

Effect of an Instructional Antenatal Care Program on Knowledge Enhancement among Primigravida Women

Antenatal Care
Program on
Knowledge
among
Primigravida

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ABSTRACT

Objective: To evaluate the effect of an instructional antenatal care program on knowledge enhancement among primigravida women.

Study Design: A quasi-experimental study

Place and Duration of Study: This study was conducted at the Al-Hindiya Teaching Hospital and the Obstetrics and Gynecology Teaching Hospital in Karbala from 1st June 2025 to 30th November 2025.

Methods: A total of 150 primigravida women were purposively assigned to a study group (n=75), which received a structured instructional program, and a control group (n=75), which received routine care.

Results: Pre-intervention, the majority of participants in both groups had low knowledge (study group: 85.3%, control group: 86.7%), with no significant difference between groups (p=0.551). Post-intervention, 81.3% of the study group achieved high knowledge levels compared to 0% in the control group. The study group's mean knowledge score increased significantly from 25.97±8.08 to 36.42±11.25 (p<0.001, Cohen's d =1.00), whereas the control group remained unchanged. Repeated measures ANOVA showed a significant time × group interaction (F=113.99, p<0.001, η^2 =0.44), confirming the program's effect.

Conclusion: The instructional antenatal care program significantly improved knowledge among primigravida women. Incorporating structured instructional sessions into routine antenatal care is recommended to enhance maternal knowledge and promote safe pregnancy practices.

Key Words: Antenatal care, Primigravida women, Knowledge enhancement, Instructional program

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INTRODUCTION

Antenatal care (ANC) is a critical component of maternal health services, aiming to ensure the well-being of both the mother and fetus throughout pregnancy.¹ For primigravida women - those experiencing pregnancy for the first time - adequate knowledge about pregnancy, childbirth, and newborn care is essential for making informed decisions and promoting positive health outcomes.²

However, studies indicate that many primigravida women possess limited knowledge about these aspects, which can lead to increased anxiety, poor health

practices, and suboptimal utilization of healthcare services.^{3,4}

Instructional antenatal care programs have emerged as effective interventions to enhance maternal knowledge and self-efficacy. These programs typically incorporate various instructional strategies, including structured sessions, multimedia resources, and interactive discussions, to impart essential information about pregnancy and childbirth.^{5,6} Research has demonstrated that such programs significantly improve primigravida women's knowledge, attitudes, and practices regarding pregnancy and childbirth.⁷

The effectiveness of instructional antenatal care programs is further supported by studies focusing on specific aspects of maternal health instruction. The examining the impact of antenatal instructional sessions on breastfeeding knowledge, attitude, and self-efficacy found significant improvements in these areas among primigravida women who participated in the program.⁸ Similarly, interventions targeting maternal self-care practices have been shown to empower primigravida women, enhancing their confidence and ability to manage pregnancy-related challenges.⁹

The integration of instructional programs into routine antenatal care has been associated with increased compliance with ANC visits. Women with higher levels of knowledge are more likely to adhere to

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recommended ANC schedules, thereby improving maternal and fetal health outcomes.¹⁰ The importance of incorporating comprehensive instructional interventions into ANC services to address knowledge gaps and promote positive health behaviors among primigravida women.¹¹ Therefore, by providing targeted instruction on various aspects of pregnancy and childbirth, these programs empower women to make informed decisions, adopt healthy practices, and engage actively in their care. As such, integrating instructional interventions into routine ANC services is essential for improving maternal health outcomes and ensuring a positive pregnancy experience.

METHODS

A quasi-experimental study was conducted at Al-Hindiya Teaching Hospital and the Obstetrics and Gynecology Teaching Hospital, Karbala, from 1st June to 30th November 2025 letter No. 3434/QM/Approval/JSDJNEHU; May 21, 2025). A total of 150 primigravida women were recruited by purposive sampling and equally allocated to the study (n=75) and control (n=75) groups. Eligible participants were aged 18-45 years, attended antenatal clinics, understood Arabic, and provided informed consent. Women with high-risk pregnancies or severe chronic illnesses were excluded.

