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Assessment of Pregnant Women's Knowledge Regarding the Importance of the Fourth Antenatal Care Visit in Al-Najaf Governorate, Iraq

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Abstract

Background: Antenatal care (ANC) is a core maternal-health service that enables early detection of pregnancy-related complications, counselling, preventive supplementation, fetal monitoring, and preparation for safe delivery. Although the World Health Organization currently recommends eight ANC contacts, the fourth ANC visit remains an important benchmark in many health systems and a practical opportunity to reinforce key messages before delivery. Although maternal knowledge about ANC has been widely studied, the level of pregnant women's knowledge of the fourth ANC visit is still limited in Iraq. **Aim:** The current study aimed to assess pregnant women's knowledge of the importance and components of the fourth ANC visit in the context of current maternal health recommendations. **Methods:** A descriptive cross-sectional study using convenience sampling was conducted among 381 pregnant women attending antenatal care services at 32 randomly selected primary health care centers in Al-Najaf Governorate, Iraq. The sample size was determined using Cochran's formula. Data were collected using a structured interviewer-administered questionnaire covering socio-demographic characteristics, knowledge regarding the components and importance of the fourth ANC visit, and sources of information. Data were analyzed using SPSS version 26, and descriptive statistics, Chi-square tests and Bivariate analysis were used to summarize the data and assess associations between ANC attendance and knowledge variables. **Results:** Overall, 307 women (80.5%) had adequate knowledge regarding the fourth ANC visit. Adequate knowledge was significantly more frequent among women who had attended four or more ANC visits than among those with fewer visits ($\chi^2 = 12.99$, $P < 0.001$). Women

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with ≥4 ANC visits also showed higher awareness of laboratory investigations, nutritional counselling, supplementation, maternal and fetal monitoring, danger signs, and birth preparedness. Healthcare providers were the most commonly reported source of information (40%), followed by family and friends (35%). **Conclusion:** The findings suggest that most pregnant women attending primary health care centers in Al-Najaf Governorate had adequate knowledge regarding the importance and main components of the fourth ANC visit. However, important gaps remain regarding pregnancy danger signs and birth preparedness. Strengthening structured counselling during routine ANC visits may support maternal preparedness for pregnancy-related complications and improve the quality of ANC health education in PHCCs.

Keywords: Antenatal care; Fourth ANC visit; Maternal knowledge; Pregnancy; Primary health care; Iraq.

Introduction

Maternal health remains a major public health concern because many pregnancy-related complications can be prevented when women receive timely, continuous, and good-quality care during pregnancy. Global estimates show that maternal deaths still occur mainly in low- and middle-income countries, where delays in recognizing complications, reaching health services, and receiving appropriate care continue to affect maternal and neonatal outcomes. ANC provides an opportunity for risk identification, health education, counselling, and preparation for safer childbirth [1]. ANC provides repeated opportunities to monitor maternal blood pressure and weight, assess fetal growth and wellbeing, request essential laboratory investigations, provide nutritional counselling and supplementation, and discuss pregnancy danger signs and birth preparedness. These components are particularly important because many women may attend health facilities without fully understanding the purpose of each procedure or counselling message. When ANC is used effectively, it can improve women's ability to recognize warning symptoms, follow medical advice, and seek timely care when complications occur [2].

The World Health Organization previously recommended a focused ANC model based on at least four visits, but in 2016 it shifted to a minimum of eight contacts to improve the quality of care, reduce perinatal mortality, and improve women's experience during pregnancy. However, ANC4+ remains an internationally monitored maternal-health indicator and is still used as a tracer of maternal health service coverage

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and universal health coverage. WHO defines ANC4+ as the proportion of women aged 15–49 years with a live birth who received antenatal care four or more times during pregnancy. Therefore, focusing on the fourth ANC visit remains relevant, particularly in settings where the eight-contact model has not yet been fully achieved or evenly implemented [3].

In Iraq, national data show that the gap between the older minimum four-visit model and the newer eight-contact recommendation remains substantial. According to MICS 2018 data reported in Iraq's RMNCAH situation working paper, 67.9% of women aged 15–49 years with a recent live birth received four or more ANC visits, whereas only 22.2% met the eight-contact recommendation. The same MICS dataset reported that ANC4+ coverage in Al-Najaf Governorate was 71.7%, which is higher than the national average but still does not ensure that women understand the content and importance of the fourth visit. Therefore, the fourth ANC visit remains a useful point for reinforcing counselling within Iraqi primary health care services [4].

