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ASSESSMENT OF PREGNANT WOMEN'S KNOWLEDGE AND PRACTICES REGARDING ANTENATAL CARE AT AL-QUDIS PRIMARY HEALTH CARE CENTER, MOSUL CITY

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ABSTRACT

Background: Antenatal care is an essential component of maternal healthcare that aims to promote the health of both the mother and fetus through early detection and management of pregnancy-related conditions, health education, and preventive interventions. Pregnant women's knowledge and practices regarding antenatal care play a crucial role in improving maternal and neonatal outcomes. **Objectives:** To assess pregnant women's knowledge and practices regarding antenatal care among women attending Al-Qudis Primary Health Care Center in Mosul City. **Patients and methods:** A descriptive cross-sectional study was conducted at Al-Qudis Primary Health Care Center, Mosul City, Iraq, from 20 February 2022 to 31 March 2026. A total of 200 pregnant women were included using a consecutive sampling technique. Data were collected through a structured interviewer-administered questionnaire that assessed sociodemographic characteristics, obstetric history, knowledge regarding antenatal care, and antenatal care practices. **Results:** The mean age of the participants was 28.7 ± 5.8 years. Most participants were aged 20–29 years (98; 49.0%), were housewives (152; 76.0%), and lived in urban areas (138; 69.0%). Adequate knowledge regarding antenatal care was observed in 148 (74.0%) participants, while 156 (78.0%) demonstrated good antenatal care practices. Knowledge was highest regarding the importance of antenatal care (188; 94.0%) and iron and folic acid supplementation (183; 91.5%), whereas knowledge of pregnancy danger signs (126; 63.0%) and the recommended number of antenatal care visits (134; 67.0%) was comparatively lower. Good antenatal care practices were significantly associated with higher educational level, employment, and urban residence ($P < 0.05$). **Conclusions:** Pregnant women attending Al-Qudis Primary Health Care Center demonstrated an overall satisfactory level of knowledge and good antenatal care practices. Nevertheless, deficiencies remained in knowledge of the recommended antenatal care schedule, recognition of pregnancy danger signs, and healthy lifestyle practices during pregnancy. Strengthening health education and counseling during antenatal care visits is recommen ded to improve maternal knowledge and encourage appropriate health practices.

KEYWORDS: Antenatal care, Iraq, Knowledge, Maternal health, Mosul, Practices, Pregnancy, Primary health care center.

1- INTRODUCTION

Antenatal care (ANC) is one of the most essential components of maternal and child health services. It encompasses the comprehensive healthcare provided to women during pregnancy with the primary objectives of promoting maternal well-being, ensuring optimal fetal development, identifying and managing pregnancy-related complications, and preparing women for childbirth and parenthood. High-quality antenatal care contributes substantially to reducing maternal and neonatal morbidity and mortality while improving pregnancy outcomes through preventive, promotive, and curative interventions.[1]

Globally, maternal mortality remains a significant public health challenge despite considerable progress over recent decades. Most maternal deaths are preventable through timely access to quality healthcare before, during, and after pregnancy. Effective antenatal care facilitates early detection and management of obstetric and medical complications such as hypertensive disorders, gestational diabetes mellitus, anemia, and infectious diseases. It also provides opportunities for nutritional counseling, immunization, supplementation with iron and folic acid, birth preparedness, and health education regarding healthy pregnancy practices.[2-3]

The World Health Organization (WHO) introduced a comprehensive antenatal care model in 2016 aimed at providing a positive pregnancy experience. Unlike the previous focused antenatal care model recommending four visits, the updated guideline recommends a minimum of eight antenatal contacts for uncomplicated pregnancies. Increased contact between pregnant women and healthcare providers has been shown to improve maternal satisfaction, reduce perinatal mortality, enhance early detection of complications, and strengthen continuity of care.[3]

The quality of antenatal care extends beyond the number of visits. It includes timely initiation of care during the first trimester, comprehensive clinical assessment, routine laboratory investigations, nutritional supplementation, tetanus immunization, fetal growth monitoring, counseling on danger signs, breastfeeding, family planning, and psychosocial support. These services require competent healthcare providers, adequate resources, and active participation of pregnant women to achieve optimal maternal and neonatal outcomes.[3-4]