Data were collected using a structured questionnaire covering sociodemographic characteristics, antenatal care knowledge (20 items), and attitudes (15 items). The instrument was pilot-tested in 10 women and showed good reliability for the knowledge scale (Cronbach's $\alpha=0.84$).

The intervention consisted of four structured sessions on pregnancy care, nutrition, danger signs, and childbirth preparation, delivered through lectures, demonstrations, role-playing, and group discussions. The control group received routine antenatal care.

Assessments were performed before and after the intervention.

Data were analyzed using SPSS version 24. Independent and paired t-tests assessed between- and within-group differences, respectively. Repeated-measures ANOVA evaluated time, group, and time $\times$ group effects. Chi-square tests analyzed categorical variables. Effect sizes were reported using Cohen's d and partial η^2 , with $p<0.05$ considered statistically significant.

RESULTS

The mean age was 23.30 ± 3.2 years in the study group and 23.81 ± 3.1 years in the control group. Most participants were housewives, lived in urban areas, and had attended one to four antenatal visits. Health professionals were the main source of pregnancy-related information. Baseline sociodemographic characteristics were comparable between groups (all $p>0.05$) (Table 1). Before the intervention, low knowledge was observed in 85.3% of the study group and 86.7% of the control group, with no participants achieving high knowledge levels (Table 2). Mean baseline knowledge scores were similar between groups (25.97 ± 8.08 vs. 25.75 ± 8.11 ; $p=0.551$) (Table 3).

After the intervention, 81.3% of the study group achieved high knowledge compared with none in the control group, where 78.7% remained at a low level (Table 4). The post-test mean knowledge score was significantly higher in the study group than in the control group (36.42 ± 11.25 vs. 25.79 ± 8.13 ; $p<0.001$) (Table 5). Within the study group, knowledge scores increased significantly from 25.97 ± 8.08 to 36.42 ± 11.25 ($p<0.001$; Cohen's $d=1.00$), while no meaningful change occurred in the control group ($p=0.905$) (Table 6). Repeated-measures ANOVA showed a significant time $\times$ group interaction ($F=113.99$, $p<0.001$, partial $\eta^2=0.44$), confirming greater improvement in the intervention group (Table 7).

Table No. 1: Distribution of sociodemographics

Variable	Category	Study Group (n=75)	Control Group (n=75)	Chi-square	p-value
Age (years)	18–22	28 (37.3%)	30 (40.0%)	0.267	0.875
	23–27	35 (46.7%)	32 (42.7%)		
	28–32	12 (16%)	13 (17.3%)		
Level of Instruction	Read and Write	5 (6.7%)	6 (8%)	1.432	0.699
	Primary	12 (16%)	13 (17.3%)		
	Secondary	30 (40%)	28 (37.3%)		
	University	28 (37.3%)	28 (37.3%)		
Occupation	Housewife	40 (53.3%)	42 (56.0%)	0.267	0.876
	Employed	25 (33.3%)	23 (30.7%)		
	Student	10 (13.3%)	10 (13.3%)		
Residence	Urban	45 (60.0%)	43 (57.3%)	0.133	0.715
	Rural	30 (40.0%)	32 (42.7%)		
Frequency of	None	10 (13.3%)	12 (16.0%)	1.267	0.533

antenatal visits so far	1–2 times	20 (26.7%)	21 (28.0%)		
	3–4 times	25 (33.3%)	24 (32.0%)		
	> 4 times	20 (26.7%)	18 (24.0%)		
Source of information on pregnancy	Family/friends	30 (40.0%)	28 (37.3%)	2.134	0.545
	Social media	25 (33.3%)	27 (36.0%)		
	Health professionals	50 (66.7%)	48 (64.0%)		
	TV/Radio	15 (20.0%)	18 (24.0%)		
	Books or leaflets	10 (13.3%)	12 (16.0%)		

Table No. 2: Primigravida women's knowledge about antenatal care (pre-test) [n=100]

