

## Assessment of Pregnant Women's Knowledge and Practices Regarding Warning Signs of Pregnancy in Baghdad

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### Abstract

**Background:** Pregnancy warning signs are important indicators of maternal and fetal complications. Early recognition of these signs and seeking appropriate medical care can reduce maternal and neonatal morbidity and mortality. **Objective:** This study aimed to assess pregnant women's knowledge and practices regarding warning signs of pregnancy attending primary healthcare centers in Baghdad, Iraq. **Methodology:** A cross-sectional study was conducted among 384 pregnant women attending primary healthcare centers in Baghdad governorate from September 2025 to April 2026. Data were collected through face-to-face interviews using a structured questionnaire consisting of socio-demographic characteristics, knowledge, source of information, and practices regarding warning signs of pregnancy. Data were analyzed using SPSS version 2019. Descriptive statistics and chi-square tests were used, and a p-value  $\leq 0.05$  was considered statistically significant. **Results:** Most participants were aged 20–29 years (49.7%), had secondary education (45.3%), and were housewives (70.6%). High awareness was observed for warning signs such as vaginal bleeding or leakage of fluid (89.2%) and reduced fetal movement (82.1%). However, lower awareness was found for jaundice (43.0%), decreased urine output (40.1%), and severe itching (38.5%). The overall knowledge level was moderate among 45.8% of participants, while 29.2% had good knowledge. Most mothers (77.6%) reported immediately going to the hospital when warning signs appeared. Statistically Significance found among knowledge level, age of participants, educational level, and antenatal care visits ( $p \leq 0.05$ ). **Conclusions:** Pregnant women exhibit an acceptable knowledge level with good emergency response

practices to warning signs of pregnancy. Both educational level and attendance at antenatal care are significantly associated with maternal knowledge. Mothers' education programs are recommended to increase awareness.

**Keywords:** Pregnancy Warning Signs, Pregnant Women, Antenatal Care, Maternal Health, Primary Health Care Center

## Introduction

Pregnancy is an important period that needs appropriate healthcare to protect both the mother and the fetus. Despite worldwide improvements in maternal health, maternal mortality is still a serious public health issue, especially in low- and middle-income countries. In 2020, about 287,000 women died from pregnancy-related complications, the majority of which were avoidable [1]. Reducing maternal mortality is still a major global priority, with the Sustainable Development Goals seeking to lower it to fewer than 70 per 100,000 live births by 2030 [2].

In Iraq, maternal health statistics have gradually improved over recent years; however, there are still many obstacles to overcome, and remain higher than desired levels, indicating ongoing gaps in healthcare access or quality [3]. Furthermore, pregnancy outcomes are still influenced by socioeconomic determinants and differences in maternal health services [4]. Largely, maternal deaths are preventable, with direct obstetric causes such as haemorrhage, hypertension, and infections accounting for about 75% of these deaths. Therefore, identifying warning symptoms early in pregnancy is important to avoiding complications [5]. Some common warning signs include heavy vaginal bleeding, severe headache, blurred vision, swelling of the face and hands, widespread abdominal pain, cramps, fever, leakage of amniotic fluid, and decreased fetal movement. It is important to recognize these signs because delayed intervention can have serious consequences for both mother and fetus [6].

Knowledge of common warning signs is a crucial issue that influences women's health-seeking behaviour. Women who are aware of warning indicators are more likely to seek prompt medical care, which leads to reducing delays that contribute to maternal and neonatal mortality [4]. However, Research carried out in developing nations, including Iraq, reveals that awareness is frequently insufficient, especially concerning less apparent symptoms like jaundice, reduced urine output, and unusual discharge [7][8]. Recognizing warning signs during pregnancy is a fundamental component of

maternal health education. A good understanding of these warning signs is closely linked to timely access to healthcare providers and the adoption of optimal preventive behaviors. Conversely, a lack of knowledge has been found to be a major cause of delayed medical care and an increased risk of pregnancy complications [9][10].