Maternal knowledge regarding ANC is shaped by both personal and service-related factors. Educational level may influence how easily women understand health information; family support may affect whether women attend visits and follow advice; and repeated ANC attendance may increase exposure to counselling. Other factors such as age, residence, socioeconomic status, and previous contact with health services may also influence women's awareness. For this reason, assessing knowledge alone is not sufficient; it is also important to examine which maternal and antenatal-care-related characteristics are associated with adequate knowledge [5,6].

Previous studies in Iraq and nearby settings have mainly examined general ANC utilization, maternal awareness of obstetric danger signs, or broad knowledge of pregnancy care. However, limited Iraqi evidence has specifically examined pregnant women's knowledge regarding the importance and components of the fourth ANC visit as a distinct maternal-health contact. This gap is important because women may report ANC attendance while still having weak understanding of danger signs, birth preparedness, or the purpose of investigations and supplementation during late pregnancy. Addressing this gap may help primary health care providers identify which counselling messages need to be strengthened during routine ANC services [7,8].

Therefore, this study aimed to assess pregnant women's knowledge regarding the importance and selected components of the fourth antenatal care visit and to examine selected socio-demographic and antenatal-care-related factors associated with adequate

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knowledge among women attending primary health care centers in Al-Najaf Governorate, Iraq. The study was guided by the hypothesis that women with a higher educational level, stronger family support, and four or more ANC visits would be more likely to have adequate knowledge regarding the fourth ANC visit. In the conceptual framework of this study, adequate knowledge regarding the fourth ANC visit was treated as the main outcome. Maternal age, educational level, residence, socioeconomic status, family support, and number of ANC visits were treated as explanatory variables that may be associated with women's understanding of the visit.

Materials and Methods

Study Design and Setting

The current study was a descriptive cross-sectional study conducted in Al-Najaf Governorate, Iraq, among pregnant women attending antenatal care services at primary health care centers (PHCCs). Thirty-two PHCCs were randomly selected from PHCCs providing routine ANC services across Al-Najaf Governorate. Data collection was carried out over three months, from 12 December 2025 to 12 March 2026.

Study Population and Eligibility Criteria

The study population included pregnant women attending the selected PHCCs for antenatal care during the data-collection period. Women were eligible for inclusion if they were pregnant, attended a PHCC for ANC, agreed to participate, and were able to communicate and answer the questionnaire items. Women were excluded if they had a severe illness preventing participation, declined participation, or submitted incomplete questionnaires.

Sample Size and Sampling Technique

The sample size was estimated using Cochran's formula for cross-sectional studies:

$$n = Z^2P\,(1 - P) / d^2$$

Where n represents the required sample size, Z is the standard normal value at a 95% confidence level, P is the expected proportion of adequate knowledge, and d is the accepted margin of error. According to official statistical records, the number of live births in Najaf was 43,618. By using Cochran's formula with a 95% confidence level, 5% margin of error, and 50% response distribution, the required sample size was approximately 381 participants

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The sampling process involved two levels:

1- PHCCs were selected to cover ANC services across Al-Najaf Governorate.

2- Eligible pregnant women attending ANC clinics during the data-collection period were recruited using non-probability convenience sampling.

Operational Definitions

In this study, ANC attendance was defined as women who had attended four or more ANC visits were classified as having ≥4 ANC visits, whereas women who had attended fewer than four ANC visits were classified as having <4 ANC visits. This classification was based on the internationally used ANC4+ indicator, which defines antenatal care coverage as receiving antenatal care four or more times during pregnancy [3,4].

Adequate knowledge regarding the fourth ANC visit was defined according to the total knowledge score. Each correct answer was assigned one point, while incorrect and "I do not know" responses were assigned zero. The total knowledge score ranged from 0 to 8. Scores of 0–3 were classified as poor knowledge, 4–6 as moderate knowledge, and 7–8 as good knowledge. For inferential analysis, moderate and good knowledge were combined and classified as adequate knowledge, while poor knowledge was classified as inadequate knowledge. These knowledge cut-off points were operationally defined for the present study according to the number of questionnaire items and the scoring system.

Data Collection Tool

Data were collected using a structured interviewer-administered questionnaire developed by the researcher after reviewing relevant literature and antenatal care recommendations. The questionnaire was designed to assess pregnant women's knowledge of selected components related to the fourth ANC visit within routine PHCC-based ANC services. Each interview took approximately 12–15 minutes.