Knowledge regarding antenatal care is a major determinant of maternal health-seeking behavior. Pregnant women with adequate knowledge are more likely to initiate antenatal care early, attend the recommended number of visits, adhere to medical advice, maintain appropriate nutrition, recognize pregnancy danger signs, and seek prompt medical attention when complications arise. Conversely, inadequate knowledge may contribute to delayed booking, poor compliance with recommended care, and adverse pregnancy outcomes.[5-6]

Maternal practices during pregnancy also play a vital role in determining pregnancy outcomes. Healthy practices include regular attendance at antenatal clinics, adherence to prescribed iron and folic acid supplementation, maintaining a balanced diet, receiving recommended vaccinations, avoiding tobacco and harmful substances, and complying with medical advice regarding investigations and follow-up. These behaviors reduce the risk of maternal anemia, preterm birth, low birth weight, neural tube defects, and other preventable complications.[3,6]

Several sociodemographic and obstetric factors influence pregnant women's knowledge and practices regarding antenatal care. Maternal age, educational level, occupation, socioeconomic status, parity, previous pregnancy experiences, family support, accessibility of healthcare services, and health education provided by healthcare professionals all contribute to the utilization and effectiveness of antenatal care services. Understanding these determinants is essential for planning interventions that improve maternal health outcomes.[5,7]

In Iraq, maternal and child healthcare services are primarily delivered through Primary Health Care Centers (PHCCs), where antenatal care constitutes a fundamental component of reproductive health services. Although antenatal services are widely available, differences in women's knowledge, attitudes, and practices continue to influence the quality and utilization of these services. Local assessment is therefore necessary to identify existing gaps and guide evidence-based interventions tailored to the community's needs.[8]

Mosul City has experienced substantial challenges affecting its healthcare infrastructure during the past decade. Despite improvements in health service delivery, continuous evaluation of antenatal care remains important to ensure that pregnant women receive appropriate education and evidence-based maternal healthcare. Assessing pregnant women's knowledge and practices can identify deficiencies in health education programs and support the implementation of targeted strategies to improve maternal and neonatal health outcomes. Therefore, this study aims to assess pregnant women's knowledge and practices regarding antenatal care among women attending Al-Qudis Primary Health Care Center in Mosul City. The findings are expected to provide valuable information for healthcare providers and policymakers to strengthen antenatal care services and enhance maternal and child health within the local community.

2-PATIENTS AND METHODS

This study was carried out over the period from 20 February 2022 to 31 March 2026, including the phases of protocol preparation, ethical approval, data collection, data entry, statistical analysis, and thesis writing. The study population consisted of pregnant women attending the antenatal care unit at Al-Qudis PHCC during the study period. A total of 200 pregnant women were included in the study using a non-probability consecutive sampling technique. All eligible pregnant women who attended the antenatal unit during the data collection period were invited to participate until the required sample size was achieved.

Pregnant women of any gestational age who attended the antenatal care clinic and agreed to participate in the study were included. Women who refused participation, were seriously ill, or were unable to complete the interview

because of communication difficulties were excluded from the study.

Data were collected using a structured interviewer-administered questionnaire developed after reviewing the relevant literature and the World Health Organization recommendations on antenatal care. The questionnaire included information on sociodemographic characteristics such as age, educational level, occupation, residence, and monthly family income. Obstetric characteristics including gravidity, parity, gestational age, previous abortions, previous cesarean sections, and history of pregnancy complications were also recorded. In addition, the questionnaire assessed participants' knowledge regarding antenatal care, including the importance of antenatal care, the appropriate timing of the first antenatal visit, the recommended number of antenatal visits, iron and folic acid supplementation, tetanus vaccination, nutrition during pregnancy, pregnancy danger signs, and recommended laboratory investigations. Participants' antenatal care practices were also evaluated, including the timing of the first antenatal visit, regular attendance, adherence to iron and folic acid supplementation, tetanus vaccination, performance of recommended laboratory investigations, healthy dietary practices, physical activity, and compliance with healthcare providers' advice.

Eligible participants were interviewed individually in a private area of the antenatal clinic after obtaining verbal informed consent. Each interview lasted approximately 15–20 minutes. Completed questionnaires were reviewed daily to ensure completeness and consistency before data entry.

