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Level of Awareness on Danger Signs During Pregnancy and Associated Factors among Pregnant Mothers Attending Daynile General Hospital Mogadishu, Somalia: A Facility-Based Cross-Sectional Study

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Abstract

Background: Maternal mortality remains a major public health challenge in low-resource settings, with delayed recognition of obstetric danger signs contributing to preventable maternal deaths. Evidence on awareness levels in Somalia remains limited. This study assessed awareness of danger signs during pregnancy and associated factors among pregnant mothers attending Daynile General Hospital in Mogadishu, Somalia.

Methods: A facility-based cross-sectional study was conducted among 422 pregnant women attending antenatal care (ANC) between April 28 and June 20, 2026. Participants were selected using systematic random sampling. Data were collected using a structured interviewer-

administered questionnaire. Bivariate and multivariate logistic regression analyses were performed to identify associated factors.

Results: Only 112 (26.54%) participants demonstrated good awareness of danger signs. Vaginal bleeding (18.01%) and blurred vision (15.17%) were the most frequently recognized signs, while 62.56% could not identify any danger sign. Maternal age ≥30 years (AOR = 0.32, 95% CI: 0.14–0.74), ≤2 ANC visits (AOR = 0.47, 95% CI: 0.27–0.82), and intended pregnancy (AOR = 0.31, 95% CI: 0.14–0.69) were negatively associated with good awareness. Experiencing a danger sign (AOR = 2.56, 95% CI: 1.11–5.90), receiving health talks during ANC (AOR = 2.80, 95% CI: 1.32–5.92), and hemoglobin ≥10 g/dL (AOR = 2.05, 95% CI: 1.16–3.60) were positively associated with good awareness.

Conclusions: Awareness of obstetric danger signs was critically low. Strengthening routine health education during ANC and promoting early and regular attendance may improve maternal awareness and facilitate timely recognition of complications.

Keywords: awareness, obstetric danger signs, pregnancy, antenatal care, maternal health, Somalia, cross-sectional study.

Background

Maternal mortality is defined as the death of a woman during pregnancy or within 42 days of termination of pregnancy from any cause related to or aggravated by pregnancy or its management[1]. Maternal morbidity encompasses any physical or mental illness directly related to pregnancy and childbirth, affecting millions of women annually[2]. Globally, approximately 287,000 to 295,000 women died in 2017 from pregnancy-related causes, with approximately 810 women dying daily from pregnancy-related causes[1]. The vast majority of these deaths occur in low-resource settings, specifically during pregnancy, childbirth, and the postpartum period[3]. Most maternal deaths are preventable through timely recognition of complications and access to skilled institutional care[4]. Addressing these issues remains a major global public health challenge in achieving the Sustainable Development Goals (SDG)[5].

Obstetric danger signs are warning signals encountered during pregnancy, labor, and the postpartum period that indicate imminent or ongoing life-threatening events[5]. The key danger

signs during pregnancy include severe vaginal bleeding, severe headache, blurred vision, convulsions, swelling of the face and hands, severe abdominal pain, and reduced fetal movement[6]. Early recognition of these symptoms by the mother or family is an essential first step in ruling out serious complications and initiating immediate treatment[7]. Proper awareness facilitates timely healthcare-seeking from skilled birth attendants, which significantly reduces adverse maternal and fatal outcomes, including premature death and long-term disability[4]. Consequently, the identification of these signs is vital in emergency obstetric care[6].

Awareness of danger signs plays a critical role in the decision-making process for maternal health, as it empowers women to seek care proactively[7]. Adequate knowledge contributes to early antenatal care (ANC) utilization, prompt referral to specialized facilities, and the pursuit of emergency obstetric care[8]. Conversely, poor awareness is a major barrier linked to the "three delays": delay in making the decision to seek care, delay in reaching a health facility, and delay in receiving treatment[9]. A lack of knowledge often results in failure to recognize life-threatening complications as they occur, leading to significant delays in obtaining care[3]. Therefore, raising awareness is a fundamental strategy for improving health-seeking behavior and reducing maternal mortality[2].

Global and regional evidence indicates that awareness of obstetric danger signs is often unacceptably low, particularly in low- and middle-income countries (LMICs)[10]. For instance, studies in sub-Saharan Africa show that overall good knowledge levels fluctuate significantly, reported as only 25.3% in Hargeisa and 16.8% in Southern Ethiopia[5,10]. In Rwanda, while 56% of women were aware of the danger signs during pregnancy, only 9% and 17% were aware of those during labor and the postpartum period, respectively[9]. In East Africa, awareness levels range from as low as 4.7% in Kenya to over 80% in specific urban contexts in Ethiopia[1,10]. This wide variation across settings highlights that, despite some progress, a large proportion of mothers remain insufficiently informed about the critical threats to their health and the health of their infants[4].

Previous studies have identified several predictors of maternal awareness of the danger signs. Maternal age, higher educational status, and urban residence were consistently associated with better knowledge[4]. Women who are employed or have higher household incomes often exhibit greater awareness, likely because of better access to information and health services[10]. Obstetric history, including higher gravidity and parity, also influences knowledge levels, as

previous experiences with pregnancy complications are an important source of information. Furthermore, frequent ANC attendance, exposure to health education, and media exposure, including mainstream and social media, are crucial for disseminating essential health information[10]. These factors influence a woman's capacity to recognize complications and seek timely medical care[11].

Somalia faces substantial maternal health challenges, with a maternal mortality ratio of 396 deaths per 100,000 live births in 2020[5]. Women encounter numerous barriers to accessing maternal health services, including geographic distance, a lack of resources, and limited knowledge of obstetric risks[5]. The available evidence regarding awareness is concerning; a study in Hargeisa found that only 25.3% of pregnant women were knowledgeable about obstetric danger signs[5]. Many Somali women may delay seeking care simply because they do not recognize the symptoms as serious threats, which hinders progress toward global health goals for women[5]. In this fragile context, improving awareness remains critically important to ensure that women can identify complications early and pursue life-saving emergency interventions, ultimately helping the region reduce its high burden of maternal and neonatal mortality[5].

