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Knowledge and Understanding of Obstetric Alarming Signs and Symptoms Among Pregnant Women at Maternity and Children Hospital in Al Ahsa: A Cross-Sectional Study

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ABSTRACT

Introduction: In 2020, ~800 women died daily worldwide from preventable pregnancy-related causes, though Saudi Arabia's maternal mortality is relatively low. In Saudi society, consanguinity and early marriage may increase pregnancy risks. Research indicates improved institutional delivery when women know the danger signs. This study in Al-Ahsa investigates pregnant women's awareness, emphasizing early detection for effective obstetric care. WHO underscores this critical need.

Methodology: It is a cross-sectional study conducted in Al-Ahsa, Saudi Arabia, using convenience sampling. Participants were interviewed via structured questionnaires addressing demographics, comorbidities, and obstetric danger signs. The data is processed in Excel and examined with IBM SPSS 29.0.0

Results: A total of 400 pregnant women were assessed. Most were aged 25–34 years (175, 43.8%), with 186 (46.5%) in the third trimester, and 324 (81.0%) reporting no underlying medical conditions. Nevertheless, 102 (25.5%) experienced serious health problems, most commonly vaginal bleeding (24, 32.4%). While 380 (95.0%) attended antenatal clinics regularly, 286 (71.5%) did not seek help for severe symptoms. Age (>40 vs. 18–24, $p<0.001$), gravidity ($p=0.002$), and parity ($p=0.002$) correlated with higher knowledge scores. Women with comorbidities (4.41 ± 2.12, $p<0.001$) scored significantly higher. Logistic regression revealed age ($p=0.003$) and medical conditions ($p=0.001$) as predictors for better knowledge, with an odds ratio of 1.553 and 2.477, respectively. Education and gestational weeks were not significant ($p>0.05$).

Conclusion: This study shows that older age, higher gravidity, parity, and the presence of comorbidities significantly enhance obstetric danger sign awareness. Despite high antenatal attendance, gaps remain among younger and healthier women. Targeted interventions are necessary to bolster education and encourage prompt care-seeking behaviors. Research should explore cultural norms impacting knowledge.**KEYWORDS**: Saw palmetto, beta-sitosterol, pygeum africanum, phytotherapy, benign prostatic hyperplasia, BPH 2.

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OBJECTIVES

To assess the knowledge of obstetric danger signs among pregnant women attending the Maternity and Children's Hospital.

INTRODUCTION

It is estimated that nearly 800 women globally die every day from preventable causes related to pregnancy and childbirth, as reported in the World Health Organization's report from 2020[1]. Compared to other countries, Saudi Arabia has a low maternal mortality rate, with only seven deaths per 100,000 live births. The reasons may be linked to the fact that skilled care at birth is free, and emergency obstetric care is readily available whenever other complications arise[2]. It should be noted that obstetric danger signs are merely symptoms that are well-known to non-obstetricians. There are a number of danger signs that may occur during pregnancy, including severe vaginal bleeding, swelling of the hands and face, and blurred vision. It is important to be aware of the most common danger signs of labor, which include severe vaginal bleeding, prolonged labor, convulsions, and

retained placentas.

On the other hand, severe bleeding, loss of consciousness, and fever have been identified as the most frequent signs of postpartum complications[3]. Having a basic understanding of these danger signs and their association with obstetric complications will allow women and their families to seek appropriate medical attention promptly, ensuring a safe delivery for both mother and child[2]. A unique characteristic of Saudi society is that cousin marriages are highly favored[4]. Saudi Arabians also prefer to marry relatively young. Pregnancy would likely be more dangerous for Saudi Arabian women under these circumstances[5]. Research has shown a positive correlation between knowledge of danger signs before, during, or after delivery, and delivery in an institutional setting[6]. Karkee and colleagues reported that the probability of delivering in a health facility was higher among women who spontaneously mentioned any danger signs during the antepartum, intrapartum, or postpartum period[7]. Ethiopian women receiving maternal and child health education in the Aleta Wondo district are nine times more likely to deliver in a health facility, according to a study conducted by Hailu and colleagues[8]. A previous cross-sectional study conducted in Riyadh, Saudi Arabia, underscored a concerning lack of awareness among pregnant Saudi women regarding potential complications during pregnancy and childbirth[9]. Similarly, another cross-sectional study indicated that a significant proportion of pregnant women lacked sufficient knowledge about warning signs. Therefore, prioritizing early detection of obstetric warning signs and understanding associated risk factors is essential for effective prevention strategies[10]. The World Health Organization (WHO) has recommended raising awareness among women about the danger signs before, during, and after delivery to improve early detection and reduce the time it takes to seek obstetric care[11]. We conducted a study in Al-Ahsa, Saudi Arabia, to assess pregnant women's knowledge and understanding of obstetric alarming signs and symptoms.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Governmental Public Hospital of Maternity and Children (MCH) in Al-Ahsa, Saudi Arabia, from July 2024 to March 2025. Via a convenience sampling technique, pregnant women in the waiting area of MCH were selected and interviewed. The inclusion criteria comprised Saudi and non-Saudi pregnant women older than 18 who visited MCH and agreed to participate in the study. Non-pregnant women, women attending other hospitals, and women under the age of 18 were excluded to ensure a more homogeneous sample population.