The questionnaire consisted of three main sections. The first section included sociodemographic and care-related characteristics, such as age, educational level, occupation, residence, socioeconomic status, family support, and number of ANC visits. The second section assessed knowledge regarding the fourth ANC visit. The third section assessed the participants' main source of information about ANC.

The knowledge section included eight items covering measurement of maternal weight and blood pressure, abdominal examination and fetal monitoring, laboratory investigations, nutritional counselling, prescription of supplements such as iron,

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calcium, and vitamin D, monitoring of maternal and fetal health, recognition of pregnancy danger signs, and birth preparedness counselling.

Validity and Reliability

Validity was assessed through review by six experts in maternal and child health and community medicine. The experts evaluated the questionnaire for relevance, clarity, cultural appropriateness, and coverage of the essential components of the fourth ANC visit. Suggested modifications were incorporated before starting data collection. A pilot study was conducted among 20 pregnant women who were not included in the results to assess clarity, feasibility, interview duration, and participants' understanding of the questionnaire items. The final version of the questionnaire was revised according to the pilot feedback. Reliability coefficients were not calculated, which was considered when interpreting the findings.

Ethical Considerations

Ethical approval was obtained from Najaf Health Directorate, dated 23 September 2025, numbered 6/2628, before data collection. Administrative permission was also obtained from the health authorities responsible for the selected PHCCs. Participation was voluntary, and participants were informed that they had the right to withdraw at any time.

Statistical Analysis

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Categorical variables were summarized as frequencies and percentages. The Chi-square test was used to examine bivariate associations between knowledge level and categorical variables, including age group, educational level, occupation, residence, socioeconomic status, family support, and ANC attendance category. Fisher's exact test was used when expected cell counts were small.

Univariable logistic regression was used to estimate crude odds ratios with 95% confidence intervals for factors associated with adequate knowledge. Multivariable logistic regression was not performed; therefore, the findings were interpreted as crude associations rather than independent predictors.

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Results

A total of 381 pregnant women attending antenatal care services at primary health care centers were included in the analysis. The largest proportion of participants were aged 25–29 years (28.3%), followed by those aged 20–24 years (24.1%). Most women had secondary or primary education, were not employed, and lived in urban areas. More than half of the participants had attended fewer than four ANC visits during the current pregnancy, and nearly two-thirds reported receiving family support (Table 1).

Table 1. Sociodemographic and obstetric characteristics of pregnant women

Variable	Frequency	Percentage
Age group (years)		
<20	45	11.8
20–24	92	24.1
25–29	108	28.3
30–34	64	16.8
35–39	48	12.6
≥40	24	6.3
Educational level		
Illiterate	18	4.7
Primary	133	34.9
Secondary	148	38.8
Institute	26	6.8
College and above	56	14.7
Occupation		
Not working	315	82.7
Working	66	17.3
Residence		
Urban	287	75.3
Rural	94	24.7
ANC visits during current pregnancy		
<4 visits	212	55.6
≥4 visits	169	44.4
Socioeconomic status		
Low	262	68.8

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Moderate	97	25.5
High	22	5.8
Family support		
Yes	243	63.8
No	138	36.2

Women with four or more ANC visits had higher correct responses for most knowledge items than women with fewer than four visits. The differences were statistically significant for fetal monitoring, laboratory investigations, nutritional counselling, supplementation, maternal and fetal health monitoring, danger signs, and birth preparedness. However, knowledge regarding checking weight and blood pressure did not differ significantly between the two ANC attendance groups (Table 2).

Table 2. Knowledge of fourth ANC visit components according to ANC attendance category.