Despite the critical role of awareness, significant knowledge gaps remain in the literature, particularly concerning specific local contexts within Somalia[5]. While some research has been conducted in Hargeisa, there is very limited evidence available from Mogadishu, specifically the Daynile district. This lack of localized data hinders the development of targeted public health interventions that address the unique sociocultural and economic factors influencing the population of the capital. Local evidence is needed to plan effective maternal health programs and strengthen hospital-based education strategies tailored to the Somali population[3]. By assessing current awareness levels and associated factors in this specific setting, health authorities can better design interventions to improve emergency care-seeking and reduce preventable maternal deaths in the future[5].

This study aimed to assess the level of awareness of danger signs during pregnancy and the associated factors among pregnant mothers attending the Daynile General Hospital in Mogadishu, Somalia. By identifying these predictors, this study provides a basis for strengthening maternal health education and improving healthcare-seeking behaviors in this specific hospital setting in the future.

Methods

Study Design, Area, and period

A facility-based cross-sectional study was conducted at the Daynile General Hospital in the Daynile District of Mogadishu, Somalia. The hospital is public and is one of the major public healthcare facilities providing comprehensive maternal and child health services, including antenatal care (ANC), delivery services, postnatal care, and immunization. The study targeted pregnant mothers who attended antenatal care services at the hospital during the study period. Data were collected from April 28, 2026, to June 20, 2026, using an interviewer-administered structured questionnaire adapted from previously published studies[12]. The questionnaire assessed the participants' awareness of danger signs during pregnancy and factors potentially associated with their awareness levels. A cross-sectional study design was employed because it enabled the assessment of the level of awareness of pregnancy danger signs and the identification of associated factors among pregnant mothers at a specific point in time.

Study Population and Eligibility Criteria

A total of 1,034 pregnant women attending antenatal care services at the Daynile General Hospital were assessed for eligibility during the study period. Of these, 422 (40.8%) women met the inclusion criteria and were enrolled in the study and the final analysis.

Among those assessed, 408 (39.5%) women declined to participate in the study, and 204 (19.7%) were excluded for not meeting the eligibility criteria. The exclusion criteria were serious illness, inability to communicate, incomplete information, and failure to provide informed consent.

Overall, 612 women were excluded from the final analysis due to refusals or ineligibility.

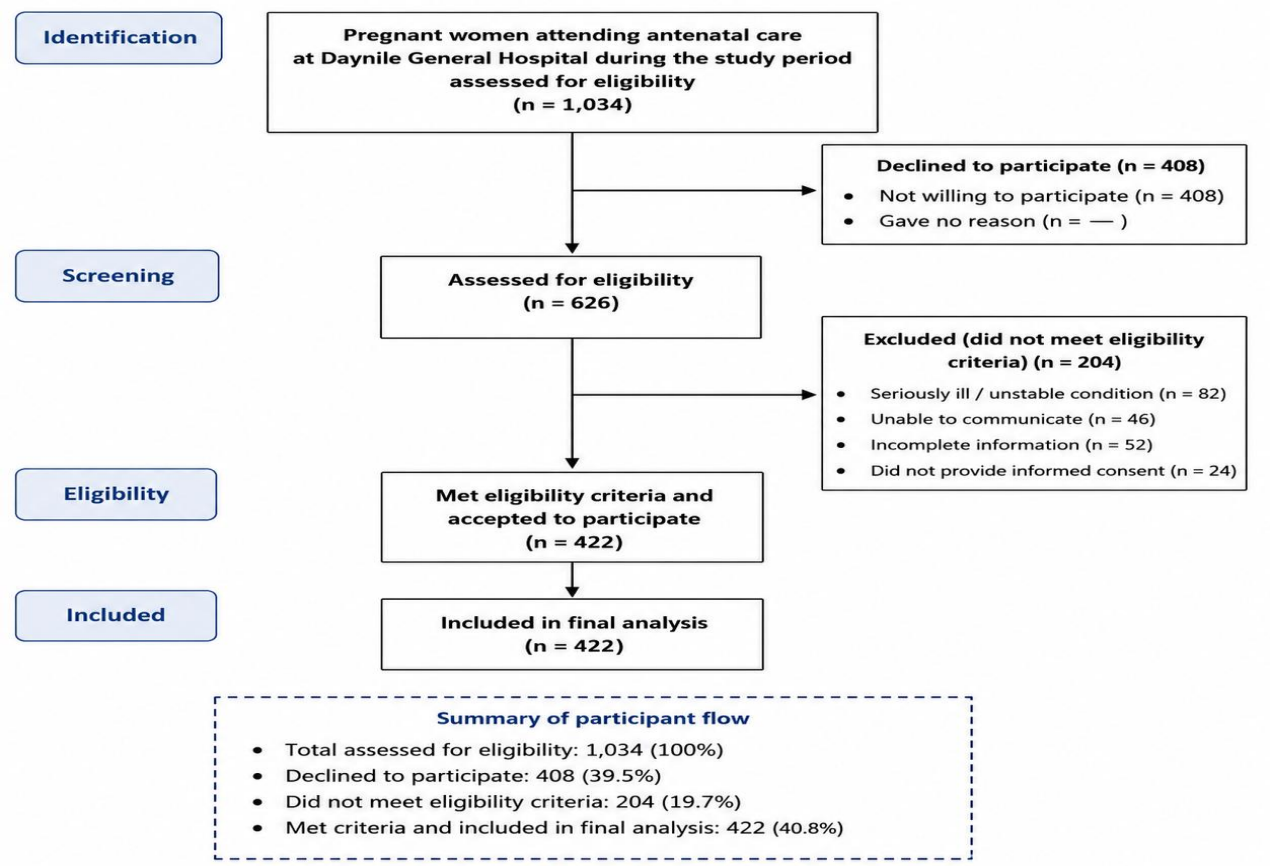


Figure 1. CONSORT-style flow diagram of participant selection.