Data was collected through an interview-administered questionnaire based on a previously validated and reliable modified questionnaire in English (12). The questionnaire consisted of two sections: the first section gathered socio-demographic data, such as age, level of education, obstetric factors, parity, current pregnancy's gestational age, health issues, and the number of prenatal visits. The second section assessed participants' knowledge and understanding of obstetric alarming signs and symptoms in pregnancy, labor, and the postpartum period. To assess the level of awareness, the participants were asked to spontaneously list at least three of the 12 primary pregnancy danger symptoms, such as significant vaginal bleeding, swollen hands or face, and blurred vision, Similarly, spontaneously mentioning at least three of the nine primary danger indicators during labor including severe vaginal bleeding, prolonged labor (lasting more than 12 hours), convulsions, and retained placenta, were a prerequisite for complete awareness of labor/childbirth difficulties. Full awareness of postpartum problems was defined as consciously stating at least three of the 11 major warning indicators, which include high fever, foul-smelling vaginal discharge, and significant vaginal hemorrhage. The questionnaire was administered to every participant who fit the criteria in the waiting area of MCH, ensuring uniform data collection.

Informed consent was obtained both verbally and in writing from all participants before they were included in the study, and the study was approved by the King Faisal University Deanship of Scientific Research Ethical Committee (KFU-REC-2024-APR-ETHICS2207) and the Maternity and Children's Hospital Research Committee (H-05-HS-137) in April 2024. Prior to data collection, participants were informed about the study's purpose, the intended use of the data, and potential advantages and disadvantages of participation, and all measures were taken to protect the privacy and confidentiality of the participants. No names, identification numbers, or other personal information were collected. Participation was entirely voluntary, and no incentives were provided.

A convenience sampling technique was employed to determine the sample size. The sample size was calculated using the formula $n = z^2pq/d^2$. With a confidence level of 95%, an estimated proportion of 50%, and a 5% level of precision, the appropriate sample size was determined to be 400 participants.

DATA ANALYSIS PLAN

The data was recorded in a Microsoft Excel spreadsheet without any personally identifiable information to ensure anonymity and confidentiality. The dataset was cleaned for inconsistencies, missing values, and outliers before being transferred to IBM SPSS Statistics version 19 for analysis. Descriptive statistical analysis was performed, where quantitative data were summarized using measures of central tendency, including mean, median, and mode, as well as measures of dispersion, such as standard deviation. Categorical data was analyzed using chi-square tests, and logistic regression was conducted to assess the effect of single variables on other variables. Categorical data was further summarized using percentages and proportions to facilitate interpretation.

RESULTS

Our study included 400 pregnant women for the assessment of knowledge and understanding of obstetric alarming signs and symptoms ***(Table 1)***. The majority were aged 25–34 years (n=175, 43.8%), followed by 35–40 years (n=107, 26.8%), and 18–24 years (n=83, 20.8%). Most participants were Saudi nationals (n=356, 89.0%) and had at least secondary education (n=338, 84.5%). Regarding gestational age, the largest group was in the third trimester (28–40 weeks) (n=186, 46.5%). More than half

had a gravidity of 1–3 (n=204, 51.0%), and nearly half had parity of 1–3 (n=199, 49.8%), while 62 participants (15.5%) had not given birth before. Most respondents reported no underlying medical condition (n=324, 81.0%).

Table 1: - ***Sociodemographic parameters of participants (n=400)***

		Frequency N (%)
Age	18-24 Years	83 (20.8%)
	25-34 Years	175 (43.8%)
	35-40 Years	107 (26.8%)
	>40 Years	35 (8.8%)
Nationality	Non-Saudi	44 (11.0%)
	Saudi	356 (89.0%)
Education Status	Literate	4 (1.0%)
	Elementary School	9 (2.3%)
	Middle School	49 (12.3%)
	Secondary or Above	338 (84.5%)
Gestational Week	1-13 Weeks	70 (17.5%)
	14-27 Weeks	144 (36.0%)
	28-40 Weeks	186 (46.5%)
Gravidity	1-3	204 (51.0%)
	4-6	159 (39.8%)
	>6	37 (9.3%)
Parity	Nulliparous	62 (15.5%)
	1-3	199 (49.8%)
	4-6	130 (32.5%)
	>6	9 (2.3%)
Medical Condition	No	324 (81.0%)
	Yes	76 (19.0%)

Figure 1 shows the distribution of comorbidities among the 76 participants who reported having a medical condition. Diabetes mellitus (DM) was the most prevalent (29.7%), followed by sickle cell anemia (SCA) (20.3%), thyroid disorders (12.2%), hypertension (10.8%), and thalassemia (10.8%). Asthma (6.8%), chronic kidney disease (CKD) (5.4%), and other conditions (4.1%) made up the remainder.