Weighted	Study Group			Control Group		
	No.	%	Mean±SD	No.	%	Mean±SD
Low	64	85.3	25.97±8.08	65	86.7	25.75±8.11
Moderate	11	14.7		10	13.3	
High	0	0.0		0	0.0	

Table No. 3: Primigravida women's knowledge about antenatal care between study and control groups (pre-test)

Groups	Mean±SD	t (df=148)	η^2	Sig (p-value)
Study	25.97±8.08	-0.756	0.005	0.551
Control	25.75±8.11			

Table No. 4: Primigravida women's knowledge about antenatal care (post-test)

Weighted	Study Group			Control Group		
	No.	%	Mean±SD	No.	%	Mean±SD
Low	3	4.0	36.42±11.25	59	78.7	25.79±8.13
Moderate	11	14.7		16	21.2	
High	61	81.3		-	-	

Table No. 5: Primigravida women's knowledge about antenatal care between study and control groups (post-test)

Groups	Mean±SD	t (df=148)	η^2	Sig (p-value)
Study	36.42±11.25	12.892	0.45	0.000
Control	25.79±8.13			

Table No. 6: Paired comparison of knowledge scores pre- and post-test by group

Groups	Pre-test	Post-test	Paired t (df=74)	p-value	Cohen's d (Effect Size)
Study	25.97±8.08	36.42±11.25	13.45	<0.001	1.00 (Large)
Control	25.75±8.11	25.79±8.13	0.12	0.905	0.01 (Negligible)

Table No. 7: Repeated measures ANOVA for knowledge scores

Source	SS	df	MS	F	p-value	Partial η^2
Time (Pre/Post)	3125.60	1	3125.60	145.30	<0.001**	0.50
Group (Study/Control)	21.78	1	21.78	1.01	0.317	0.01
Time × Group	2450.92	1	2450.92	113.99	<0.001**	0.44
Error	3191.15	148	21.55			

DISCUSSION

Before the intervention, the overall knowledge of primigravida women about antenatal care was predominantly low in both the study and control groups

in the present study. In the study group, 85.3% of participants demonstrated low knowledge (25.97±8.08), while only 14.7% fell within the moderate category, and none achieved high scores. A similar trend was observed in the control group, where 86.7% had low knowledge levels (25.75±8.11), 13.3% had moderate

scores, and none scored high. These results highlight the insufficient baseline awareness among primigravida women regarding essential antenatal care practices. This emphasizes a critical gap in maternal health literacy during the first pregnancy, which could negatively influence maternal preparedness, pregnancy outcomes, and neonatal well-being. Comparable findings were reported in Thailand, where a large proportion of primigravida women demonstrated inadequate knowledge of antenatal care prior to structured health instruction sessions.¹² Similarly, a study in Ethiopia, found that pregnant women, particularly those in their first pregnancy, often lacked adequate knowledge of antenatal services and pregnancy danger signs before exposure to health interventions.¹³

This study showed that mean knowledge score of the study group (25.97 ± 8.08) was nearly identical to that of the control group (25.75 ± 8.11). The independent sample t-test revealed no statistically ($p=0.551$) significant difference between the two groups, with a negligible effect size ($\eta^2 = 0.005$). This indicates that both groups began the study at an almost equivalent baseline level of knowledge, thus validating the comparability of the groups prior to the intervention. These findings are consistent with Jordan, which demonstrated no significant differences in baseline antenatal knowledge between study and control groups prior to structured prenatal instruction programs.¹⁴ Similarly, in a study conducted in Australia, pre-test assessments revealed comparable low knowledge scores between intervention and control participants, underscoring the uniformity of maternal knowledge deficits before targeted health instruction.¹⁵