Sample Size Determination and Sampling Procedure

The sample size for this study was determined using the single population proportion formula, assuming a 50% prevalence of awareness of danger signs during pregnancy (in the absence of prior local estimates), a 95% confidence level, and a 5% margin of error. The calculated minimum sample size was 384 participants. To account for potential non-response, a 10% non-response rate was added, resulting in a final sample size of 422 pregnant women in their third trimester of pregnancy.

The sample size was calculated using the following formula:

$$n = \frac{Z2p(1-p)}{d2}$$

Where:

(n) = the required sample size

(Z) = standard normal value at 95% confidence level (1.96)

(p) = estimated proportion (0.5)

(d) = margin of error (0.05)

$$n = \frac{(1.96)2\times0.5(1-0.5)}{(0.05)2} = n = \frac{3.8416\times0.25}{0.0025} = 384$$

Adding a 10% non-response rate:

$$nf = 384 + (384 \times 0.10) = 422$$

Participants were selected using systematic random sampling method. According to hospital records, approximately 1,034 pregnant women attended antenatal care services at the Daynile General Hospital during the study period. The sampling interval ((k)) was calculated as follows:

$$k = \frac{N}{\text{n}} = \frac{1034}{422} = 2.45$$

The sampling interval was approximately 2 s. After selecting the first participant through a lottery method from the first two eligible women, every second eligible pregnant woman attending antenatal care services was recruited until the required sample size of 422 participants was reached.

During the study period, 1,034 pregnant women were assessed for eligibility. Of these, 408 declined to participate, and 204 were excluded because they did not meet the eligibility criteria, including serious illness, inability to communicate, incomplete information, and refusal to provide informed consent. Consequently, 422 pregnant women were enrolled and included in the final analysis, yielding response rates of 40.8% and 100% among all women assessed and eligible women who consented to participate, respectively.

Data Collection Instrument and Techniques

Data were collected using a structured, interviewer-administered questionnaire adapted from previously published studies on awareness of obstetric danger signs during pregnancy.

The tool included sections on sociodemographic characteristics (age, marital status, education, occupation, residence, family size, and income), reproductive and obstetric characteristics (pregnancy intention, gestational age, gravidity, parity, abortion history, place of delivery, and antenatal care (ANC) visits), and maternal health service utilization. Information on health talks during ANC, counseling on obstetric danger signs, and health service accessibility were also collected.

Awareness was assessed by asking participants to identify the recognized danger signs during pregnancy, including vaginal bleeding, severe headache, blurred vision, abdominal pain, reduced fetal movement, swelling of the face and legs, fever, difficulty in breathing, loss of consciousness, vomiting, and dysuria. Participants were also asked about their perceived consequences of danger signs for mothers and fetuses.

Data Quality Control

We emphasized quality control throughout the data collection process to ensure the reliability and consistency of our findings. The questionnaire was initially developed in English, translated into Somali for field use, and then back-translated into English by independent language experts to verify consistency and accuracy of meaning.

Six trained data collectors and two supervisors with prior experience in health surveys were recruited for this study. They were provided with two days of intensive training before the data collection commenced. The training focused on the study objectives, a detailed review of the questionnaire, interviewing techniques, ethical considerations, confidentiality of information, informed consent procedures, and the roles and responsibilities of data collectors and supervisors.

During data collection, the principal investigator closely supervised the process to ensure adherence to the study procedures and address any emerging issues. Completed questionnaires were reviewed daily for completeness and consistency prior to data entry.

In addition, a pretest was conducted on 10% of the sample size at the nearby Barwaqo Health Center. Based on the pretest findings, necessary modifications were made to improve clarity, remove ambiguities, and refine the flow and structure of the questionnaire.

Data Processing and Statistical Analysis

The data were checked for completeness and consistency before being coded and entered into Stata version 14 for the analysis. Data cleaning was performed to identify and correct any entry errors or inconsistencies. Descriptive statistics, including frequencies and percentages, were used to summarize the characteristics of the study participants and are presented in the tables.

Bivariate and multivariate logistic regression analyses were conducted to identify the factors associated with awareness of danger signs during pregnancy. Variables with a p-value <0.25 in the bivariable analysis were included in the multivariable logistic regression model. The strength of association was measured using crude odds ratios (COR) and adjusted odds ratios (AOR) with 95% confidence intervals (CI). Statistical significance was set at $p < 0.05$.

Multicollinearity among the independent variables was assessed using the Variance Inflation Factor (VIF). The mean VIF was 1.29, with a maximum value of 1.97, indicating no multicollinearity. The goodness-of-fit of the final logistic regression model was evaluated using the Hosmer–Lemeshow test, which demonstrated an adequate model fit ($\chi^2 = 4.43$, df = 7, $p = 0.7293$). Questionnaires with incomplete or inconsistent data were excluded from the analysis.

Inclusion and exclusion criteria

All pregnant women who attended antenatal care services at the Daynile General Hospital during the data collection period were eligible for inclusion in this study. Women who were seriously ill at the time of data collection, unable to communicate during the interview, or unwilling to provide informed consent were excluded.

Operational Definitions

Pregnant mothers: Women who were currently pregnant and attending antenatal care (ANC) services at the Daynile General Hospital during the study period were included.

Awareness of danger signs during pregnancy: A woman's ability to correctly identify at least two obstetric danger signs during pregnancy, including vaginal bleeding, severe headache, blurred vision, convulsions, swelling of the face and hands, severe abdominal pain, reduced fetal movement, fever, difficulty breathing, loss of consciousness, vomiting, or dysuria.