Furthermore, despite a significant proportion of births in Iraq being overseen by qualified healthcare professionals, there are still deficiencies in the quality of antenatal care and health education available to expectant mothers [11]. Obstacles, including financial limitations, challenges with transportation, and dependence on familial decision-making, can hinder prompt access to healthcare services, consequently elevating the likelihood of complications. Studies from some developing countries have shown that pregnant women's knowledge of danger signs during pregnancy is insufficient. For example, in studies conducted in Ethiopia, Nigeria, and Jordan (with pregnant women receiving antenatal care), a significant proportion of participants were unable to recognize key emergency warning signs. These findings suggest that knowledge gaps persist among women even with regular access to health services [6] [10] [12]. A good understanding of warning signs is as crucial as knowledge itself for preventing pregnancy and childbirth complications. Recommended strategies include regular antenatal care visits, seeking specialized medical care immediately upon the appearance of any risk signs, and following the recommendations of healthcare providers. However, several factors, such as educational level, socioeconomic status, cultural beliefs, and access to healthcare services, can influence the response to warning signs [13].

Antenatal care services provide a vital channel for raising awareness of risk signs during pregnancy and preparing for emergencies. Prenatal visits, which are relatively effective, have proven their ability to promote awareness and encourage timely healthcare seeking, thus contributing to improved maternal and newborn health. Therefore, assessing pregnant women's knowledge and practices regarding warning signs during pregnancy can provide insight into existing gaps for identifying effective interventions to improve maternal health [1] [12]. This study aimed to assess the levels of pregnant women's knowledge and practices regarding warning signs of pregnancy who attend the primary health care center, which are essential for identifying gaps and improving maternal health interventions. Although numerous studies on maternal health have been conducted in Iraq, evidence regarding pregnant women's knowledge

and practices concerning pregnancy warning signs in primary healthcare centers in Baghdad is limited. Therefore, this study was conducted to address this gap.

## Methods

**Study Design and Sample Size:** A cross-sectional study conducted in primary health care centres in Baghdad, Iraq, during the period from [9/2025 to 4 2026] included 12 primary health care centers. The sample size was calculated by using the Cochran formula and estimated to be 384 pregnant women, assuming a 95% confidence level and a 5% margin of error. While the sampling technique was convenient used to recruit eligible

## Inclusion and Exclusion Criteria

- **Inclusion criteria:** Pregnant women of any gestational age attending to PHCCs and willing to participate.
- **Exclusion criteria:** Women who appeared ill and refused to participate.

## Data Collection

Data were collected by using a questionnaire through face-to-face interviews with pregnant women attending PHCCs. Each interview lasted approximately 15–20 minutes. The questionnaire consists of four sections:

1. Socio-demographic characteristics
2. Knowledge (general knowledge and knowledge of warning signs of pregnancy)
3. Source of information on warning signs
4. Practices on warning signs

## Scoring

**Knowledge Scoring:** Correct answer was scored as 1, while incorrect and don't know answers were scored as 0. The total knowledge was calculated

- Good knowledge:  $\geq 75\%$
- Moderate knowledge: 50–74%
- Poor knowledge:  $< 50\%$

**Practice Scoring:** Practices were assessed by using a three-point Likert scale:

- Always = 3
- Sometimes = 2
- Never = 1

The total practice score was calculated as:

- Good practice:  $\geq 75\%$
- Moderate practice: 50–74%
- Poor practice:  $< 50\%$

### Statistical Analysis:

Data were analyzed by using the Statistical Package for the Social Sciences (SPSS) version [2019]. Descriptive statistics included frequencies and percentages for categorical variables. While Inferential statistics included the chi-square test, a p-value of  $\leq 0.05$  was considered statistically significant.

### Ethical Approval

Ethical approval was obtained from the Ethics Review Committee of the College of Medicine, Iraqi University, Iraq (IRB 2025). Written/oral informed consent was obtained from all participants prior to data collection. Confidentiality and anonymity were maintained throughout the study.

## Results

### Socio-demographic Characteristics

Most participants were aged 20–29 years (49.7%). Most participants had secondary education (45.3%) and housewives (70.6%). The majority of mothers lived in urban areas (65%). Regarding gestational age, most of them were in the second trimester 40.8%. Additionally, 44.7% of mothers had 2–3 pregnancies. Most participants attended (3–4) antenatal visits.