	<4 ANC visits			≥4 ANC visits			χ^2	df	P-value
Knowledge item	Yes n (%)	No n (%)	Don't know n (%)	Yes n (%)	No n (%)	Don't know n (%)			
Weight and blood pressure should be checked during the fourth visit	147 (69.3)	37 (17.5)	28 (13.2)	123 (72.8)	31 (18.3)	15 (8.9)	1.76	2	0.414
Abdominal examination and fetal monitoring are performed during the fourth visit	116 (54.7)	32 (15.1)	64 (30.2)	133 (78.7)	17 (10.1)	19 (11.2)	25.62	2	<0.001
Urine and blood tests are performed during the fourth visit	97 (45.8)	22 (10.4)	93 (43.9)	142 (84.0)	3 (1.8)	24 (14.2)	59.51	2	<0.001
Nutritional counselling is provided during the fourth visit	101 (47.6)	59 (27.8)	52 (24.5)	151 (89.3)	6 (3.6)	12 (7.1)	74.23	2	<0.001
Supplements such as iron, calcium, and vitamin D are prescribed during the fourth visit	76 (35.8)	38 (17.9)	98 (46.2)	162 (95.9)	2 (1.2)	5 (3.0)	144.43	2	<0.001
The fourth visit is important for	76 (35.8)	22 (10.4)	114 (53.8)	158 (93.5)	2 (1.2)	9 (5.3)	131.86	2	<0.001

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monitoring maternal and fetal health									
Awareness of danger signs requiring emergency care during this visit	57 (26.9)	51 (24.1)	104 (49.1)	113 (66.9)	22 (13.0)	34 (20.1)	61.40	2	<0.001
Birth preparedness counselling during the fourth visit	93 (43.9)	21 (9.9)	98 (46.2)	121 (71.6)	18 (10.7)	30 (17.8)	35.62	2	<0.001

Abbreviations: ANC, antenatal care. Test used: Pearson Chi-square test. Percentages were calculated within each ANC attendance category: <4 ANC visits, n = 212; ≥4 ANC visits, n = 169.

Overall, 307 women had adequate knowledge regarding the fourth ANC visit, representing 80.5% of the study participants, while 74 women (19.5%) had inadequate knowledge (Table 3).

Table 3. Overall knowledge level regarding the fourth ANC visit.

Knowledge level	Frequency	Percentage (%)
Adequate knowledge	307	80.5
Inadequate knowledge	74	19.5

Figure 1 shows the distribution of overall knowledge level regarding the fourth ANC visit. Most participants had adequate knowledge (80.5%), whereas 19.5% had inadequate knowledge.

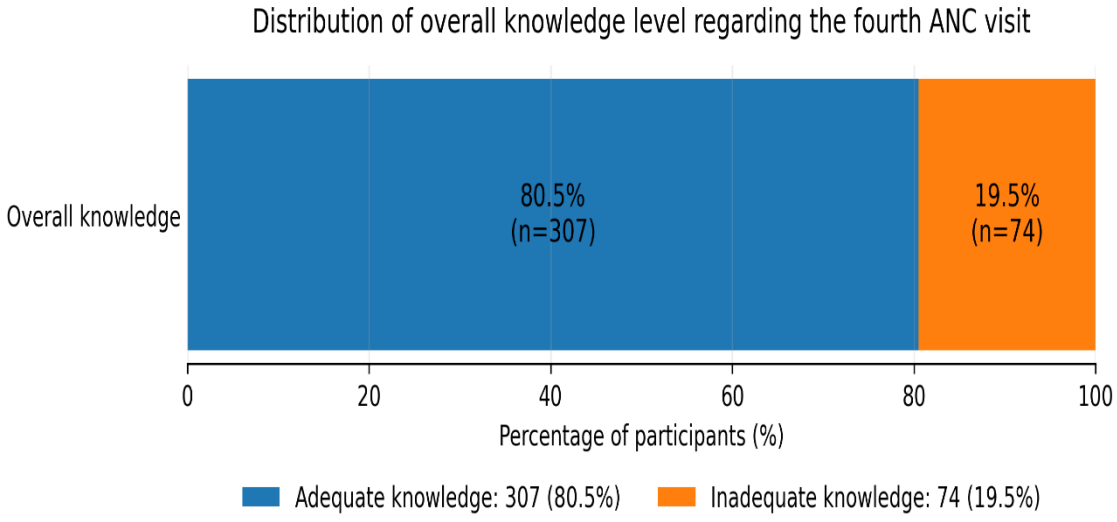

Figure 1. Distribution of overall knowledge level regarding the fourth ANC visit.

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Figure 2 shows the main sources of information regarding the fourth ANC visit. Health workers were the most frequently reported source of information (40%), followed by family/friends (35%), social media (23%), and other sources (2%).