Good awareness of danger signs: Respondents who correctly mentioned four or more obstetric danger signs during pregnancy.

Poor awareness of danger signs: Respondents who mentioned fewer than four obstetric danger signs or were unable to mention any.

Danger signs during pregnancy: Warning symptoms that may indicate serious maternal or fetal complications requiring immediate medical attention.

Antenatal care (ANC) follow-up: At least one visit to a health facility for pregnancy-related care during the current pregnancy.

Health talks during ANC: Information or counseling provided to pregnant women during ANC visits regarding pregnancy care, obstetric danger signs, and appropriate care-seeking behavior.

Intended pregnancy: A pregnancy that was planned or desired at the time of conception.

Unintended pregnancy: A pregnancy that was not planned or desired at the time of conception.

Gravida: The total number of times a woman has been pregnant, including her current pregnancy.

Parity: The number of pregnancies carried to viability and delivery, excluding abortions and current pregnancy.

Gestational age: Duration of the current pregnancy at the time of data collection.

Chronic medical illness: Any self-reported long-term medical condition, such as hypertension, asthma or heart disease.

Accessibility of health facilities: Self-reported ease of reaching a health facility, commonly measured by the travel time from home.

Blood group awareness: A woman's knowledge of her blood group status.

Rh factor awareness: A woman's knowledge of her Rh factor status.

Hemoglobin awareness: A woman's knowledge of her most recent hemoglobin level.

Results

Sociodemographic characteristics of participant

A total of 422 pregnant women participated in this study. The largest proportion of participants were aged 20–24 years (140, 33.18%), followed by those aged 25–29 years (114, 27.01%), while mothers aged 15–19 and 30 years or older accounted for 22.04% and 17.77% of the sample, respectively. Most respondents were married (371, 87.91%), while 25 (5.92%) were divorced, and 26 (6.16%) were widowed.

Regarding occupation, the majority of participants were housewives (369, 87.44%), while 38 (9.00%) were daily laborers, 11 (2.61%) were market vendors, and 4 (0.95%) had other occupations. Educational attainment was generally low, with 355 (84.12%) respondents unable to read and write. Only 34 (8.06%) could read and write without formal education, 29 (6.87%) had completed primary education, 3 (0.71%) had secondary education, and 1 (0.24%) had a college or university education.

More than half of the participants were born in urban areas (245, 58.06%), and 177 (41.94%) were born in rural areas. Similarly, 302 (71.56%) and 120 (28.44%) participants resided in semi-urban and urban areas, respectively. Regarding access to healthcare facilities, 252 (59.72%) respondents reported traveling 30 min or more to reach a health facility, whereas 170 (40.28%) travelled less than 30 min.

Family size varied among participants, with 122 (28.91%) reporting a household size of 6–7 members, followed by 110 (26.07%) with eight or more family members, 106 (25.12%) with 4–5 members, and 84 (19.91%) with fewer than three. In terms of monthly household income, the majority of respondents (299, 70.85%) earned ≤100 USD per month, 108 (25.59%) earned between 100 and 300 USD, and only 15 (3.55%) reported a monthly income of over 300 USD. (Table 1).

Table1: Sociodemographic characteristics of Pregnant Mothers Attending Daynile General Hospital (N = 422).

Variables	**Categories**	**N (%)**
Maternal age	15-19	93(22.04)
	20-24	140(33.18)
	25-29	114(27.01)
	≥30	75(17.77)
Marital status	Married	371(87.91)
	Divorced	25(5.92)
	Widowed	26(6.16)
Occupation	Daily labourer	38(9.00)
	Housewife	369(87.44)
	Market vendor	11(2.61)

	Other*	4(0.95)
Educational level	Not read and write	355(84.12)
	Read and write only	34(8.06)
	Primary	29(6.87)
	Secondary	3(0.71)
	College/University	1(0.24)
Place of birth	Rural	177(41.94)
	Urban	245(58.06)
Residence	Urban	120(28.44)
	semi-urban	302(71.56)
Travel time to health facility	<30min	170(40.28)
	≥30min	252(59.72)
Family size	<3	84(19.91)
	4-5	106(25.12)
	6-7	122(28.91)
	≥ 8	110(26.07)
Monthly income**	≤100	299(70.85)
	100-300	108(25.59)
	>300	15(3.55)

*Note: * other common occupation: Market porter (common in Bakaro market in Mogadishu), ** income was in USD*

Obstetrics history of ANC attendant of the Participants

Among the 422 pregnant mothers included in the study, the majority reported that their current pregnancy was intended (388, 91.94%), while 30 (7.11%) described the pregnancy as unintended, and 4 (0.95%) preferred not to disclose this information. Regarding gestational age, 151 (35.78%) participants were in the seventh to eighth month of pregnancy, 147 (34.83%) were between four and six months, 70 (16.59%) were in the first trimester, and 54 (12.80%) were nine months pregnant or more.

Regarding the most recent place of delivery, nearly half of the respondents (210, 49.76%) delivered at home, while 97 (22.99%) delivered at public hospitals, 71 (16.82%) at maternal and child health (MCH) centers, and 9 (2.13%) at private hospitals. Thirty-two (7.58%) respondents

were primigravida. Most participants who had previously delivered reported a normal vaginal delivery (381, 90.28%), whereas 7 (1.66%) had undergone a caesarean section; 33 (7.82%) were primigravid, and one participant (0.24%) preferred not to disclose the mode of delivery.