Figure 1: - ***Prevalence of different comorbidities among participants (n=76)***

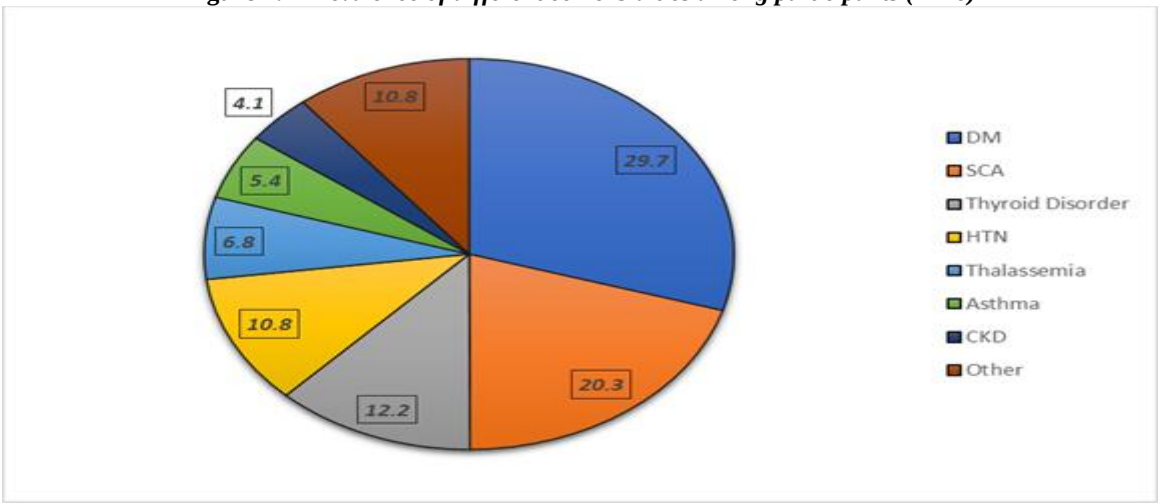

Table 2 shows the knowledge and response to obstetric alarming signs among 400 pregnant women. Regular antenatal clinic visits were high (n=380, 95.0%), yet 25.5% (n=102) reported experiencing serious health problems during pregnancy. Among those with complications, vaginal bleeding was most frequent (n=24, 32.4%), followed by diabetes mellitus (n=9, 12.2%), severe headache (n=7, 9.5%), and decreased fetal movement (n=6, 8.1%). Assistance was mostly not sought as symptoms resolved or were absent (n=286, 71.5%), though 23.5% (n=94) consulted a doctor. While 70.0% (n=280) acknowledged that complications can be fatal, 72.3% (n=289) believed that maternal complications can endanger the baby.

Table 2: - ***Assessment of Knowledge and Understanding of Obstetric Alarming Signs and Symptoms among Pregnant Women (n=400)***

		Frequency N (%)
Do you visit the antenatal clinic regularly	No	20 (5.0%)
	Yes	380 (95.0%)
Do you have serious health problems during pregnancy?	No	298 (74.5%)
	Yes	102 (25.5%)
Major Serious Health Problems	Vaginal Bleeding	24 (32.4)
	DM	9 (12.2)
	Severe Headache	7 (9.5)
	Decrease Baby movement	6 (8.1)
Whom did you see for Assistance	There wasn't any Problem	286 (71.5%)
	Didn't Ask for Help / Symptoms Improved	20 (5.0%)
	Doctor	94 (23.5%)
Delivery complication history	No/Didn't Give Birth Before	309 (77.3%)
	Yes	91 (22.8%)
Can a pregnant woman die from complications?	No/Don't Know/ Don't Believe There's any Complications	120 (30.0%)
	Yes	280 (70.0%)
Can maternal complications endanger baby?	No/Don't Know/ Don't Believe There's any Complications	111 (27.7%)
	Yes	289 (72.3%)

Figure 2 shows participants' awareness of life-threatening obstetric signs which occurs during pregnancy phase. Severe vaginal bleeding was the most frequently recognized danger sign (64.8%), followed by accelerated or reduced fetal movement (51.0%). Around one-third (31.0%) identified severe abdominal pain as a critical concern, while 28.0% cited the water breaking without labor. Noticeable swelling of hands, face, or feet was flagged by 24.8%. Other reported signs included preeclampsia (14.8%), high fever (14.0%), and severe weakness or breathing difficulty (both 12.0%). Fewer participants (7.0%) recognized severe headache, and only 2.5% identified convulsions. A small fraction (5.0%) believed none of these signs existed.