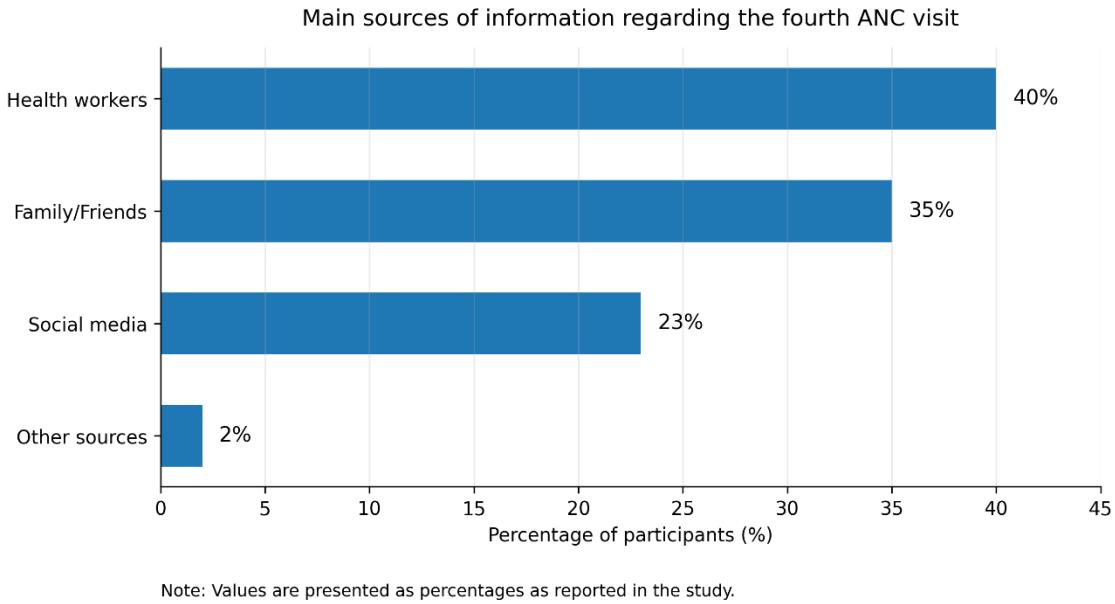

Figure 2. Main sources of information regarding the fourth ANC visit.

Bivariate analysis showed that adequate knowledge was significantly associated with educational level, occupation, family support, and number of ANC visits. Women with secondary education had the highest proportion of adequate knowledge (87.8%), while illiterate women had the lowest proportion (55.6%). Adequate knowledge was also more frequent among women who reported family support than among those without family support. Similarly, women who attended four or more ANC visits had a higher proportion of adequate knowledge than those who attended fewer than four visits.

No statistically significant association was observed between adequate knowledge and age group, residence, or socioeconomic status.

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Table 4. Factors associated with adequate knowledge regarding the fourth ANC visit among participants (n = 381)

Variable	Category	Adequate knowledge n (%)	Inadequate knowledge n (%)	χ^2	df	P-value
Age group, years	<20	34 (75.6)	11 (24.4)	2.29	5	0.807
	20–24	74 (80.4)	18 (19.6)			
	25–29	90 (83.3)	18 (16.7)			
	30–34	50 (78.1)	14 (21.9)			
	35–39	38 (79.2)	10 (20.8)			
	≥40	21 (87.5)	3 (12.5)			
Educational level	Illiterate	10 (55.6)	8 (44.4)	13.75	4	0.008
	Primary	105 (78.9)	28 (21.1)			
	Secondary	130 (87.8)	18 (12.2)			
	Institute	20 (76.9)	6 (23.1)			
	College and above	42 (75.0)	14 (25.0)			
Occupation	Not working	260 (82.5)	55 (17.5)	4.47	1	0.034
	Working	47 (71.2)	19 (28.8)			
Residence	Urban	236 (82.2)	51 (17.8)	2.03	1	0.154
	Rural	71 (75.5)	23 (24.5)			
Socioeconomic status	Low	210 (80.2)	52 (19.8)	0.50	2	0.778
	Moderate	78 (80.4)	19 (19.6)			
	High	19 (86.4)	3 (13.6)			
Family support	Yes	205 (84.4)	38 (15.6)	6.14	1	0.013
	No	102 (73.9)	36 (26.1)			
ANC visits	<4 visits	157 (74.1)	55 (25.9)	12.99	1	<0.001
	≥4 visits	150 (88.8)	19 (11.2)			

Test used: Pearson Chi-square test. Percentages were calculated within each category.