Almost half of the respondents (199, 47.16%) reported giving birth for the first time at or before 15 years of age, while 176 (41.71%) had their first birth between 16 and 20 years of age. Twenty participants (4.74%) reported their first childbirth at age ≥ 21 years, whereas 27 (6.40%) were primigravid. Regarding abortion history, 309 (73.22%) participants reported no previous abortions, 58 (13.74%) had experienced one, 32 (7.58%) had experienced two, and 17 (4.03%) reported more than two.

In terms of reproductive history, 168 (39.81%) participants had experienced more than three pregnancies, followed by 86 (20.38%) who had been pregnant three times, 72 (17.06%) who had been pregnant twice, and 49 (11.61%) who had been pregnant once. Regarding parity, 113 (26.78%) had delivered four or more times, 97 (22.99%) had delivered twice, and 69 (16.35%) had delivered once. Fifty-one (12.09%) participants had no previous births and 33 (7.82%) preferred not to disclose their parity information.

A history of pregnancy-related risk was reported by 30 (7.11%) respondents, whereas 359 (85.07%) reported no previous pregnancy risks, and 33 (7.82%) were primigravida. Similarly, only 20 (4.74%) participants reported having previously delivered babies with health problems, whereas 369 (87.44%) had not reported this. Among mothers who reported previous neonatal problems (n = 20), the most frequently mentioned conditions were other unspecified problems (75.00%), followed by macrosomia (15.00%), and congenital malformations (10.00%).

Most respondents (394, 93.36%) did not have any chronic illnesses. Among those with chronic conditions, hypertension was the most common (10, 2.37%), followed by other illnesses (8, 1.90%), asthma (7, 1.66%), and heart disease (3, 0.71).

Regarding antenatal care utilization, 173 (41.00%) participants attended two or fewer ANC visits, 93 (22.04%) attended three visits, 28 (6.64%) attended four visits, and 25 (5.92%) attended more than four. Notably, 103 (24.41%) mothers did not attend any ANC visits during their current pregnancy. Furthermore, 53 (12.56%) respondents reported experiencing danger signs during their current pregnancy, whereas 369 (87.44%) did not.

Knowledge of blood group and Rh factor status was generally poor among participants. More than four-fifths of the participants did not know their blood group (344, 81.52%) or Rh factor status (344, 81.52%). Similarly, over half of the respondents (n = 216, 51.18%) were unaware of their hemoglobin levels. Among those who knew their hemoglobin status, 81 (19.19%) reported levels of 7–9 g/dl, 68 (16.11%) reported 10–11 g/dl, 29 (6.87%) reported 12–16 g/dl, and 28 (6.64%) reported levels below 7 g/dl. (Table 2).

Table2: Obstetrics history of ANC attendants among Pregnant Mothers Attending Daynile General Hospital (N = 422).

Variables	**Categories**	**N (%)**
Pregnancy intended	Wanted	388(91.94)
	Unwanted	30(7.11)
	prefer not to talk	4(0.95)
Months of pregnancy	≤ 3 months	70(16.59)
	4-6 months	147(34.83)
	7-8 months	151(35.78)
	≥ 9 months	54(12.80)
Place of most recent child delivery	Home	210(49.76)
	MCH	71(16.82)
	Private hospital	9(2.13)
	Public hospital	97(22.99)
	Primigravid	32(7.58)
	Other*	3(0.71)
Type of delivery	Normal	381(90.28)
	Cesarian section	7(1.66)
	Primigravid	33(7.82)
	prefer not to talk	1(0.24)
Age at first birth	≤ 15 years	199(47.16)
	16-20 years	176(41.71)
	≥ 21 years	20(4.74)
	Primigravid	27(6.40)

Number of abortions	Once	58(13.74)
	Twice	32(7.58)
	More than two	17(4.03)
	None	309(73.22)
	prefer not to talk	6(1.42)
Gravida	Once	49(11.61)
	Twice	72(17.06)
	3 times	86(20.38)
	More than 3	168(39.81)
	prefer not to talk	47(11.14)
Parity	1	69(16.35)
	2	97(22.99)
	3	59(13.98)
	4+	113(26.78)
	None	51(12.09)
	prefer not to talk	33 (7.82)
Previous risk of pregnancy	Yes	30(7.11)
	No	359(85.07)
	Primigravida	33(7.82)
Having babies with problem	Yes	20(4.74)
	No	369(87.44)
	Primigravida	33(7.82)
Type of problems baby had (n=20)	Congenital malformation	2(10.00)
	Macrosomic baby	3(15.00)
	Other**	15(75.00)
Chronic medical illness	Asthma	7(1.66)
	Heart disease	3(0.71)
	Hypertension	10(2.37)
	Other***	8(1.90)

	None	394(93.36)
Number of ANC visit	≤ 2	173(41.00)
	3	93(22.04)
	4	28(6.64)
	>4	25(5.92)
	I didn't visit	103(24.41)
Developed danger sign in present pregnancy	Yes	53(12.56)
	No	369(87.44)
Blood group	A	21(4.98)
	B	12(2.84)
	AB	19(4.50)
	O	26(6.16)
	Don't know	344(81.52)
Rh factors	Positive	66(15.64)
	Negative	12(2.84)
	Don't know	344(81.52)
Hemoglobin	<7 gm/dl	28(6.64)
	7-9 gm/d	81(19.19)
	10-11gm/dl	68(16.11)
	12-16 gm/d	29(6.87)
	I don't know	216(51.18)

Note: **Religious healing center; ** the other common problems were: Birth Asphyxia, Respiratory distress; *** diabetes*.

Knowledge and counseling assessment of ANC attendants among participants.

Regarding maternal health education, only 85 (20.14%) respondents reported receiving health talks during antenatal care (ANC) visits, whereas the majority, 337 (79.86%) had not received any health talks. Among mothers who received health education during ANC (n = 85), most considered the information adequate (70, 82.35%), while 15 (17.65%) perceived it to be inadequate.