Figure 2: - ***Understanding of Obstetric Alarming Signs and Symptoms that Endanger Life During Pregnancy***

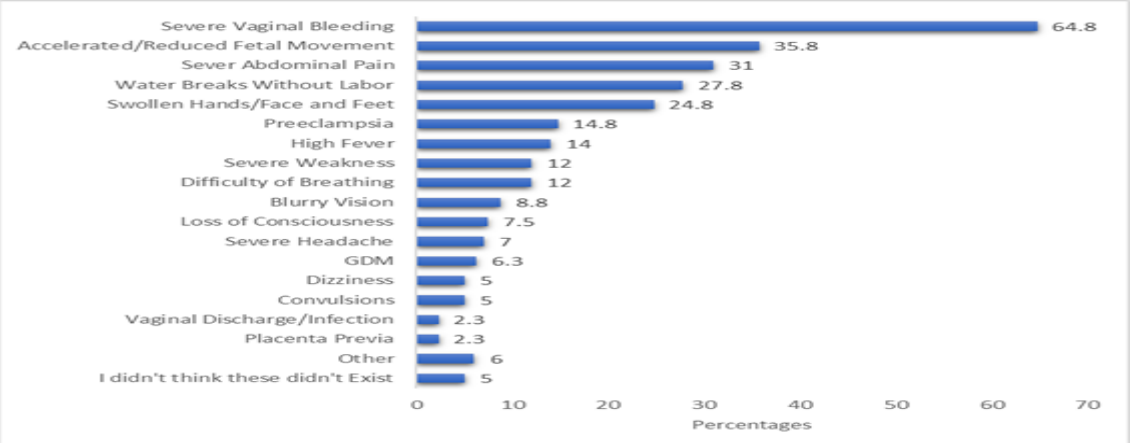

Figure 3 shows that severe bleeding was the most recognized life-threatening obstetric complication during labor and childbirth (60.5%). Perineal tears (23.8%) and prolonged labor exceeding 12 hours (23.3%) followed as key concerns. Fewer participants identified signs like loss of consciousness (14.5%), preeclampsia (11.0%), or a retained placenta (10.0%). Other issues—such as having a large baby (7.3%), fever (5.0%), and breech presentation (4.8%)—were mentioned less frequently, and convulsions (4.5%) or severe headache (4.0%) rarely appeared on the radar. A handful of participants (5.5%) listed miscellaneous dangers, suggesting that while many recognize major complications like hemorrhage, knowledge gaps remain around other critical issues.

Figure 3: ***Understanding of Obstetric Alarming Signs and Symptoms that Endanger Life During Labor and Childbirth***