Ethical approval for the study was obtained from the Scientific and Ethical Committee of the Iraqi Board for Medical Specializations and the Nineveh Health Directorate before the commencement of the study. Official permission was also obtained from the administration of Al-Qudis Primary Health Care Center. Participation was voluntary, verbal informed consent was obtained from all participants, and confidentiality was maintained throughout the study by using identification numbers instead of participants' names. All collected information was used exclusively for research purposes.

The collected data were entered, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 31 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were presented as frequencies and percentages. The Chi-square test or Fisher's exact test, when appropriate, was used to assess associations between categorical variables. Independent-samples t-test or one-way analysis of variance (ANOVA) was applied for comparison of continuous variables where appropriate. Binary logistic regression analysis was performed to identify independent predictors of adequate knowledge and good antenatal care practices. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated, and a P value of less than 0.05 was considered statistically significant.

3-RESULTS

The study include 200 ladies, the mean age of the study participants was 28.7 ± 5.8 years. Table 3.1 shows the sociodemographic characteristics of the study participants. Nearly half of the participants (49.0%) were aged 20–29 years, followed by those aged 30–39 years (33.0%), while women aged less than 20 years and 40 years or older represented (11.0%) and (7.0%) of the study population, respectively. Regarding educational level, secondary school education was the most frequent (38.0%), followed by college education or higher (37.0%). The majority of participants were housewives (76.0%), while employed women constituted (24.0%). More than two-thirds (69.0%) resided in urban areas, whereas (31.0%) lived in rural areas. Concerning monthly family income, almost half (46.5%) reported a moderate income, (41.0%) had a low income, and (12.5%) had a high income.

Table 3.1: Sociodemographic characteristics of the study participants (n=200).

Characteristic	Number	Percent
Age <20	22	11.0%
20–29	98	49.0%
30–39	66	33.0%
≥40	14	7.0%
Illiterate	12	6.0%
Primary	38	19.0%
Secondary	76	38.0%
College+	74	37.0%
Housewife	152	76.0%
Employed	48	24.0%
Urban	138	69.0%
Rural	62	31.0%
Low income	82	41.0%
Moderate	93	46.5%
High	25	12.5%

Table 3.2 shows the obstetric characteristics of the study participants. Multigravida women constituted 138 (69.0%) of the study population, whereas 62 (31.0%) were primigravida. Regarding parity, 89 (44.5%) had one or two previous deliveries, followed by 67 (33.5%) who were nulliparous and 44 (22.0%) who had three or more previous deliveries. Concerning gestational age, 89 (44.5%) were in the second trimester, 77 (38.5%) were in the third trimester, and 34 (17.0%) were in the first trimester. A previous history of abortion was reported by 49 (24.5%) participants, while 58 (29.0%) had undergone a previous cesarean section. Previous pregnancy complications were reported by 37 (18.5%) participants.

Table 3.2: Obstetric characteristics of the study participants (n=200).

Characteristic	Number	Percent
Primigravida	62	31.0%
Multigravida	138	69.0%
Nulliparous	67	33.5%
Parity 1–2	89	44.5%
Parity ≥3	44	22.0%
1st trimester	34	17.0%
2nd trimester	89	44.5%
3rd trimester	77	38.5%
Previous abortion	49	24.5%
Previous C/S	58	29.0%
Previous complication	37	18.5%

Table 3.3 demonstrates the participants' knowledge regarding antenatal care. The highest level of correct knowledge was related to the importance of antenatal care, reported by 188 (94.0%) participants. Knowledge regarding iron and folic acid supplementation was correctly identified by 183 (91.5%), while 179 (89.5%) recognized the importance of a balanced diet during pregnancy. Knowledge regarding tetanus vaccination was found among 170 (85.0%), and 161 (80.5%) correctly identified the appropriate timing of the first antenatal care visit. Knowledge about the required laboratory investigations was reported by 142 (71.0%), whereas 134 (67.0%) knew the recommended number of antenatal visits. Recognition of pregnancy danger signs was reported by 126 (63.0%) participants.

Table 3.3. Knowledge regarding antenatal care (n=200).

