 2.20 to 3.55. In addition, their ability to recognise signs of minor illnesses during pregnancy improved with a score increase from 2.33 to 3.38 indicating a better understanding of common discomforts experienced during pregnancy. With regard to the information learned on breastfeeding and breast health, there was an increase in the mean score from 2.17 to 3.42 indicating that the participants clearly learned the importance of initiating and exclusively continuing to breastfeed immediately following birth. Lastly, participants' knowledge of family planning methods in the context of prenatal medical care improved with a mean score increase from 2.39 to 3.53, indicating a deeper understanding of spacing methods, which will ultimately improve both maternal & child health.

Overall, these results show that the planned health education program was quite successful in raising the primigravida's awareness of all important aspects of prenatal care. The notable increase in post-test mean scores in a number of domains suggests that structured educational interventions can be extremely important in providing first-time moms with the knowledge they need to make safer pregnancies and improve outcomes for both mothers and new-borns.

Table 3: Mothers are assessed both before and after the test according to their general level of knowledge. N 300

Overall Knowledge levels	Score Range	Pre test		Post test	
		F	%	F	%
Poor knowledge	1 – 10	0	0	0	0
Average knowledge	11 – 20	75	25.0	0	0
Good knowledge	21 - 30	222	74.0	8	2.7
Breast care and feeding	4	2.17	54.3	3.42	85.6
Family planning	4	2.39	59.8	3.53	88.3

Table 3 and Figure 2 provide a thorough evaluation of the knowledge levels of primigravida who were chosen from particular hospitals in Jaipur City with reference to prenatal care. This assessment was carried out both prior to and following the implementation of a methodical

approach to health education. The knowledge assessment's cumulative scores were added up and categorised using the classification scheme shown in the preceding table.

A significant portion of the participants, 222 mothers (74%), had a good level of comprehension regarding prenatal care during the pre-intervention phase, according to the findings. On the other hand, just an average level of knowledge was discovered in 75 individuals (25%). Only three responders, or 1% of the total, demonstrated an exceptional level of awareness. Interestingly, a significant portion of the participants lacked insufficient knowledge at the time of this initial assessment.

Knowledge scores significantly improved after the planned health education intervention was administered, according to the post-intervention evaluation. Eight mothers (2.7%) showed good knowledge, whereas the majority of participants, 292 women (97.3%), had outstanding knowledge levels. It is crucial to emphasise that during the post-test phase, no people were found to fall into the categories of average or poor knowledge.

The data clearly indicate a significant improvement in knowledge levels following the structured educational program. There was a marked shift from average and good knowledge levels prior to the intervention, to predominantly excellent knowledge levels afterward. These findings strongly suggest that the health education program was successful in improving the overall awareness and understanding prenatal care among women who are first-time mothers.