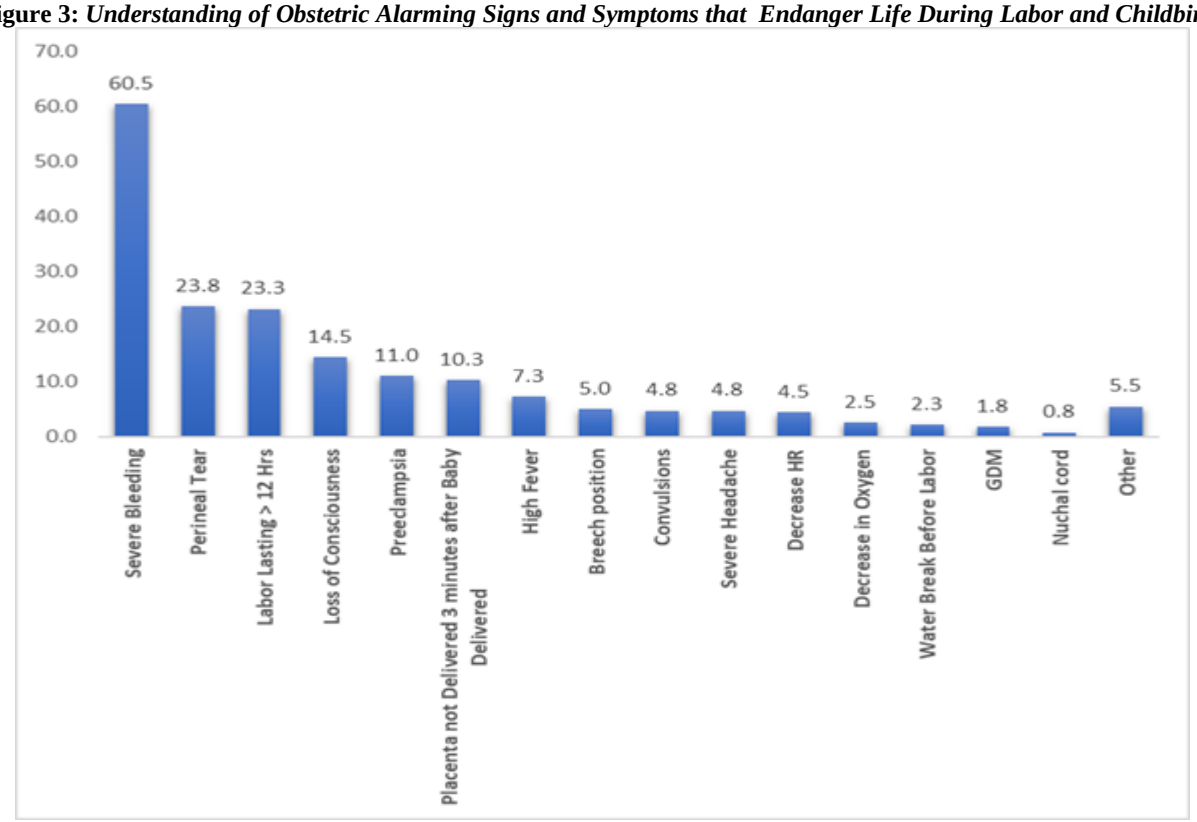

Figure 4 shows that 60.3% of respondents identified severe bleeding as the primary life-threatening complication occurring more than two days after childbirth. High fever (21.3%) and postpartum depression (18.5%) also emerged as notable concerns. Fewer participants mentioned perineal tears (15.5%) or severe weakness (14.3%). Alarmingly low percentages recognized symptoms like foul-smelling vaginal discharge (3.5%), severe headache (2.8%), and difficulty breathing (2.5%)—all of which can be red flags. Meanwhile, 5.0% believed such complications simply do not occur.

Figure 4: - *Understanding of Obstetric Alarming Signs and Symptoms that Endanger Life After 2 Days if Child Birth*

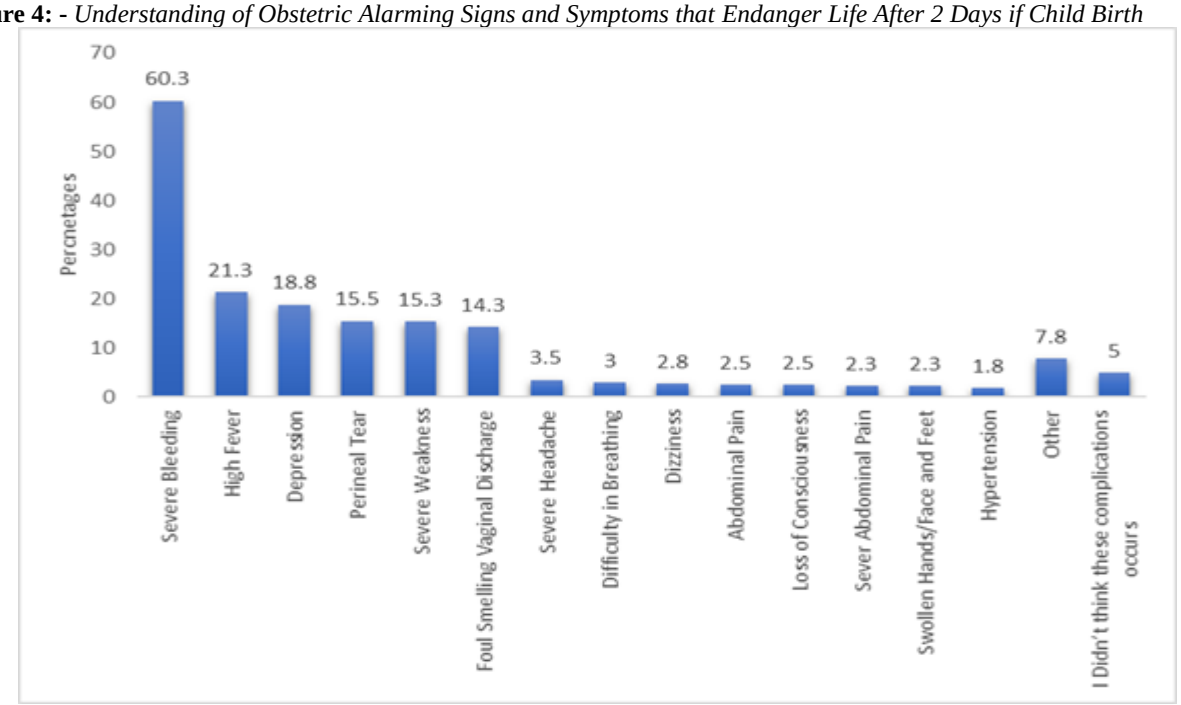

Table 3 shows that the knowledge score of obstetric alarming signs significantly increases with age, as younger women (18–24 years: 2.89 ± 1.78) score lower than older counterparts (>40 years: 4.69 ± 2.13) (p<0.001). Saudi women (3.72 ± 1.89) also scored higher than non-Saudis (2.98 ± 1.80) (p=0.014). Although education status showed differences—literate (4.25 ± 2.22) versus middle school (3.24 ± 2.17)—these were not statistically significant (p=0.358). Women in the third trimester (28–40 weeks: 3.89 ± 1.93) had better scores compared to those in earlier weeks (p=0.027). Higher gravidity and parity were associated with increased scores (p=0.002), and those with medical conditions (4.41 ± 2.12) were significantly more knowledgeable than those without (3.46 ± 1.79) (p<0.001).