Table 5 showed univariable logistic regression was performed to estimate crude associations between selected factors and adequate knowledge. Family support and attending four or more ANC visits were associated with higher crude odds of adequate

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knowledge, while working status showed lower crude odds. These estimates were not adjusted for potential confounders.

Table **5**. Univariable logistic regression analysis of factors associated with adequate knowledge regarding the fourth ANC visit

Factor	Category	Crude OR	95% CI	P-value
Age	<25 years (Ref.)	1.00	0.70–2.00	0.519
	≥25 years	1.19		
Education	<Secondary (Ref.)	1.00	0.95–2.64	0.079
	≥Secondary	1.58		
Occupation	Not working (Ref.)	1.00	0.29–0.96	0.037
	Working	0.52		
Residence	Rural (Ref.)	1.00	0.86–2.62	0.156
	Urban	1.50		
Socioeconomic status	Low/Moderate (Ref.)	1.00	0.45–5.42	0.483
	High	1.56		
Family support	No (Ref.)	1.00	1.14–3.18	0.014
	Yes	1.90		
ANC visits	<4 visits (Ref.)	1.00	1.57–4.88	<0.001
	≥4 visits	2.77		

The outcome variable was adequate knowledge regarding the fourth ANC visit. Odds ratios are crude estimates from univariable logistic regression.

Discussion

The present study assessed pregnant women's knowledge regarding the importance and components of the fourth ANC visit among women attending PHCCs in Al-Najaf Governorate.

In this study, most pregnant women were young adult women, within the 20–29-year age group, and the largest educational categories were primary and secondary education. This pattern is comparable to a recent Iraqi cross-sectional study conducted in primary health care centers in Nasiriyah, where the mean age of pregnant women receiving ANC services was 26.5 years, indicating that PHCC-based ANC samples in Iraq commonly include women in early adulthood [9]. Most women in the present study had primary or secondary education and were not working. A similar tendency was

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reported in the Nasiriyah study, where more than half of the women were housewives, suggesting that non-working women may be more available to attend routine PHCC-based ANC services [9]. In the present study, 44.4% of participants had attended four or more ANC visits, a higher proportion than the 12.91% reported in the Nasiriyah study. This difference may reflect variation in study setting, the timing of recruitment during pregnancy, local service use, or the categorization of ANC attendance.

Table 2 showed that pregnant women who attended four or more ANC visits had significantly higher knowledge than women who attended fewer visits. The largest differences were observed in knowledge of laboratory investigations, nutritional counselling, supplementation, maternal and fetal monitoring, danger signs, and birth preparedness. Similar associations have been reported in regional and international studies. Abu-Shaheen et al. found that ANC attendance was related to women's awareness of obstetric danger signs in Saudi Arabia. At the same time, Necho and Goshu reported that ANC follow-up was associated with knowledge of pregnancy danger signs among women attending antenatal care units in Ethiopia [11,12]. Repeated ANC contact may increase women's exposure to counselling, routine procedures, and direct explanations from health workers. However, women with better prior awareness may have been more motivated to attend four or more visits.

The relatively low awareness of pregnancy danger signs deserves attention because these signs are directly related to timely care-seeking during obstetric emergencies. Similar gaps were reported in the Iraqi study from Mosul, where pregnant women attending ANC services still had incomplete awareness of warning signs during pregnancy [10]. Other findings were also observed in Jordan and Saudi Arabia, where knowledge of obstetric danger signs remained inadequate among some pregnant women despite contact with antenatal services [11,13]. This suggests that the problem may not be access to PHCCs alone, but also the way danger-sign counselling is explained and repeated. Unlike routine procedures such as blood pressure measurement, danger signs require explanation, repetition, and practical examples. In the Iraqi context, where family members may influence decisions about transport, cost, and place of care, weak understanding of danger signs may delay timely response to complications.

Birth preparedness counselling also showed weaker awareness than routine clinical procedures. This is consistent with evidence from Ethiopia, where birth preparedness and complication readiness were associated with maternal education, ANC follow-up,

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knowledge of danger signs, and service-related factors [14,15]. Birth preparedness is difficult to improve through a single counselling message because it involves planning for place of delivery, transportation, financial readiness, support persons, and emergency decisions. Therefore, counselling during the fourth ANC visit should go beyond general advice to include clear, simple, and locally relevant instructions that help women and families prepare before complications arise.