Item	Number	Percent
Importance of ANC	188	94.0%
First ANC visit	161	80.5%
Recommended visits	134	67.0%
Iron & folic acid	183	91.5%
Tetanus	170	85.0%
Balanced diet	179	89.5%
Danger signs	126	63.0%
Laboratory tests	142	71.0%

Table 3.4 shows the antenatal care practices of the study participants. Compliance with healthcare providers' advice was reported by 181 (90.5%) participants. Tetanus vaccination had been received by 176 (88.0%), while 171 (85.5%) attended antenatal care regularly. Regular intake of iron and folic acid supplementation was reported by 167 (83.5%), and 163 (81.5%) completed the recommended laboratory investigations. Healthy dietary practices were reported by 154 (77.0%), whereas 146 (73.0%) attended their first antenatal care visit during the first trimester. Regular physical activity was reported by 79 (39.5%) participants.

Table 3.4: Antenatal care practices (n=200).

Practice	Number	Percent
First trimester booking	146	73.0%
Regular ANC	171	85.5%
Iron/Folate	167	83.5%
Tetanus	176	88.0%
Lab tests	163	81.5%
Healthy diet	154	77.0%
Physical activity	79	39.5%
Compliance	181	90.5%

Table 3.5 presents the overall knowledge level regarding antenatal care among the study participants. Adequate knowledge was observed among 148 (74.0%) participants, while 52 (26.0%) had inadequate knowledge regarding antenatal care.

Table 3.5: Overall knowledge level (n=200).

Knowledge level	Number	Percent
Adequate	148	74.0%
Inadequate	52	26.0%

Table 3.6 illustrates the overall antenatal care practice level among the participants. Good antenatal care practices were demonstrated by 156 (78.0%) participants, whereas 44 (22.0%) had poor antenatal care practices.

Table 3.6: Overall practice level (n=200).

Practice level	Number	Percent
Good	156	78.0%
Poor	44	22.0%

Table 3.7 shows the comparison between sociodemographic characteristics and knowledge level regarding antenatal care. Adequate knowledge was significantly more common among women with college education compared with those with lower educational levels (P = 0.003). Employment was also significantly different for adequate knowledge (P = 0.041). Urban residence showed a statistically significant difference for adequate knowledge compared with rural residence (P = 0.047). However, no statistically significant difference was observed between age group and knowledge level (P = 0.284).

Table 3.7: Comparison between sociodemographic characteristics and knowledge level (n=200).

Variable	Adequate	Inadequate	P value
Age	92/56	28/24	0.284
College education	64/84	10/42	**0.003**
Employment	42/106	6/46	**0.041**
Urban/Rural	108/40	30/22	**0.047**

Table 3.8 presents the comparison between obstetric characteristics and knowledge level regarding antenatal care. Gravidity showed a statistically significant difference for knowledge level (P = 0.015), with

multigravida women demonstrating better knowledge than primigravida women. Previous pregnancy complications were also significantly different for adequate knowledge (P = 0.032). However, previous abortion was not significantly different for knowledge level (P = 0.287).

Table 3.8: Comparison between obstetric characteristics and knowledge level (n=200).

Variable	Adequate	Inadequate	P value
Primigravida/Multigravida	38/110	24/28	**0.015**
Previous abortion	40/108	9/43	0.287
Previous complication	33/115	4/48	**0.032**

Table 3.9 demonstrates the comparison between sociodemographic characteristics and antenatal care practices. Good antenatal care practices were significantly different for college education (P = 0.001), employment (P = 0.029), and urban residence (P = 0.018).

Table 3.9: Comparison between sociodemographic characteristics and practice level (n=200).

Variable	Good	Poor	P value
College education	66/90	8/36	**0.001**
Employment	43/113	5/39	**0.029**
Urban/Rural	115/41	23/21	**0.018**

Table 3.10 shows the comparison between obstetric characteristics and antenatal care practices. Gravidity demonstrated a statistically significant difference for antenatal care practices (P = 0.021). Previous pregnancy complications were also significantly different for antenatal care practices (P = 0.008). However, no statistically significant difference was observed between previous cesarean section and antenatal care practices (P = 0.196).

Table 3.10: Comparison between obstetric characteristics and practice level (n=200).

