Knowledge of obstetric danger signs and associated factors among pregnant women in Wolaita Sodo town, South Ethiopia: A community-based cross-sectional study

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Abstract

Introduction: Obstetric complications continue to be the major causes of maternal mortality in low- and middle-income countries. Knowledge of women toward obstetric danger signs is an important part of improving maternal and fetal outcomes. However, the reported level of knowledge on obstetric danger signs is low and inconsistent.

Methods: Community-based cross-sectional study design was used. Data were collected from randomly selected 740 pregnant women. A pregnant woman said to have good knowledge of obstetric danger signs if she spontaneously mentioned at least two of the danger signs during each of the three periods (pregnancy, labor/childbirth, and postpartum) and otherwise said to have poor knowledge of obstetric danger signs. Adjusted odds ratio at 95% confidence interval and a value of $p < 0.05$ were used to identify the predictors.

Results: A total of 740 pregnant women participated in the study with the response rate of 97.5%. One hundred twenty-four (16.8%) of the respondents were knowledgeable about obstetric danger signs. According to our study, age range of 20–24 years (adjusted odds ratio = 6, confidence interval: 2.67–17.44) and 25–29 years old (adjusted odds ratio = 2.4, confidence interval: 1.14–5.10); being housewife (adjusted odds ratio = 0.5, confidence interval: 0.28–0.87); monthly income of ⩽1000ETB (adjusted odds ratio = 0.24, confidence interval: 0.12–0.46) and 1001-2500ETB (adjusted odds ratio = 0.24, confidence interval: 0.12–0.47); and primigravida (adjusted odds ratio = 0.09, confidence interval: 0.04–0.18) and primipara (adjusted odds ratio = 0.15, confidence interval: 0.07–0.30) were factors significantly associated with knowledge of obstetric danger signs.

Conclusion: Knowledge of obstetric danger signs among pregnant women was low. Maternal age, average monthly income, maternal occupation, parity, and gravidity were factors significantly associated with the knowledge of obstetric danger signs.

Introduction

Obstetric complications and the associated mortality remain one of the major burdens in low- and middle-income countries.[1] In 2015, complications related to pregnancy and childbirth contributed to the death of 830 women daily throughout the world. Two-thirds (66.2%) of these deaths occurred in Sub-Saharan Africa. In low- and middle-income countries, the risk of women dying from maternal-related causes during their lifetime is almost 33 times higher than that in developed countries.[2]

Even though many developing nations including Ethiopia have made significant progress in reducing maternal mortality,

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maternal mortality yet remains a significant burden in these nations. In Ethiopia, maternal mortality decreased from 676 per 100,000 live births in 2011 to 412 per 100,000 live births in 2016. However, this number makes Ethiopia one of the countries with the highest maternal mortality.[3,4]

Obstetric danger signs such as blurred vision, absence of fetal movements, vaginal bleeding, a gush of fluid from the vagina, high fever, foul-smelling vaginal discharge, convulsions, abdominal pain, and severe headaches are among the most commonly encountered obstetric danger signs that account for about 75% of all maternal deaths during pregnancy, labor, and after childbirth.[5–9]

During pregnancy and delivery, appropriate care is important for the health of the mother and the baby. Around 15% of pregnant women acquire life-threatening complications that are unpredictable and may advance rapidly to a fatal outcome.[10]

Although recognizing and understanding the key obstetric danger signs have a considerable role in reducing both maternal and child mortality by making the fast decision for seeking emergency interventions, numerous literature revealed that the level of knowledge of these obstetric danger signs was found to be low in countries of Sub-Saharan African and South Asia.[8,11–13]

Different studies conducted in Ethiopia have revealed that the level of knowledge on obstetric danger signs is low, unevenly distributed, and inconsistent among regions.[14–17] For example, the level of women's knowledge about obstetric danger signs during pregnancy was lowest (32%) in the Ethiopian Somali region, eastern Ethiopia,[16] and highest (72%) in the Tigray region, northern Ethiopia.[18] This might show the effect of the difference in the study setting, level of antenatal care (ANC) utilization, and socio-demographic characteristics. Furthermore, the majority of the studies conducted in Ethiopia were institution-based.[19–23] The finding of the study helps to see the gaps in the community on the knowledge of obstetric danger signs, and it will be an input for health service providers, policymakers, and program managers to design intervention strategies that will improve knowledge of obstetric danger signs in the communities. As our knowledge goes, there is no published study conducted in the study area. Therefore, this study aimed to determine the level of knowledge on obstetric danger signs and its determinants among pregnant women in Wolaita Sodo town, Wolaita zone, South Ethiopia.