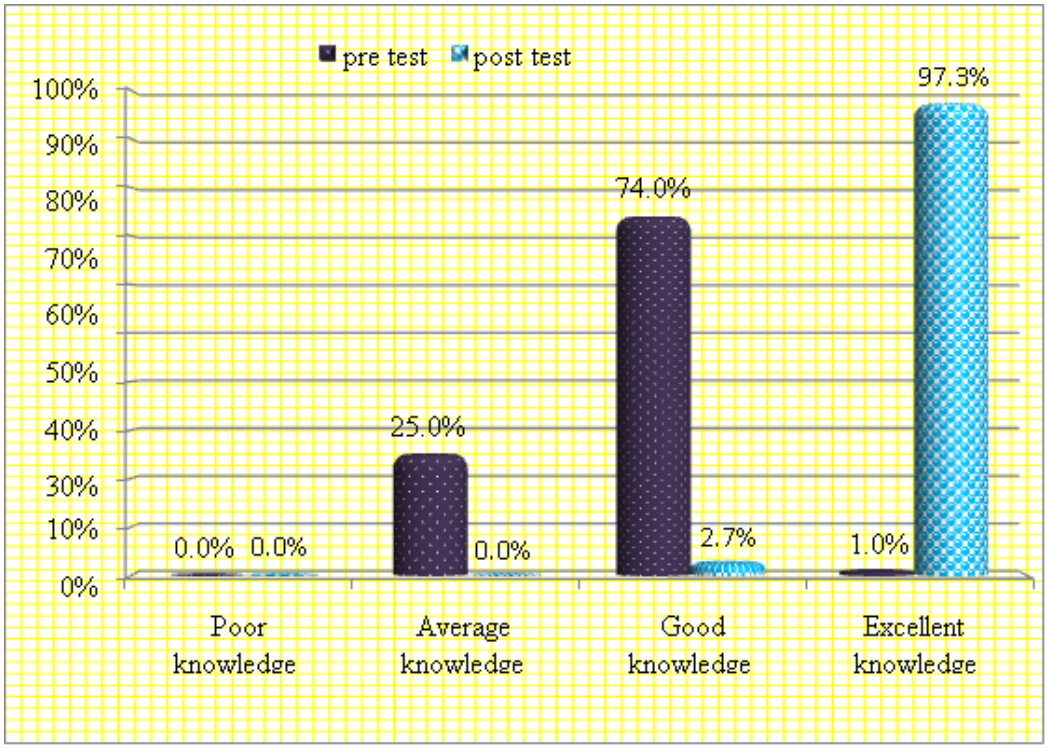

Figure 2: Comparison of overall pre-test and post-test knowledge scores

4.3 Effectiveness of the proposed education program

In order to determine the effectiveness of the proposed education program, this part compares the knowledge of primigravida mothers about prenatal care before and after the test. To determine the significance of the difference between the pre and post test results and to evaluate the impact of the planned instruction program on primigravida mothers' knowledge of prenatal care, the "t" test for small correlated samples was employed.

Table 4: Comparison of the average scores for general knowledge before and after (N-300)

Comparison of knowledge		**Mean**	**S. D.**	**M.D.**	**SEM D**	**t value**	***p* value**
Overall knowledge	Pre test	22.74	2.09	11.64	0.165	70.72	0.001
	Post test	34.38	3.11				

A paired t-test showed that the increase in overall knowledge scores following the structured teaching programme was statistically significant, $t(299) = 70.72$, $p < 0.001$. The effect size, calculated using Cohen's d, was 4.39, indicating an extremely large and educationally meaningful impact of the intervention on antenatal care knowledge.

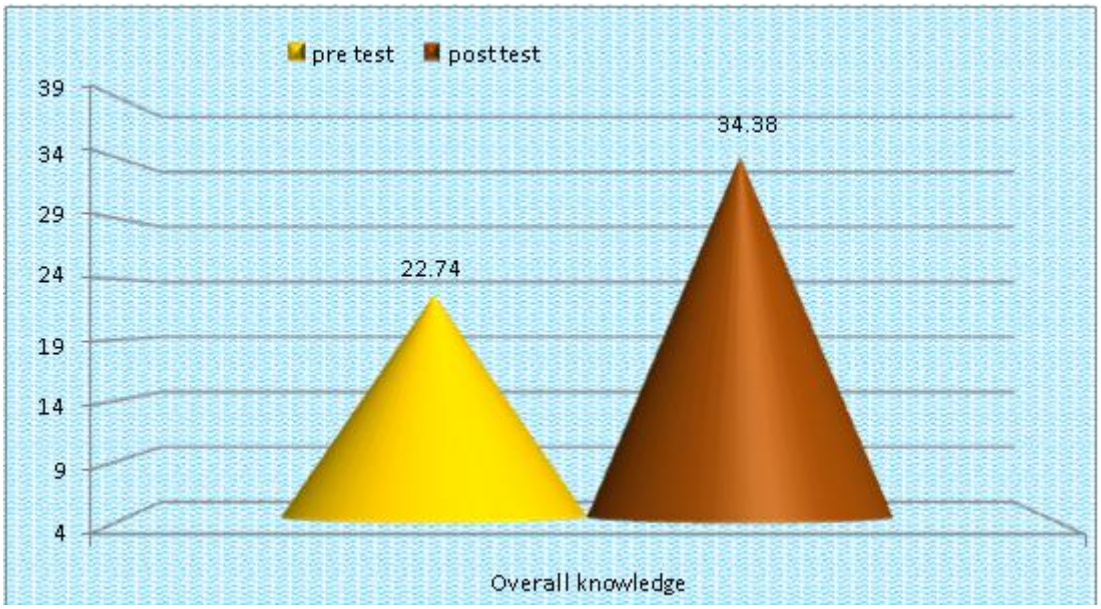

Figure 3: Comparative Analysis of Pre-Test and Post-Test Knowledge on Prenatal Treatment for primigravida Mothers.

Table 4 and Figure 3 provide a detailed comparison between pre-test and post-test knowledge scores pertaining to prenatal treatment in primigravida mothers. This analysis was conducted to measure the efficiency of the organised health education program intervention.

5. Limitations

This study has certain limitations that should be acknowledged. As a pre-experimental one-group design was used, the absence of a control group limits the ability to attribute improvements solely to the structured teaching programme, as external factors may also have influenced knowledge gain. The use of purposive sampling and recruitment from selected ANC outpatient departments restricts the generalizability of the findings to all primigravida mothers in the region. Additionally, although care was taken to standardize procedures, the possibility of information contamination between the pre-test and post-test cannot be completely ruled out, particularly because the post-test was conducted within a short interval. The short follow-up period allowed only assessment of immediate knowledge retention, and long-term retention or behavioural changes could not be evaluated. Future studies employing

randomized controlled designs with longer follow-up durations are recommended to strengthen the evidence.