Table 1: Socio-demographic Characteristics

<i>Variable</i>	<i>Category</i>	<i>n</i>	<i>%</i>
<i>Age</i>	<20	101	26.3
	20–29	191	49.7
	30–39	87	22.7
	≥40	5	1.3
<i>Education</i>	Illiterate	3	0.8
	Primary	77	20
	Secondary	174	45.3
	College or higher	130	33.9
<i>Occupation</i>	Housewife	271	70.6
	Employee	69	18
	Student	28	7.3
<i>Residence</i>	Urban	249	65.0
	Rural	135	35.0
<i>Gestational age</i>	First trimester	92	24.0
	Second trimester	157	40.8
	Third trimester	135	35.2
<i>Pregnancies</i>	First	118	30.8
	2–3	172	44.7
	≥4	94	24.5
<i>ANC visits</i>	First visit	127	33.2
	Second visit	146	38.1
	3–4	82	21.1
	>4	29	7.6

**General Knowledge**

Most mothers (84.0%) should know the warning signs. About 63.0% believed the mother should know the complications of warning signs. The majority agreed that untreated complications might harm the baby (80.7%) and lead to maternal mortality (74.2%).

Table 2: General Knowledge

Question	Yes n (%)	No n (%)	Don't know n (%)
A mother should know the warning signs	320 (84.0)	28 (7.3)	35 (8.9)
A mother should know the complications of warning signs	242 (63.0)	77 (19.8)	65 (17.2)
A complication that harms the baby	310 (80.7)	31 (8.1)	43 (11.2)
A complication can lead to maternal death	285 (74.2)	47(12.0)	52 (13.8)

### Knowledge of Warning Signs

The majority of mothers showed high awareness of common signs like vaginal bleeding and fluid leakage (89.2%), and most mothers correctly identified reduced fetal movement (82.1%) as a warning sign. More than half of mothers answered correctly that severe abdominal pain (78.6%) and convulsions (76.1%) were warning signs.

Answers that showed moderate knowledge were observed for symptoms that included headache, fever, blurred vision and swelling of the face or hands (72.0%, 69.4%, 67.4%, 63.4%), respectively. In contrast, lower knowledge was observed for other warning signs such as jaundice, decreased urination and severe itching (43.0%), (40.1%), (38.5%) respectively.

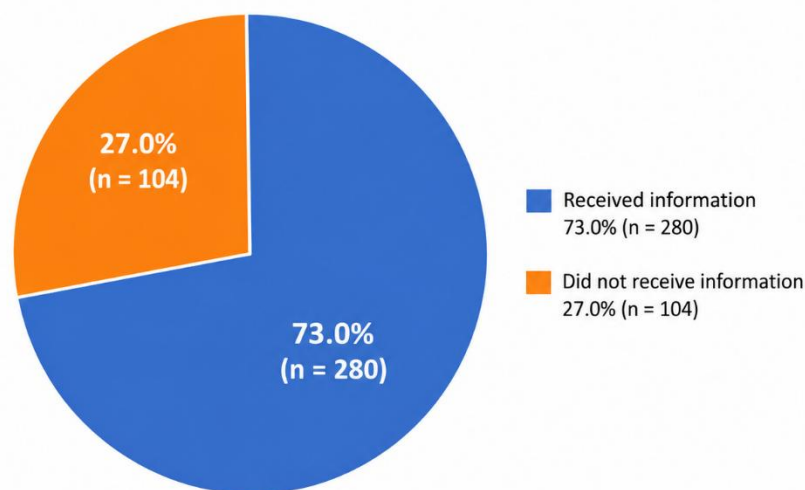
Table 3: Knowledge of Warning Signs

Warning Sign	Yes (%)	No (%)	Don't know (%)
Vaginal bleeding or leakage of fluid is a warning sign	341 (89.2)	20 (5.0)	23 (5.8)
Severe abdominal pain is a warning sign	301 (78.6)	39 (10.2)	43 (11.2)
Severe headache as a warning sign	275 (72.0)	50 (13)	59 (15.4)
Blurred vision as a warning sign	259(67.4)	74(19.3)	51 (13.3)
Swelling of the face or hands is a warning sign	244 (63.4)	61 (15.8)	79 (20.8)
Persistent vomiting is a warning sign	199 (51.7)	83 (21.5)	102 (26.8)
High fever is a warning sign	265 (69.4)	50 (12.8)	69 (17.8)