Methods

Study area and period

The study was conducted in Wolaita Sodo town, Wolaita zone. The town is located in Southern Nations, Nationalities, and Peoples' Region (SNNPR) at 380 km from Addis Ababa, the capital city of Ethiopia, and 157 km from Hawassa, the capital city of SNNPR. Wolaita Sodo town has a total of 18 kebeles (a kebele is the smallest administrative unit of Ethiopia), 11 urban and 7 rural kebeles with a total population of 140,195. Of the total population, about 32,665 were in the reproductive age group (15–49 years) and about 4851 were pregnant women in 2016/2017. The health coverage of the town is 96%.[24] The study was conducted from 1 April to 30 July 2017.

Study design

A community-based cross-sectional study design was implemented. The work has been reported in line with the STROCSS criteria.[25] The Unique Identifying Number (UIN) of this study is researchregistry5333 in Research Registry registration, per the Declaration of Helsinki.

Population

All pregnant women living in Wolaita Sodo town during the study period were our source population, whereas all randomly selected pregnant women from randomly selected kebeles of Wolaita Sodo town were our study population. Pregnant mothers registered in each kebele for home delivery free (HDF) initiative and who lived in the study area for at least 6 months were included. Pregnant mothers who were critically ill and cannot communicate during the study period were excluded.

Sample size determination

The sample size was determined by using a single population proportion formula for a cross-sectional survey and assuming the proportion of knowledgeable women to be 58.8% which gives the maximum sample size from the previous study[14] with a confidence level of 95% and degree of precision of 5%. By inserting the above value in the formula, the minimum sample required was 372. Since our source population was less than 10,000, finite population correction was made. Accordingly, a sample size of 345 was obtained. Finally, by considering the design effect of the 2% and 10% non-response rate, the total sample size was 759.

Sampling technique

For the selection of study subjects, a two-stage stratified sampling technique was used. Initially, the list of kebeles was stratified into urban and rural. A kebele was defined as a cluster and a total of 18 clusters were formed. Of these clusters five (3 of 11 urban and 2 of 7 rural kebeles) were selected by the lottery method. For the randomly selected clusters, the sampling frame was made and participants of the study were proportionally selected by systematic random sampling. The pregnant women registry in each cluster for HDF initiative was used as the sampling frame. The sampling interval (K) was obtained by dividing the total number of pregnant
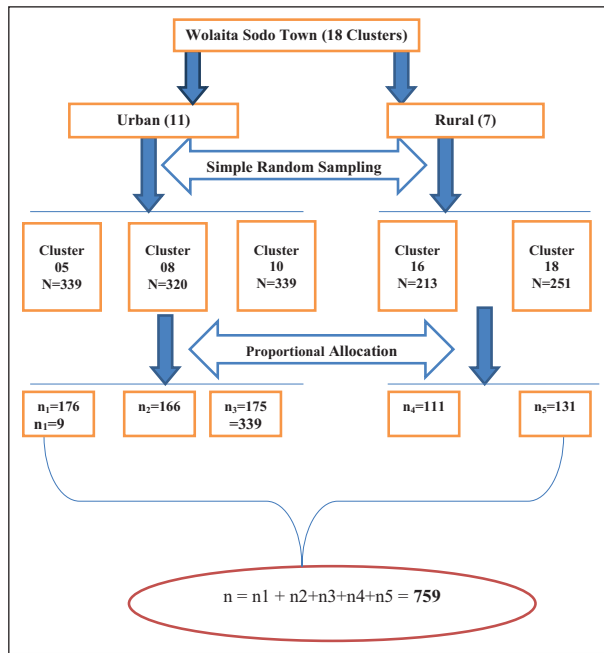
Figure 1. Schematic presentation of sampling procedure, Wolaita Sodo, South Ethiopia, 2017.

women in each cluster by its sample size. By doing so, K was found to be 2 for all clusters. Then, the first sample was taken by the lottery method (Figure 1).