6. Conclusion

The findings of this study demonstrate that the structured health-teaching programme produced a substantial improvement in antenatal care knowledge among primigravida mothers, with overall mean scores increasing from 22.74 in the pre-test to 34.38 in the post-test. The increase shown by this study is remarkable, and demonstrates that using a structured module-based approach to educate women about the importance of accessing antenatal care (ANC) early during their pregnancies can help improve their health-seeking behaviours when it comes to accessing medical services for themselves and their babies. It is likely that incorporating such structured teaching modules into routine ANC service delivery could also lead to higher levels of early registrations for medical care, as well as preparedness for pregnancy and childbirth. While there are limitations in the current study, such as lacking a control group and having a short follow-up period, the future use of RCTs, larger representative sample sizes, and longer follow-up periods would allow for further validation of these findings and provide additional evidence to support integrating structured teaching modules into maternal health programs.

References

1. Mirzakhani, K., Ebadi, A., Faridhosseini, F., & Khadivzadeh, T. (2020). Well-being in high-risk pregnancy: an integrative review. *BMC Pregnancy and Childbirth*, *20*, 526. https://doi.org/10.1186/s12884-020-03190-6
2. Dayna, A. J. A., & Chaudhary, V. (2020). A Study to Evaluate the Effectiveness of Structured Teaching Programme on Knowledge regarding antenatal care among Primigravida mothers in a selected Villages of Mehsana District. *International Journal of Advances in Nursing Management*, *8*, 93-95. https://doi.org/10.5958/2454-2652.2020.00022.0
3. Barclay, L., Everitt, L., Rogan, F., Schmied, V., & Wyllie, A. (1997). Becoming a mother—an analysis of women's experience of early motherhood. *Journal of advanced nursing*, *25*, 719-728. https://doi.org/10.1046/j.1365-2648.1997.t01-1-1997025719.x
4. Bashir, S., Ansari, A. H., & Sultana, A. (2023). Knowledge, attitude, and practice on antenatal care among pregnant women and its association with sociodemographic factors: a hospital-based study. *Journal of patient experience*, *10*, 23743735231183578. https://doi.org/10.1177/23743735231183578
5. Laishram, J., Mukhia, S., Thounaojam, U. D., Devi, H. S., & Panmei, J. (2013). Knowledge and practice of ante-natal care in an urban area. *VHL Regional Portal: Information and Knowledge for Health*, 157495.
6. Balsarkar, G. (2021). World Patient Safety Day 2021: "Safe Maternal and New Born Care". *The Journal of Obstetrics and Gynecology of India*, *71*, 465-467. https://doi.org/10.1007/s13224-021-01547-1
7. Ahirwar, N. (2018). Study to assess knowledge attitude and practices of antenatal care among antenatal women attending outdoor clinic in tertiary care hospital. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, *7*, 1754-1760. https://doi.org/10.18203/2320-1770.ijrcog20181473
8. Alnabri, A. A. M., Ulhaq, N. I. N., Kabbos, R. S. A., Aljohani, S. S. M., Alshammari, R. Z., Alanazi, M. S., & Alshammari, K. F. (2025). Knowledge, attitudes, and concerns regarding antenatal pregnancy screening among women in Hail city and its surrounding provinces: A cross-

sectional survey study. *Journal of Family Medicine and Primary Care*, *14*, 2041-2047. https://doi.org/10.4103/jfmpc.jfmpc_1914_24

9. UNICEF. (2018). Antenatal Care-UNICEF DATA: Monitoring the Situation of Children and Women.
10. Dhavalshankh, A. (2021). Knowledge, awareness and attitude regarding WHO recommended ANC visits among pregnant women attending antenatal clinic at DY Patil hospital, Kolhapur, Maharashtra, India. *International Journal of Basic & Clinical Pharmacology*, *8*, 689-692. https://doi.org/10.18203/2319-2003.ijbcp20191101
11. Gross, K., Alba, S., Glass, T. R., Schellenberg, J. A., & Obrist, B. (2012). Timing of antenatal care for adolescent and adult pregnant women in south-eastern Tanzania. *BMC pregnancy and childbirth*, *12*, 16. https://doi.org/10.1186/1471-2393-12-16
12. Somu, P. (2020). A study on perception about antenatal care among primigravida attending a tertiary care hospital. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, *9*, 56-60. https://doi.org/10.18203/2320-1770.ijrcog20195624
13. Boah, M., Abanga, E. A., & Adokiya, M. N. (2024). Quality of antenatal care services received by women of reproductive age prior to delivery in selected public health facilities in the northern zone of Ghana. *BMC Health Services Research*, *24*, 1063. https://doi.org/10.1186/s12913-024-11491-1