Table 3 showed that 80.5% of participants had adequate knowledge regarding the fourth ANC visit. This suggests a generally acceptable level of awareness among PHCC attendees. Overall scores may appear satisfactory while specific gaps remain in clinically important domains such as danger signs and birth preparedness. A recent Iraqi study from Baghdad on pregnant women's knowledge of neonatal danger signs reached similar findings that maternal knowledge should not be judged only by general awareness, because specific awareness may remain poorly recognized and require targeted education during antenatal and postnatal care [16]. Internationally, a 2024 systematic review on birth preparedness and complication readiness also showed that knowledge of danger signs and preparedness-related domains are closely linked with maternal readiness [14]. Therefore, the overall adequate knowledge observed in the present study should be considered encouraging but incomplete.

Table 4 showed that adequate knowledge was significantly associated with educational level, occupation, family support, and number of ANC visits. The association with education is consistent with a 2024 systematic review and meta-analysis from Africa, which reported that secondary or higher education was associated with better birth preparedness and complication readiness. Education may improve women's ability to understand counselling, ask questions during ANC, and recognize when symptoms require care-seeking [18]. Family support was associated with increased knowledge, which is relevant in settings where pregnancy-related decisions may involve husbands or other family members. A study from South Wollo, Ethiopia, noted that family support is an understudied factor in birth preparedness and complication readiness research, and showed that advice about birth preparedness and awareness of danger signs were associated with readiness for complications [15]. In the present study, family support may have helped women attend visits, remember advice, and follow recommendations.

Women who attended four or more ANC visits had higher adequate knowledge than those with fewer visits. This is consistent with evidence from Ghana, where group ANC

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improved birth preparedness and complication readiness compared with individualized care, supporting the role of repeated and structured ANC contact in strengthening preparedness messages [19].

Age, residence, and socioeconomic status were not significantly associated with adequate knowledge. This differs from a 2024 African systematic review, which reported that urban residence and education were among factors associated with birth preparedness and complication readiness [18]. A possible explanation is that our sample included only women already attending PHCCs, which may have reduced differences between urban and rural participants. The small number of women in the high socioeconomic category may also have limited the ability to detect significant differences.

Figure 2 showed that healthcare providers were the main source of information, followed by family and friends, while social media was reported by nearly one-quarter of participants. This pattern is consistent with pregnancy information-seeking literature, where health professionals, family members, friends, and online sources are commonly reported sources of information during pregnancy [17]. A Baghdad study on pregnant women's knowledge of neonatal danger signs recommended strengthening educational programs during antenatal and postnatal care, which supports the role of health facilities as key points for maternal education [16]. However, the weaker knowledge of danger signs and birth preparedness suggests that counselling by health workers may need to be more structured, repeated, and focused on emergency preparedness.

Limitations

This study has some limitations. Its cross-sectional design prevents causal interpretation; therefore, the association between ANC attendance and knowledge cannot confirm that attendance caused better knowledge. The use of non-probability convenience sampling may have introduced selection bias, as only women attending PHCCs in Al-Najaf Governorate were included, which may limit generalizability, particularly to pregnant women who do not attend ANC services. In addition, the interviewer-administered questionnaire may have been affected by social desirability and recall bias. Finally, residual confounding may remain because most analyses were bivariate and factors such as education, occupation, socioeconomic status, family support, and ANC attendance may be interrelated.

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Conclusion

The findings of this study indicate that most pregnant women attending primary health care centers in Al-Najaf Governorate had adequate knowledge regarding the importance and main components of the fourth antenatal care visit. Women who attended four or more ANC visits showed better awareness of several essential components, including maternal and fetal monitoring, laboratory investigations, nutritional counselling, and supplementation. However, important gaps remain regarding knowledge of pregnancy danger signs and birth preparedness, which are critical for timely care-seeking and prevention of pregnancy-related complications.

Recommendations

1. Integrate a standardized fourth-ANC-visit counselling checklist into PHCC practice, including danger signs, birth preparedness, supplementation adherence, and when to seek emergency care.
2. Provide brief, repeated, and culturally appropriate counselling messages during every ANC visit rather than relying on a single education session.
3. Develop official PHCC-based educational materials and social media messages to counter incomplete or inaccurate information.
4. Encourage involvement of supportive family members in counselling when acceptable to the pregnant woman.
5. Conduct future analytic studies using probability sampling and multivariable analysis to identify independent predictors of maternal knowledge and preparedness.

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