Reduced fetal movement is a warning sign	314 (82.1)	29 (7.4)	41 (10.5)
Convulsions are a warning sign	290 (76.1)	37 (9.4)	56 (14.5)
Burning urination is a warning sign	220 (57.6)	74 (19.1)	90 (23.3)
Difficulty breathing is a warning sign	247 (64.7)	60 (15.4)	77 (19.9)
Dizziness or fainting is a warning sign	235 (61.5)	62 (15.9)	87 (22.6)
Severe back pain or Chest pain is a warning sign	186(48.7)	93 (24.0)	105 (27.3)
Jaundice is a warning sign	164 (43.0)	104 (26.9)	116 (30.1)
Decreased urine is a warning sign	153(40.1)	112 (29.0)	119 (30.99)
Severe itching	147 (38.5)	114 (29.5)	123 (32.0)

### Source of Information

Most participants (73.0%) received information about the warning signs of pregnancy, while 27.0% reported not receiving such information. Nurses and midwives were the main source of information (57.0%), followed by physicians (37.2%). (Figure 1 and Table 4).



Category	Frequency (n)	Percentage (%)
Received information	280	73.0
Did not receive information	104	27.0
<b>Total</b>	<b>384</b>	<b>100.0</b>

Note. n = 384 pregnant women.

Figure 1. Distribution of Participants According to Receipt of Information About Warning Signs of Pregnancy.

Table 4: Main Sources of Information About Warning Signs of Pregnancy Among Participants\*

Source	n	%
Doctors	143	37.2%
Nurse or Midwife	219	57.0%
Family	102	26.6%
Friends	21	5.5%
Social media	50	13.0%
TV or Radio	11	2.9%

\*Multiple responses were allowed.

The total knowledge level regarding warning signs of pregnancy was moderate (45.8%), while good knowledge constituted 29.2%.

Table 5: Knowledge Levels among Antenatal Mothers

Knowledge Level	Frequency (n)	Percentage (%)
Poor	96	25.0
Moderate	176	45.8
Good	112	29.2

### Practices Regarding Warning Signs

Most mothers (77.6%) answered that they should immediately attended to the hospital if warning signs occur. More than half of the mothers (52.1%) sometimes go to antenatal care PHCCs. Regarding consultation practices, 62.8% of mothers answered sometimes consulted their doctors while 67.2% of them always consulted their family. Additionally, 73.2% answered always using home care.

Table 6: Practices Toward Danger Signs of Pregnancy

Practice Category	Always n (%)	Sometimes n (%)	Never n (%)
Immediately go to the hospital for a visit	298 (77.6%)	80 (20.8%)	6 (1.6%)
Go to ANC at PHCCs	112 (29.2%)	200 (52.1%)	72 (18.8%)
Doctor consultation	104 (27.1%)	241 (62.8%)	39 (10.2%)
Family consultation	258 (67.2%)	81 (21.1%)	9 (2.3%)
Home remedies or traditional care	281 (73.2%)	95 (24.7%)	8 (2.1%)

A significant association was found between knowledge level and age of mothers, educational level and number of antenatal care visits at p value ( $p = 0.021$ ), ( $p = 0.002$ ), ( $p < 0.001$ ), respectively.

Table 7: Association between Selected Variables and Knowledge

Variable	Category	Poor n (%)	Moderate n (%)	Good n (%)	P-value
Age (years)	<20	18 (47.4)	15 (39.5)	5 (13.1)	0.021*
	20–29	38 (19.8)	96 (50.0)	58 (30.2)	
	30–39	29 (24.0)	51 (42.1)	41 (33.9)	
	≥40	11 (34.4)	14 (43.7)	7 (21.9)	
Education	Illiterate	28 (60.9)	15 (32.6)	3 (6.5)	<0.001*
	Primary	33 (37.5)	41 (46.6)	14 (15.9)	
	Secondary	24 (18.2)	69 (52.3)	39 (29.5)	
	College or higher	9 (9.5)	39 (41.1)	47 (49.4)	
	Postgraduate	2 (9.1)	12 (54.5)	8 (36.4)	
ANC visits	None	16 (55.2)	10 (34.5)	3 (10.3)	0.002*
	1–2	29 (35.8)	39 (48.1)	13 (16.1)	
	3–4	34 (23.3)	71 (48.6)	41 (28.1)	
	>4	17 (13.4)	56 (44.1)	54 (42.5)	