Table 3: ***Association of Knowledge Score of Obstetric Alarming Signs and Symptoms among Pregnant Women with different features***

		Mean (SD)	Sig. Values
Age	18-24 Years	2.89 (1.78)	<0.001b
	25-34 Years	3.50 (1.69)	
	35-40 Years	4.09 (1.94)	
	>40 Years	4.69 (2.13)	
Nationality	Non-Saudi	2.98 (1.80)	0.014a
	Saudi	3.72 (1.89)	
Education status	Literate (Able to Read/Write)	4.25 (2.22)	0.358b
	Elementary School	4.11 (2.62)	
	Middle School	3.24 (2.17)	
	Secondary or above	3.67 (1.82)	
Gestational week	1-13 Weeks	3.59 (2.16)	0.027b
	14-27 Weeks	3.33 (1.64)	
	28-40 Weeks	3.89 (1.93)	
Gravidity	1-3	3.38 (1.85)	0.002b
	4-6	3.77 (1.83)	
	>6	4.49 (2.08)	
Parity	Didn't Give Birth	2.97 (1.82)	0.002b
	1-3	3.62 (1.77)	
	4-6	3.89 (1.92)	
	>6	5.00 (3.00)	
Medical Condition	No	3.46 (1.79)	<0.001a
	Yes	4.41 (2.12)	

(a) Independent T test, (b) ANOVA

Table 4 shows the adjusted predictors for high knowledge of obstetric alarming signs among pregnant women. Age was a significant predictor, with each additional year associated with a 55.3% increase in the odds of high knowledge (B=0.440, p=0.003, Exp(B)=1.553, 95% CI: 1.160–2.078). Women with any comorbidities had 2.48 times higher odds of being knowledgeable (B=0.907, p=0.001, Exp(B)=2.477, 95% CI: 1.460–4.203). Although Saudi nationality (B=0.499, Exp(B)=1.647) showed a trend towards significance, it did not reach it (p=0.183). Higher education status, gestational week, gravidity, and parity were not significant predictors (all p>0.05). Overall, age and comorbidities emerged as the key factors influencing knowledge levels.

Table 5: - ***Adjusted Predictors of High Knowledge of Obstetric Alarming Signs and Symptoms among Pregnant Women with different features***

	B	Sig.	Exp(B)	95% CI	
				Lower	Upper
Age	.440	***.003***	1.553	1.160	2.078
Nationality (Saudi)	.499	.183	1.647	.790	3.433
Higher Education Status	-.075	.730	.928	.606	1.420
Gestational Week	.049	.738	1.050	.789	1.397
Gravidity	.121	.608	1.129	.710	1.795
Parity	-.085	.699	.919	.599	1.411
Any Comorbidities (Yes)	.907	***.001***	2.477	1.460	4.203
Constant	-2.529	.002	.080		

DISCUSSION

Saudi Arabia maintains a relatively low maternal mortality rate, supported by its free healthcare system, skilled care, and accessible emergency obstetric services [13]. Moreover, specific socio-cultural factors, including consanguinity, early marriages, and limited awareness of danger signs, may raise pregnancy-related risks [14]. However, the crucial threats during pregnancy, labor, and postpartum include severe bleeding, prolonged labor, convulsions, and postpartum pyrexia [15]. The greater knowledge of these indicators encourages institutional delivery, which aligns with global health guidance for early detection and timely intervention. However, notable knowledge gaps persist, prompting this research in Al-Ahsa.

Notably, our study revealed that the majority were aged between 25 to 34 years, of Saudi nationality, and with at least secondary school education. These demographics are consistent with previous studies conducted in Saudi Arabia, including a cross-sectional study by Tharwat et al. (2017), which also reported that most pregnant women accessing antenatal services were within the 25-34 age bracket and had completed higher education or university degree, with percentage of 40% [16]. Educational attainment is often considered a protective factor for health literacy; however, our study found no statistically significant association between higher education level and knowledge score. This diverges from findings by Woldeamanuel et al. (2019) in Ethiopia, where maternal education significantly correlated with better knowledge of obstetric danger signs [17].

Notably, age and the presence of comorbidities emerged as significant predictors of better knowledge scores. Women aged >40 years and those with existing medical conditions demonstrated higher awareness. This finding aligns with the results of Hailu et al. (2010) and Chauke et al. (2025), who reported that prior exposure to health risks or complications increases maternal alertness to potential obstetric emergencies [18]. It is likely that these women either received more intensive counseling during previous pregnancies or had direct experience with complications, enhancing their awareness. The significant odds ratio (Exp(B)=2.477) observed among women with comorbidities supports the idea that frequent interaction with healthcare services improves recognition of danger signs.