Study variables

Knowledge of obstetric danger signs was the dependent variable, whereas socio-demographic factors such as age, marital status, religion, ethnicity, education, income, family size, and residence; predisposing factors such as husband's occupation and education; perception of maternity care service; and obstetric factors such as parity, history of stillbirth, and ANC follow-up were our independent variables

Data collection tool and procedure

Pre-tested and interviewer-administered structured questionnaires that capture essential data elements of the research question was adapted from monitoring safe motherhood, developed by the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) maternal and neonatal health program and adapted according to the local context and the objective of the study.[7] We have permission to use questionnaires in this study. Pre-test was done on 5% (38) of the total sample size that were not included in the main data. The data collection tool has five parts: socio-demographic characteristics; obstetric related characteristics; obstetric danger signs knowledge; husband's education and occupation; and personal experience related to the current pregnancy. Data were collected through interview directly from the study subjects.

Data were collected by four female diploma midwives who have had training on the subject matter and experience in data collection. Two public health officers supervised the overall data collection and check for filled questionnaires for consistency and completeness. During data collection, questionnaires were reviewed and checked for completeness and relevance by the principal investigators and the supervisors. The data collectors conducted an interview based on the rearranged list of participant's house numbers from the HDF initiative registration book list.

Data processing and analysis

Data were cleaned and entered into a computer by using EPI Info version 3.5.3. Statistical analysis was done using SPSS version 21. Logistic regression was carried out to identify determinants of knowledge of obstetric danger signs. Variables with $p < 0.25$ in the bivariate analysis were selected as candidate variables for multivariate logistic regression analysis to control the effect of confounders. Adjusted odds ratios (AORs) with their 95% confidence intervals (CIs) and $p < 0.05$ were considered to have a significant association between the outcome and the independent variables. The model fitness was checked using Hosmer and Lemeshow and was found fit.

Operational definitions

Knowledgeable on key danger signs of pregnancy: A woman was considered knowledgeable about obstetric danger signs during pregnancy if she can mention at least two of the three key danger signs for pregnancy (vaginal bleeding, swollen hands/face, and blurred vision) spontaneously or after prompting.

Knowledgeable on key danger signs of labor/childbirth: A woman was considered knowledgeable about obstetric danger sign during labor/childbirth if she can mention at least three of the four key danger signs for labor/childbirth (severe vaginal bleeding, prolonged labor (>12 h), convulsions, and retained placenta) spontaneously or after prompting.

Knowledgeable on key danger signs of postpartum: A woman was considered knowledgeable of obstetric danger signs during postpartum if she can mention at least two of the three key danger signs for postpartum (severe vaginal bleeding, foul-smelling vaginal discharge, and high fever) spontaneously or after prompting.

Knowledge of obstetrical danger signs: A pregnant women said to have **good knowledge** of obstetric danger signs if she spontaneously mentioned at least two of the danger signs during each of the three periods (pregnancy, labor/childbirth, and postpartum); otherwise said to have **poor knowledge** of obstetric danger signs. The above method of scoring has been previously used by studies

conducted to assess women's knowledge of obstetric danger signs.[16,23,26]

HDF initiative: It was the initiative designed by the Federal Ministry of Health of Ethiopia to make home delivery zero. The strategy to achieve this goal is by deploying health extension workers to the community to register all pregnant women and encourage them to have ANC follow-up.

Results

Socio-demographic and obstetric characteristics

A total of 740 pregnant women participated in the study giving a response rate of 97.5%. The mean age of the study participants was 26.63 years (±4.67 standard deviation (SD)) in the range of 17–37 years. Regarding the marital status and religion of respondents, 630 (85.1%) were married and 704 (95.1%) were Christians. Regarding residence and occupation, 508 (68.6%) were from urban kebele and 373 (50.4%) were unemployed. More than half (452 (61.1%)) of the respondents had an average monthly income below 1000.00ETB. Of the total study participants, 427 (57.7%) were multigravida, whereas 270 (36.5%) were multipara (Table 1).

Knowledge of obstetric danger signs among pregnant women

Among the respondents, 506 (68.4%), 503 (68.0%), and 434 (58.6%) had awareness of obstetric danger signs during pregnancy, labor/childbirth, and postpartum period, respectively. Below half of the study subjects, 353 (47.7%) were found to be knowledgeable about danger signs during pregnancy. Two hundred seven (28.0%) study subjects were knowledgeable about danger signs during labor and delivery. It was also found that 276 (37.3%) participants were knowledgeable about danger signs during postpartum. Blurred vision was the most frequently known danger sign mentioned by study participants during pregnancy (390 (77.1%)) and at postpartum period (309 (71.2%)), whereas severe vaginal bleeding was the most frequently known danger sign mentioned by study participants during labor and childbirth (340 (67.6%)) (Table 2). Regarding the overall level of knowledge toward obstetric danger signs, the majority of respondents (616 (83.2%)) had poor knowledge, while the remaining (124 (16.8%)) had good knowledge.