## Discussion

In the present study, a significant portion of mothers, specifically 50.1%, were within the age range of 20 to 29 years, identifying this group as the most active in terms of reproduction. This finding aligns with earlier research indicating that a majority of pregnant women are typically found in this age bracket [5]. Furthermore, it was noted that 70.8% of the respondents were housewives, which is consistent with data from studies conducted in Iraq that reveal many pregnant women are not engaged in formal employment [8]. The findings indicated that a considerable 84.1% of participants understood the significance of warning signs during pregnancy, while 80.7% and 74.2% recognized the associated risks for both the mother and the baby, respectively. These results are similar to other studies suggesting that pregnant women generally possess fundamental awareness regarding potential complications during pregnancy [4].

However, only 52.5% were able to correctly identify that warning signs vary throughout different stages of pregnancy. This aligns with previous research highlighting gaps in comprehensive understanding regarding maternal health topics [5], suggesting that their knowledge may be more superficial than thorough.

A high level of awareness was noted concerning vaginal bleeding (89.3%) and reduced fetal movement (82.2%). This is consistent with numerous studies where these indicators are prominently acknowledged due to their critical nature and focus during antenatal care [5][8]. Moderate levels of recognition were observed for symptoms like severe headache (72.1%) and high fever (69.5%), reflecting findings from investigations in developing nations reporting moderate awareness regarding hypertensive and infectious issues [4]. Conversely, lower levels of recognition were evident for less apparent symptoms such as jaundice (43.1%), decreased urine output (40.2%), and severe itching (38.6%). These results align with prior research demonstrating that indirect or less visible symptoms tend to be poorly identified by pregnant women [7]. The notable proportion of “don’t know” responses further highlights existing gaps in knowledge among participants.

The majority of participants (72.9%) had received information about warning signs, with nurses or midwives being the main source of information (57.0%), followed by doctors (37.2%). This finding is consistent with WHO reports highlighting healthcare providers as the main source of maternal health information [5].

However, reliance on family (16.4%) and social media (12.8%) was also observed, which is in agreement with studies indicating the growing influence of informal sources in health education [4]. Such reliance may contribute to misinformation and delayed care-seeking behavior.

The present study showed that most mothers (77.6%) reported immediately attending the hospital when warning signs occurred, indicating relatively good emergency response practices. However, only 29.2% always attended antenatal care services, while 52.1% attended sometimes, suggesting irregular pregnancy follow-up. Similar findings were reported by [5], which emphasized that inadequate antenatal attendance remains a major challenge in maternal healthcare. Most mothers sometimes consulted doctors (62.8%), whereas 67.2% always consulted family members, reflecting the strong influence of family on maternal healthcare decisions in developing countries. Additionally, 73.2% reported always using home remedies or traditional care, which may be related to cultural beliefs and healthcare accessibility. This finding agrees with reports by [4], which highlighted the impact of social and cultural factors on maternal health practices in Iraq.

A significant association was found between knowledge level and age, educational level, and antenatal care visits. Better knowledge was observed among women aged 20–39 years, those with higher educational levels, and mothers with frequent ANC visits. Similar findings were reported in Iraqi studies, where education and antenatal care were identified as important predictors of maternal knowledge regarding pregnancy danger signs [8]. This study assessed pregnant women's knowledge and practices regarding pregnancy warning signs. The results indicate that some participants were aware of common warning signs, but significant gaps were found in both knowledge and practice. This aligns with other studies conducted in various countries, which have observed a lack of awareness among pregnant women regarding neonatal risks, even after they have received antenatal care [9][10].