Awareness of obstetric danger signs was generally low in this study sample. Only 43 (10.19%) participants reported being informed about obstetric danger signs during pregnancy, while 379 (89.81%) had not received this information.

When asked whether obstetric danger signs could result in serious health problems or death for the mother, 68 (16.11%) respondents answered affirmatively, 238 (56.40%) believed that danger signs would not lead to such outcomes, and 116 (27.49%) reported that they did not know the answer. Similarly, only 65 (15.40%) participants believed that danger signs could cause serious health problems or death for the fetus, whereas 244 (57.82%) did not believe this, and 113 (26.78%) were unsure.

In general, the findings indicate limited exposure to maternal health education and inadequate awareness of the potential consequences of obstetric danger signs for both mothers and fetuses among participants. (Table 3).

Table 3: Knowledge and counseling assessment of ANC attendants among Pregnant Mothers Attending Daynile General Hospital (N = 422).

Variables	**Categories**	**N (%)**
Health talks given during ANC	Yes	85(20.14)
	No	337(79.86)
Health talks received considered adequate(n=85)	Adequate	70(82.35)
	Inadequate	15(17.65)
Informed about obstetrics danger signs	Yes	43(10.19)
	No	379(89.81)
Do you think that danger sign may cause problems/death for the mother?	Yes	68(16.11)
	No	238(56.40)
	I don't know	116(27.49)
Do you think that danger sign may cause problems/death for the fetus	Yes	65(15.40)
	No	244(57.82)
	I don't know	113(26.78)

Note: ANC=Antenatal Care;

Knowledge on danger signs during pregnancy among participants

The participants were asked to mention the danger signs that may occur during pregnancy. Overall, awareness of specific danger signs was low, and a substantial proportion of respondents (264, 62.56%) were unable to identify any danger signs.

Among the danger signs identified by the respondents, vaginal bleeding was the most frequently recognized, reported by 76 (18.01%) participants. This was followed by blurred vision (64, 15.17%), loss of consciousness (54, 12.80%), swollen face and legs (54, 12.80%), dysuria (51, 12.09%), high fever (48, 11.37%), persistent abdominal pain (47, 11.14%), and difficulty breathing (47, 11.14%).

Other danger signs included chills (45, 10.66%), high blood pressure (43, 10.19%), persistent vomiting (42, 9.95%), weakness preventing normal daily activities (38, 9.00%), marked reduction in fatal movement (34, 8.06%), and recurrent frontal headache (32, 7.58%).

The findings indicate a generally low awareness of obstetric danger signs among pregnant mothers attending Daynile General Hospital, with fewer than one-fifth of participants correctly identifying any individual danger sign and nearly two-thirds unable to identify any danger sign. (Table 4).

Table 4: Knowledge of danger signs during pregnancy among Pregnant Mothers Attending Daynile General Hospital (N = 422).

Variables*	**N (%)**
Vaginal bleeding	76(18.01)
Marked reduction in foetal movement	34(8.06)
Blurred vision	64(15.17)
Persistent abdominal pain	47(11.14)
Loss of consciousness	54(12.80)
Difficulty of breathing	47(11.14)
High grade fever	48(11.37)
Weakness to get out of bed	38(9.00)
Chills	45(10.66)
Persistent vomiting	42(9.95)
Recurrent frontal head ache	32(7.58)
High B/P	43(10.19)

Dysuria	51(12.09)
Swollen face and leg	54(12.80)
Don't know	264(62.56)

Note: *B/p= blood pressure; N= number; * Multiple responses were allowed; therefore, the percentages do not sum to 100%*

Factors Associated with Awareness of Danger Signs During Pregnancy

In the multivariable logistic regression analysis, maternal age, number of antenatal care (ANC) visits, development of danger signs during the current pregnancy, receipt of health talks during ANC, hemoglobin level, and pregnancy intention were significantly associated with awareness of danger signs during pregnancy.

Mothers aged ≥ 30 years were 68% less likely to have good awareness of danger signs during pregnancy than those younger than 30 years (AOR = 0.32, 95% CI: 0.14–0.74).

Participants who attended two or fewer ANC visits were 53% less likely to have good awareness than those who attended more than two ANC visits (AOR = 0.47, 95% CI: 0.27–0.82).

Mothers who had experienced a danger sign during the current pregnancy were 2.56 times more likely to have good awareness than those who had not experienced a danger sign (AOR = 2.56, 95% CI: 1.11–5.90).

Similarly, respondents who received health talks during ANC visits were 2.80 times more likely to have good awareness of pregnancy danger signs than those who did not receive health talks (AOR = 2.80, 95% CI: 1.32–5.92).

Women with hemoglobin levels ≥ 10 g/dl had approximately two times higher odds of having good awareness compared with women whose hemoglobin levels were < 10 g/dl (AOR = 2.05, 95% CI: 1.16–3.60).

Furthermore, mothers with intended pregnancies were 69% less likely to have good awareness of the danger signs during pregnancy than those with unintended pregnancies (AOR = 0.31, 95% CI: 0.14–0.69).

Although the place of the most recent child delivery, being informed about obstetric danger signs, and having previously delivered a baby with health problems showed associations in the crude analysis, these variables did not remain statistically significant after adjusting for other factors. (Table 5).

Table 5. Bivariate and Multivariable Logistic Regression Analysis of Factors Associated with Awareness of Danger Signs During Pregnancy among Pregnant Mothes Attending Daynile General Hospital, Mogadishu, Somalia, 2026 (N = 422).