Interestingly, Saudi nationality showed a non-significant trend toward higher knowledge levels. This may reflect increased access to healthcare education and services among Saudi citizens compared to non-Saudis. Nonetheless, the lack of statistical significance (p=0.183) suggests that factors beyond nationality, such as cultural beliefs and language barriers, may modulate understanding.

Regarding the knowledge of specific obstetric danger signs, our results mirror global patterns. Severe vaginal bleeding was the most recognized danger sign across pregnancy (64.8%), labor (60.5%), and the postpartum period (60.3%). This finding aligns with the results from studies conducted in another region of KSA by Alshaikh et al. (2023), where hemorrhage or vaginal bleeding was consistently the most frequently reported danger sign followed by convulsions and decreased fetal movement [19]. However, awareness of other life-threatening signs—such as convulsions, severe headache, loss of consciousness, and foul-smelling vaginal discharge—was alarmingly low in our study. For instance, only 2.8% recognized severe headache as a postpartum danger sign, and merely 3.5% identified foul-smelling discharge as a red flag. These figures are lower than those reported by Gesese et al. (2023), which shows that 44.7% identified headache as a major obstetric danger sign of pregnancy, respectively [20], indicating an urgent need to enhance public health messaging around less obvious but equally critical complications.

Our study also showed that most women (95%) attended antenatal care regularly, yet only 70% acknowledged that complications can be fatal, and 72.3% recognized that maternal complications could endanger the fetus. However, Alsolami et al. (2024) shows that the prevalence of adequate ANC was 64.7% [21]. This gap between service utilization and knowledge acquisition suggests potential deficiencies in the content or delivery of health education during ANC visits. Similar observations were reported in a study by Pembe et al. (2009), where, despite high ANC attendance, only 30% of women could name at least three danger signs [22].

When evaluating the response to danger signs, it was concerning that the majority of participants (71.5%) did not seek medical help when experiencing symptoms, with some reporting that symptoms improved spontaneously. Only 23.5% sought a doctor's assistance, underscoring a behavioral gap even among women who recognized danger signs. This hesitation to seek care may

stem from cultural normalization of symptoms, low perceived severity, or systemic barriers such as transportation, costs, or family influence—issues repeatedly emphasized in maternal health literature (Omer et al. 2021) [23].

Comparison across pregnancy phases revealed that recognition of danger signs was significantly lower during labor and the postpartum period than during pregnancy. This trend is consistent with results from a previous study by Chandra et al. (2017), which also demonstrated that women tend to focus more on prenatal concerns than peripartum or postpartum risks [24]. Awareness programs often concentrate on prenatal care, which may unintentionally overlook the continuum of maternal risk extending beyond delivery.

LIMITATIONS

There are several limitations of the study. One limitation is the cross-sectional design, restricting causal inferences. Another is that data rely on self-reported responses, which can be subject to recall or social desirability bias. Also, the study is confined to a single hospital in Al-Ahsa, limiting generalizability to other regions. Moreover, certain potential confounding variables, such as cultural norms or healthcare accessibility, were not thoroughly investigated.

IMPLICATIONS AND FUTURE DIRECTIONS

These findings underscore the need for integrated, comprehensive health education programs that highlight diverse obstetric danger signs beyond hemorrhage. Targeted interventions emphasizing lesser-known red flags, especially during labor and postpartum, can bridge existing knowledge gaps. Providers and policymakers might incorporate routine counseling and tailored educational resources into antenatal care. Further, outreach efforts should involve family members and community leaders to reinforce timely, appropriate care-seeking. Future research could explore larger, multi-center cohorts and examine the impact of culture-specific interventions on maternal health outcomes.

CONCLUSION

Our study highlights critical strengths and weaknesses in pregnant women's knowledge of obstetric danger signs. While bleeding is widely recognized as a threat, awareness of other complications is lacking. Age and comorbidity status positively influence knowledge, while educational level and gravidity were not predictive. These insights call for a restructured health education strategy within antenatal clinics that reinforces a comprehensive understanding of obstetric emergencies across all phases of pregnancy. Future research should explore barriers to help-seeking behavior and assess the impact of targeted educational interventions to improve maternal outcomes in similar settings.