The post-test results demonstrated a substantial rise in knowledge levels among primigravida women in the study group following the instructional program. A majority of participants 81.3% achieved high knowledge scores, compared with none in the pre-test, while only a minimal proportion 4% remained at the low level. In contrast, the control group remained largely unchanged, with 78.7% still in the low knowledge category and none achieving high knowledge. This dramatic improvement in the study group reflects the direct impact of the antenatal care program in enhancing maternal awareness and preparedness for pregnancy. This underscores the importance of structured, targeted instruction in overcoming baseline deficiencies in maternal knowledge. These findings are consistent with a study in Brazil, which reported that structured antenatal teaching programs significantly improved pregnant women's knowledge scores post-intervention compared with control participants who received routine care.¹⁶ Similarly, a study in Pernambuco, Brazil found that focused maternal health sessions led to a significant shift from low to high knowledge categories,

reinforcing the value of systematic instructional interventions.¹⁷

This study showed that comparison between groups further confirmed the effectiveness of the intervention. The mean knowledge score of the study group (36.42 ± 11.25) was significantly higher than that of the control group (25.79 ± 8.13), with a large effect size ($\eta^2 = 0.45$). This indicates that nearly half of the variance in post-test knowledge levels was attributable to the intervention itself, highlighting its strong impact. This finding not only establishes the success of the program but also validates the experimental design by demonstrating a clear divergence between intervention and control outcomes. These results align with a study conducted in Kwara State, Nigeria, where women exposed to antenatal health instruction interventions scored significantly higher on knowledge assessments than those who did not receive structured training.¹⁸ Likewise, in Jordan revealed that participation in antenatal instructional workshops was associated with markedly better knowledge outcomes, compared with control groups relying solely on routine care.¹⁹

The within-group analysis of knowledge scores demonstrates a highly significant improvement among primigravida women in the study group following the instructional antenatal care program. The mean knowledge score increased from 25.97 ± 8.08 at pre-test to 36.42 ± 11.25 at post-test, with a paired t-test value of 13.45 ($p < 0.001$) and a large effect size (Cohen's $d = 1.00$). This indicates that the intervention had a substantial positive impact on maternal knowledge acquisition. In contrast, the control group's mean knowledge score remained virtually unchanged, moving from 25.75 ± 8.11 to 25.79 ± 8.13 , with a negligible effect size ($d=0.01$) and a non-significant ($p > 0.905$), confirming that the observed gains were specifically attributable to the instructional program. These findings underscore the importance of structured antenatal instruction in addressing knowledge deficits commonly observed among primigravida women. Supporting this, in Brazil reported significant improvements in pregnant women's knowledge following focused antenatal instruction sessions, while control participants showed no significant change.²⁰ In Egypt, highlighted that structured maternal health instruction significantly enhanced knowledge scores among first-time mothers compared with routine care.²¹

The repeated measures ANOVA for knowledge scores revealed a significant main effect of time ($F=145.30$, $p < 0.001$, $\eta^2=0.50$), indicating that, overall, participants' knowledge about antenatal care improved from pre-test to post-test. However, the main effect of group (study vs. control) was not significant ($F=1.01$, $p=0.317$, $\eta^2=0.01$), reflecting the homogeneity of knowledge levels between groups at baseline. Crucially, the time $\times$ group interaction was significant ($F=113.99$, $p < 0.001$, $\eta^2=0.44$), demonstrating that the observed improvement

over time was significantly greater in the study group than in the control group. This confirms that the instructional antenatal care program was directly responsible for the substantial increase in knowledge among the intervention participants, rather than natural progression or repeated testing effects. These findings are consistent with international evidence emphasizing the effectiveness of structured antenatal instruction. For example, a study in Brazil found that repeated instructional sessions produced significantly greater knowledge gains in women who received structured programs compared with those exposed only to routine care.²² Similarly, in Nigeria reported that primigravida women participating in targeted antenatal workshops had greater knowledge improvement than controls, confirming the role of focused instruction in maternal health instruction.²³

CONCLUSION

The instructional antenatal care program effectively enhanced primigravida women's knowledge regarding various aspects of pregnancy care, including nutrition, recognition of danger signs, and preparation for childbirth. The intervention demonstrated a clear positive impact compared to routine antenatal care, indicating that structured, interactive instructional programs are beneficial in improving understanding and awareness among first-time pregnant women.

Author's Contribution:

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