Variables	Category	Level of Awareness		COR (95% CI)	AOR (95% CI)
		Good awareness n (%) n= 112(26.54)	Poor awareness n (%) n= 310(73.46)		
Maternal age	<30	105	242	1	1
	≥30	7	68	0.24(0.11,0.53) **	0.32(0.14,0.72) **
Place of most recent child delivery	Home	46	167	0.59(0.38,0.92) *	0.98(0.58,1.65)
	Health institute	66	143	1	1
Number of ANC visit	≤ 2	35	138	0.57(0.36,0.89) *	0.47(0.27,0.82) **
	>2	77	172	1	1
Developed danger sign in present pregnancy	Yes	32	21	5.50(3.01,10.06) ***	2.56(1.11,5.89) *
	No	80	289	1	1
Health talks given during ANC	Yes	51	34	6.79(4.06, 11.36) ***	2.79(1.32,5.92) **
	No	61	276	1	1
Informed about obstetrics danger signs	Yes	33	10	12.53(5.92,26.52) ***	2.75(0.97,7.80)
	No	79	300	1	1
Having babies with problem	Yes	14	6	7.24(2.71,19.35) ***	3.11(0.96,10.04)
	No	98	304	1	1
Hemoglobin level	<10 gm/d	74	251	1	1
	≥10 gm/d	38	59	2.18(1.35, 3.54) **	2.05(1.16, 3.60) *
Pregnancy intended	Wanted	96	292	0.37(0.18,0.75) **	0.31(0.14,0.69) **
	Unwanted	16	18	1	1

Note: *Good awareness was coded as **1** and poor awareness as **0**; **ANC** = Antenatal Care; **CI** = Confidence Interval; **COR** = Crude Odds Ratio; **AOR** = Adjusted Odds Ratio. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.*

Discussion

The core finding of this study revealed that only 26.54% of pregnant mothers attending the Daynile General Hospital had good awareness of obstetric danger signs. This indicates a critically low level of knowledge, as nearly two-thirds (62.56%) of the participants were unable to mention even one pregnancy danger sign. Clinically, this deficiency is alarming because maternal recognition of these signs is the essential first step in ensuring timely access to emergency obstetric care[9]. From an epidemiological perspective, such low awareness contributes directly to the first delay, that is, the delay in deciding to seek care, which is a major driver of the high maternal mortality burden in Somalia, currently estimated at 396 deaths per 100,000 live births[5]. Without the ability to identify signals such as severe vaginal bleeding or blurred vision, mothers cannot initiate the life-saving healthcare-seeking process.

The implications of this low awareness in Mogadishu are profound. The inability to recognize complications means that most mothers and their families likely waste critical time before pursuing professional help, significantly increasing the risk of adverse maternal and fetal outcomes, including preventable deaths or long-term disability. Poor awareness is also a barrier to optimal ANC utilization, as women who do not perceive their clinical risks are less likely to prioritize regular follow-up. These results reinforce the evidence that early recognition facilitates survival; hence, the pervasive ignorance of danger signs represents a life-threatening clinical gap. Consequently, improving health literacy in this setting is not only a public health goal but also a fundamental requirement for reducing maternal morbidity and mortality rates.

Similarities The prevalence of awareness in this study (26.54%) aligns with the results from other low-resource settings in East Africa, where knowledge levels are often low. For instance, this finding is comparable to the 16.8% awareness level found in Southern Ethiopia[10], and, while higher, still reflects the severe knowledge gaps illustrated by the 4.7% reported in Bureti Sub-County, Kenya[1]. The consistency across these regions likely stems from similar healthcare access issues and ANC systems that may prioritize clinical routines over comprehensive health education. Furthermore, the high rate of illiteracy among our participants (84.1%) is a common thread in these settings, presenting a persistent sociocultural barrier to the effective dissemination of vital health information in this region.

In contrast, our findings are significantly lower than those reported in more stable urban centers. For example, a study in Mekelle, Ethiopia, reported 82.5% awareness, and a study in Kigali, Rwanda, found 56% awareness of pregnancy-related signs. These differences can be attributed to variations in the study settings, where established urban centers often benefit from better health extension programs and more consistent media exposure. Additionally, measurement differences regarding the threshold for "good knowledge" (e.g., mentioning two signs versus three) and the hospital-based nature of our sample compared to community-based surveys in other regions may contribute to these disparate results.

Multivariate analysis identified several significant predictors that transitioned the focus from general awareness to specific determinants of health literacy in Mogadishu, Somalia.

Although education is typically a strong predictor, the overwhelming illiteracy rate in this sample limited its analytical significance. However, maternal age was a significant predictor, though in an unexpected direction: mothers aged 30 years and above were 68% less likely to have good awareness compared to younger mothers (AOR = 0.32). This suggests that younger women in this setting might have had better recent exposure to health information or were more psychologically receptive to antenatal care (ANC) messages. This contradicts the background theory that older age generally correlates with higher knowledge due to cumulative experience.

The frequency of visits and exposure to counseling were the primary mechanisms of knowledge acquisition for the participants. Mothers with two or fewer ANC visits were 53% less likely to have good awareness (AOR = 0.47). Crucially, those who received health talks during visits were 2.8 times more likely to be knowledgeable (AOR = 2.80). This reinforces the background assertion that ANC is a pivotal intervention point for health education, where repeated contact facilitates better knowledge retention among pregnant women.

Consistent with the experiential learning effect, mothers who experienced danger signs during their current pregnancy were 2.56 times more likely to have good awareness (AOR = 2.56). This indicates that personal encounters with obstetric risks serve as a powerful source of information, making these women more conscious of health threats than those with healthy pregnancies.

Exposure to information was remarkably low, with only 10.19% of participants reporting that they had been informed about danger signs during their current pregnancies. This highlights a severe knowledge diffusion gap within the local healthcare system.

Biological status also influenced awareness; women with hemoglobin levels ≥ 10 g/dl or higher had two times the odds of possessing good knowledge (AOR = 2.05). Surprisingly, mothers with intended pregnancies were 69% less likely to have good awareness than those with unintended pregnancies (AOR = 0.31). This unexpected finding suggests that women with unintended pregnancies may engage with the health system with higher anxiety levels or make more frequent early visits, leading to increased exposure to risk-related information.