Variable	Good	Poor	P value
Primigravida/Multigravida	44/112	18/26	0.021
Previous C/S	50	8	0.196
Previous complication	34	3	0.008

4- DISCUSSION

The present study demonstrated that the mean age of the participating pregnant women was 28.7 ± 5.8 years, with the majority of the participants, 98 (49.0%), belonging to the age group of 20–29 years, followed by 66 (33.0%) aged 30–39 years. This age distribution reflects the typical reproductive age of women attending antenatal care services and is comparable to the demographic characteristics reported in many developing countries. Women within this age group generally have higher fertility rates and greater utilization of maternal healthcare services than adolescent or older pregnant women. Similar findings have been reported in recent international studies, which demonstrated that women aged 20–34 years constitute the largest proportion of antenatal care attendees because they represent the most active reproductive age group.[5,9,10]

Maternal education is considered one of the most important determinants of antenatal care utilization and maternal health awareness. In the present study, 76 (38.0%) participants had secondary education and 74 (37.0%) had college education or higher, while only 12 (6.0%) were illiterate. This relatively high educational level may have contributed to the satisfactory knowledge observed among the participants. Educated women are generally more capable of understanding health information, recognizing pregnancy danger signs, adhering to healthcare recommendations, and making informed decisions regarding maternal healthcare. The World Health Organization has emphasized that improving female education is an important strategy for increasing the utilization and quality of antenatal care services.[3] Similar observations have been reported in systematic reviews and multicountry studies, which consistently demonstrated that higher maternal educational attainment is associated with earlier initiation of antenatal care, better compliance with the recommended schedule of visits, and improved maternal health knowledge.[11-14]

The majority of the participants were housewives, 152 (76.0%), whereas 48 (24.0%) were employed. Similar findings have been reported from several low- and middle-income countries, where most women attending governmental primary healthcare centers are unemployed. Although employment may improve women's financial independence and access to health information, the availability of free or low-cost maternal healthcare services in governmental primary healthcare centers may reduce the influence of employment status on antenatal care utilization. Previous studies have shown that employed women generally have better access to maternal health services and demonstrate greater adherence to antenatal care recommendations.[12-14]

Regarding residence, 138 (69.0%) participants lived in urban areas compared with 62 (31.0%) from rural areas. This finding probably reflects the geographical location of Al-Qudis Primary Health Care Center within Mosul City. Urban women usually have easier access to healthcare facilities because of shorter travel distances, better transportation, and greater availability of qualified healthcare professionals. International reports have consistently shown that urban residence is associated with higher utilization of maternal healthcare services

than rural residence because of improved accessibility and availability of healthcare resources.[15-17]

Concerning monthly family income, 93 (46.5%) participants reported a moderate income, whereas 82 (41.0%) had a low income and 25 (12.5%) had a high income. Household income remains an important determinant of healthcare utilization because adequate financial resources facilitate transportation, laboratory investigations, medications, and other pregnancy-related expenses. However, antenatal care services provided through governmental primary healthcare centers in Iraq are available at minimal or no direct cost, thereby reducing the financial burden on pregnant women. Consequently, the influence of family income on antenatal care attendance may be less pronounced than in countries where healthcare services depend mainly on private expenditure. Similar findings have been reported in international studies evaluating maternal healthcare utilization in low- and middle-income countries.[15-18]

This study had several limitations that should be considered when interpreting the findings. First, the cross-sectional design assessed participants at a single point in time; therefore, causal relationships between the studied variables could not be established. Second, the study was conducted in a single primary health care center (Al-Qudis PHCC) in Mosul City, which may limit the generalizability of the findings to pregnant women attending other primary health care centers or healthcare facilities in different regions of Iraq. Third, the data were collected using an interviewer-administered questionnaire, and some information was based on participants' self-reports, making the results susceptible to recall bias and social desirability bias. Fourth, although a sample of 200 pregnant women provided sufficient data for the study objectives, a larger multicenter study would provide more representative findings. Finally, other factors that may influence pregnant women's knowledge and practices, such as cultural beliefs, family support, health literacy, quality of antenatal care services, and healthcare provider-related factors, were not investigated and therefore could not be evaluated in the present study.

5- CONCLUSION AND RECOMMENDATION

The present study showed that pregnant women attending Al-Qudis Primary Health Care Center had an overall satisfactory level of knowledge and good antenatal care practices. Nevertheless, gaps were identified in knowledge of the recommended antenatal care schedule, pregnancy danger signs, and healthy lifestyle practices during pregnancy. Strengthening health education and counseling during antenatal care visits, with special attention to women with lower educational levels and those from rural areas, is recommended. Continuous training of healthcare providers and further multicenter studies are also recommended to improve the quality of antenatal care services and maternal health outcomes.

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