REFERENCE

1. Maternal mortality. Accessed February 8, 2024. https://www.who.int/news-room/fact-sheets/detail/maternal-mortality
2. Abu-Shaheen A, … HHBP, 2020 undefined. Knowledge of obstetric danger signs among Saudi Arabian women. bmcpublichealth.biomedcentral.com. Accessed November 4, 2023. https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09075-9
3. Thaddeus' S, Maine D. TOO FAR TO WALK: MATERNAL MORTALITY IN CONTEXT. Vol 38.; 1994.
4. Warsy AS, Al-Jaser MH, Albdass A, Al-Daihan S, Alanazi M. Is consanguinity prevalence decreasing in Saudis?: A study in two generations. Afr Health Sci. 2014;14(2):314-321. doi:10.4314/AHS.V14I2.5
5. Abu-Shaheen A, Heena H, Nofal A, Riaz M, Alfayyad I. Knowledge of obstetric danger signs among Saudi Arabian women. BMC Public Health. 2020;20(1). doi:10.1186/S12889-020-09075-9
6. Salem A, Lacour O, Scaringella S, et al. Cross-sectional survey of knowledge of obstetric danger signs among women in rural Madagascar. BMC Pregnancy Childbirth. 2018;18(1):1-9. doi:10.1186/S12884-018-1664-X/FIGURES/2
7. Karkee R, Baral OB, Khanal V, Lee AH. The role of obstetric knowledge in utilization of delivery service in Nepal. Health Educ Res. 2014;29(6):1041-1048. doi:10.1093/HER/CYU059
8. M H, A G, F A. Knowledge about Obstetric Danger Signs among Pregnant Women in Aleta Wondo District, Sidama Zone, Southern Ethiopia. Ethiop J Health Sci. 2010;20(1). doi:10.4314/EJHS.V20I1.69428
9. Sami Maki JM, Dagestani H, Aldokhail L, Mohamed Alaradi L, Albalawi M. Awareness of Obstetric and Delivery Complications Among Saudi Pregnant Women in Riyadh, Saudi Arabia. cureus.com. doi:10.7759/cureus.39630
10. AlNayef N, Asiri M, … AH… J of O, 2022 undefined. Knowledge of Obstetric Warning Signs and Associated Risks among Saudi Pregnant Women: Knowledge of Obstetric Warning Signs and Associated Risks. scipublications.com. Accessed November 4, 2023. https://www.scipublications.com/journal/index.php/ujog/article/view/680
11. WHO recommendations on antenatal care for a positive pregnancy experience.
12. Maki JSM, Dagestani H, Aldokhail L, Mohamed Alaradi L, Albalawi M. Awareness of Obstetric and Delivery Complications Among Saudi Pregnant Women in Riyadh, Saudi Arabia. Cureus. 2023 May 29;15(5):e39630. doi: 10.7759/cureus.39630. PMID: 37388622; PMCID: PMC10305497.
13. Najimudeen, M., et al., The Success Story of Reducing Maternal Mortality in Saudi Arabia. 2018.
14. Abu-Shaheen, A., et al., Knowledge of obstetric danger signs among Saudi Arabian women. BMC Public Health, 2020. 20(1): p. 939.
15. Dangura, A.D., Knowledge about child birth and postpartum obstetric danger signs and associated factors among mothers in Dale district, Southern Ethiopia. BMC Pregnancy Childbirth, 2020. 20(1): p. 340.
16. Tharwat, S.S.A., A.M. Aljohani, and N.H. Mahmoud, Awareness of Antenatal Care Importance among Saudi Pregnant Women in Madina.
17. Woldeamanuel, G.G., G. Lemma, and B. Zegeye, Knowledge of obstetric danger signs and its associated factors among pregnant women in Angolela Tera District, Northern Ethiopia. BMC Res Notes, 2019. 12(1): p. 606.

18. Chauke, L., Improving access to emergency obstetric care in low- and middle-income countries. Best Practice & Research Clinical Obstetrics & Gynaecology, 2025. 98: p. 102572.
19. Alshaikh, A.A., et al., Factors associated with the knowledge of obstetric danger signs among pregnant women attending primary health care antenatal care clinics in Abha city. J Family Med Prim Care, 2023. 12(11): p. 2855-2862.
20. Gesese, S.S., E.A. Mersha, and W.F. Balcha, Knowledge of danger signs of pregnancy and health-seeking action among pregnant women: a health facility-based cross-sectional study. Ann Med Surg (Lond), 2023. 85(5): p. 1722-1730.
21. Alsolami, A.M., et al., Adequacy of Antenatal Care at Ministry of Health Facilities in Jeddah, Saudi Arabia: A Cross-Sectional Study. Cureus, 2024. 16(5): p. e61113.
22. Pembe, A.B., et al., P44 Rural Tanzanian women's awareness of danger signs of obstetric complications. BMC Pregnancy and Childbirth, 2009. 9.
23. Omer, S., et al., The influence of social and cultural practices on maternal mortality: a qualitative study from South Punjab, Pakistan. Reprod Health, 2021. 18(1): p. 97.
24. Chandra, N. and M.V. Smitha, Functional status, social support, and anxiety among postnatal women of Eastern India. Eur J Obstet Gynecol Reprod Biol X, 2023. 20: p. 100238.