These findings are directly integrated with the global and local maternal mortality burden established in the background, confirming that widespread lack of awareness remains a critical barrier to survival in Somalia. The results validate the study rationale by showing that local knowledge gaps are indeed extreme, confirming that ANC is the primary intervention point for targeted education. By demonstrating that even high-risk groups frequently lack basic awareness, this study challenges the adequacy of current hospital-based education strategies. These findings provide a logical transition to the need for tailored interventions that address these specific determinants to improve emergency care-seeking behaviors.

Conclusions

This study aimed to assess the level of awareness of danger signs during pregnancy and the associated factors among pregnant mothers attending Daynile General Hospital in Mogadishu, Somalia. The findings revealed that only 26.54% of participants had good awareness. This overall level of knowledge is considered critically inadequate, as nearly two-thirds of the women were unable to identify even one pregnancy complication.

Multivariable analysis identified maternal age, the number of antenatal care (ANC) visits, and the receipt of health talks during those visits as the main determinants independently associated with awareness of FASDs. Additionally, the experience of danger signs during the current pregnancy, maternal hemoglobin levels, and pregnancy intentions were significant predictors in the final model. These factors are important targets for interventions aimed at improving maternal awareness and reducing delays in seeking emergency care in the future.

The broader implication of these findings is that suboptimal awareness remains a significant barrier to the timely recognition of complications and the utilization of emergency obstetric services. This highlights the need to strengthen educational strategies during clinical encounters to bridge existing knowledge gaps. Improving awareness of obstetric danger signs should be an

integral component of routine antenatal care and maternal health programs to enhance survival outcomes for both mothers and infants in low-income countries.

Recommendations

Based on the findings of this study, strengthening health education on obstetric danger signs should be prioritized within routine antenatal care (ANC) services. Healthcare providers should ensure that all pregnant women receive standardized counseling on the recognition of danger signs, their potential consequences, and the importance of seeking immediate medical care. Particular attention should be given to women with limited ANC attendance and older pregnant women, who demonstrated lower levels of awareness.

Healthcare facilities should strengthen the quality and consistency of health talks provided during ANC visits by integrating structured education on obstetric danger signs into every ANC contact. Educational materials should be culturally appropriate and delivered using clear, understandable language to improve maternal knowledge and preparedness for pregnancy-related complications.

The Ministry of Health, Daynile General Hospital, and implementing partners should strengthen maternal health promotion through both facility- and community-based awareness programs. These interventions should emphasize early ANC attendance, regular follow-up throughout pregnancy, and continuous health education to improve women's recognition of obstetric danger signs and encourage timely healthcare-seeking behavior.

Routine screening and management of maternal conditions, including anemia, should be integrated with health education during ANC, as women with higher hemoglobin levels demonstrated better awareness. In addition, healthcare providers should provide targeted counseling for women experiencing pregnancy complications or unintended pregnancies to improve awareness and promote appropriate care-seeking.

Future studies should employ community-based and longitudinal designs to establish causal relationships and assess awareness of obstetric danger signs among pregnant women beyond the hospital setting. Qualitative studies are also recommended to explore barriers to maternal awareness and utilization of health information during pregnancy.

Study Limitations

This study had several limitations that should be considered when interpreting its findings. First, the cross-sectional study design precluded the establishment of causal relationships between the identified factors and awareness of danger signs during pregnancy. Second, because the study was conducted in a single health facility, the findings may not be generalizable to all pregnant

women in Somalia, particularly those who do not attend antenatal care services, receive care at other health facilities, or live in rural areas.

Third, data were collected using interviewer-administered questionnaires and relied primarily on participants' self-reported responses, which may have introduced recall bias, particularly regarding previous obstetric experiences, antenatal care, and health education. Social desirability bias may have influenced participants to overreport their awareness of danger signs or previous exposure to health talks during antenatal care.

Finally, although multivariable logistic regression was used to adjust for potential confounding factors, some categories contained relatively few observations, which may have reduced the precision of the estimated associations, as reflected by the wide confidence intervals of some variables.

Abbreviations

ANC – Antenatal Care

AOR – Adjusted Odds Ratio

BP – Blood Pressure

CI – Confidence Interval

COR – Crude Odds Ratio

DGH – Daynile General Hospital

HL – Hosmer–Lemeshow

MCH – Maternal and Child Health

MMR – Maternal Mortality Ratio

n – Initial Sample Size

NF– Final Sample Size

OR – Odds Ratio

Rh – Rhesus Factor

SDGs – Sustainable Development Goals

VIF – Variance Inflation Factor

WHO – World Health Organization

Declarations

Ethics approval and consent to participate

Ethical clearance for this study was obtained from the Institutional Review Board of Daynile General Hospital (Ref: DGH:2026/0002, issued March 2026). All study procedures adhered to the Declaration of Helsinki and relevant national guidelines. Informed consent was obtained from all participants before data collection, and confidentiality was ensured by using anonymized data and secure storage. Participants were also fully informed of their right to decline participation or withdraw at any stage without penalty.

consent to participate

Participants provided written informed consent prior to enrolment after receiving comprehensive information about the study objectives, procedures, potential risks, and their right to withdraw without penalty. Confidentiality was maintained using anonymous questionnaires.

Consent for publication

Not applicable. No individual-level identifying information is included in this manuscript.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare no competing interests.

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Authors' contributions

BMA conceived the study, led the study design, supervised data collection, conducted the data analysis, and drafted the initial manuscript. SHN and HAH provided methodological guidance and critically reviewed the manuscript for intellectual content. HMI, AAA, and RAM contributed to the questionnaire development, data collection, and cleaning. All authors have read and approved the final manuscript.

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Supplementary Files

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- STROBEchecklistforLevelofawareness.pdf