In this study, prolapse was identified as one of the most common warning signs. This finding also supports previous studies indicating that prolapse is the most prominent neonatal risk sign, as it has become increasingly noticeable and significant. Consistent with this study's findings, studies conducted in Nigeria [6], Ethiopia [12], and Jordan [6] have also found that prolapse is the most common obstetric risk sign

among pregnant women who have not yet visited our maternity clinics. They demonstrated a limited level of knowledge, regardless of their awareness of the warning signs. This finding, along with a previous study indicating that most women did not specifically understand the key danger signs in pregnancy and childbirth, may be attributed to shortcomings in health education, educational attainment, and a lack of professional knowledge regarding maternal health information, as well as the inadequacy of available resources [9][10].

The final analysis also revealed a positive correlation between higher educational attainment, prior experience, and warning signs. A higher level of awareness was observed among women with higher educational attainment who had already given birth, compared to women with lower educational attainment who were experiencing childbirth for the first time. Ana Marisela Lazo B, MSc. Age at First Pregnancy and Media Exposure in Acquiring Health Information. Previous studies have indicated similar correlations, with increased education raising awareness and leading to a better understanding of maternal health information [6][12].

Regarding practices, some participants reported delaying seeking healthcare when warning signs appeared. This can lead to undesirable outcomes for both mother and newborn due to delayed diagnosis of various medical conditions. Consistent with previous studies that found barriers to rapid transformation in the healthcare network, despite women's awareness of pre-cancer, limited resources (whether financial or due to infrastructure issues) played a significant role for the oldest woman [13]. These findings highlight the need for antenatal health education programs, with a particular focus on pregnancy warning signs, childbirth preparation, and emergency planning during antenatal care. Educational subscriptions that include visualization tools, counseling sessions, and family partnerships contribute to insufficient voluntary participation among French mothers, which reinforces their healthcare-seeking behaviors [1][9]. Also this study indicates that although women are aware of some warning signs, there are significant gaps in knowledge and practice. These gaps encompass maternal education, diagnosis, timely response, and referral for obstetric risk signs, which are crucial for reducing maternal and neonatal morbidity and mortality rates by ensuring improved pregnancy outcomes[1][6].

All the obstetric indicators mentioned here are at high risk of being overlooked by women, and many complications worsen when diagnosis or treatment is delayed [12, 15]. Therefore, improving pregnant women's ability to recognize potential danger signs is crucial to ensuring they promptly seek life-saving healthcare services and thus avoid preventable obstetric emergencies [16, 17]. This vital information enables pregnant women to proactively seek healthcare, a key strategy for reducing systemic delays in accessing appropriate clinical facilities [18]. Published studies indicate that higher awareness is positively associated with an increased likelihood of receiving emergency care for high-risk, life-threatening complications [19]. Other important indicators of this clinical awareness include the mother's level of education, number of pregnancies and births, and number of antenatal care visits [20, 21]. However, self-perceived awareness is often greater than actual diagnostic performance, indicating the need for structured educational strategies in clinical training [22]. Routine prenatal counseling is an effective opportunity to deliver targeted health education interventions that address this knowledge gap, thereby enhancing mothers' ability to make timely decisions during pregnancy [23,24].

## Conclusion

The current study indicated that mothers possessed a moderate knowledge of the warning signs associated with pregnancy, showing higher familiarity with typical symptoms like vaginal bleeding and decreased fetal activity. While there were effective emergency response practices in place, deficiencies existed in consistent attendance at antenatal care appointments and reliance on professional medical advice. A significant correlation was found between educational attainment and the frequency of antenatal visits with enhanced knowledge levels. Consequently, it is advised to enhance maternal health education initiatives and promote regular attendance at antenatal care to increase awareness and foster suitable healthcare-seeking behaviors among pregnant women.

## Recommendations

Based on the findings of this study, it is essential to strengthen health education regarding warning signs during pregnancy through antenatal care visits, enhance the role of nurses and midwives in providing counseling to mothers, and encourage regular attendance at health services. Community outreach programs and educational materials should also be developed to enhance pregnant women's understanding of the

importance of seeking timely healthcare. Further research with larger and more representative samples is also recommended to inform efforts to improve maternal health.

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