Factors associated with knowledge of obstetric danger signs

In the multivariate analysis, maternal age, monthly income, maternal occupation, number of pregnancies, and deliveries were significantly associated with knowledge of obstetric danger signs.

Table 1. Socio-demographic and obstetric characteristics of respondents in Wolaita Sodo town, South Ethiopia, 2017 (N = 740).

Variables	Category	Frequency	Percent
Age (years)	≤19	157	21.2
	20–24	205	27.7
	25–29	273	36.9
	30 and above	105	14.2
Family members	1–2 persons	292	39.5
	3–4 persons	259	35.0
	>4 persons	189	25.5
Maternal education	No formal education	79	10.7
	Primary	184	24.9
	Secondary	271	36.6
	Above secondary	206	27.8
Husband education	No formal education	33	4.5
	Primary	92	12.4
	Secondary	363	49.1
	Above secondary	252	34.1
Maternal occupation	Housewife	373	50.4
	Employed	367	49.6
Husband occupation	Employed	704	95.1
	Farmer	36	4.9
Average monthly income (Ethiopian birr, ETB)	≤1000ETB	452	61.1
	1001–2500ETB	190	25.7
	>2500ETB	98	13.2
Residence	Urban	508	68.6
	Rural	232	31.4
Pregnancy number	Primigravida	313	42.3
	Multigravida	427	57.7
Parity	Nullipara	313	42.3
	Primipara	157	21.2
	Multipara	270	36.5
Antenatal care utilization	Yes	623	84.2
	No	117	15.8
History of stillbirth	Yes	17	2.3
	No	723	97.7

Women with the age group 20–24 years were 6 times more likely to be knowledgeable of obstetric danger signs than women who were 30 years old and above (AOR = 6, CI: 2.67–17.44). Similarly, pregnant women in the age category of 25–29 years old were 2.4 times more likely to be knowledgeable of obstetric danger signs than women who were 30 years old and above (AOR = 2.4, CI: 1.14–5.10).

Women with low (≤1000ETB) monthly income were 76% less likely to be knowledgeable about obstetric danger signs compared to women who had high (>2500ETB) monthly income (AOR = 0.24, CI: 0.12–0.46). Similarly, pregnant women with a monthly income of 1001–2500ETB were 76% less likely to be knowledgeable about obstetric danger signs compared to women who had high (>2500ETB) monthly income (AOR = 0.24, CI: 0.12–0.47).

It was also observed that the probability of knowing obstetric danger signs decreased almost by 50% among

Table 2. Respondent's knowledge on danger signs during pregnancy, labor and delivery, and the postpartum period in Wolaita Sodo town, South Ethiopia, 2017.

Characteristics	Category	Knowledge of danger signs during:					
		Pregnancy (N = 506)		Labor and childbirth (N = 503)		Postpartum (N = 434)	
		n	%	n	%	N	%
Blurred vision	Yes	390	77.1	165	32.8	309	71.2
	No	116	22.9	338	67.2	125	28.8
Severe abdominal pain	Yes	329	65.0	NA	NA	NA	NA
	No	177	35.0	NA	NA	NA	NA
Sever vaginal bleeding	Yes	328	64.8	340	67.6	256	59.0
	No	178	35.2	163	32.4	178	41.0
Severe headache	Yes	319	63.0	304	60.4	227	52.3
	No	187	37.0	199	39.6	207	47.3
Severe weakness	Yes	314	62.1	NA	NA	281	64.7
	No	192	37.9	NA	NA	153	35.3
Difficulty breathing	Yes	300	60.5	NA	NA	251	57.8
	No	196	39.5	NA	NA	183	42.2
Conscious loss	Yes	298	58.9	NA	NA	248	57.1
	No	208	41.1	NA	NA	186	42.9
Water breaks before labor	Yes	289	57.1	NA	NA	NA	NA
	No	217	42.9	NA	NA	NA	NA
High fever	Yes	264	52.7	308	61.2	190	43.8
	No	237	47.3	195	38.8	244	56.2
Swollen hand/face	Yes	252	49.8	NA	NA	180	41.5
	No	254	50.2	NA	NA	254	52.5
Convulsion	Yes	217	42.9	299	59.4	140	32.3
	No	289	57.1	204	40.6	294	67.7
Accelerated/reduced fetal movement	Yes	213	42.1	NA	NA	NA	NA
	No	293	57.9	NA	NA	NA	NA
Labor lasting >12 h	Yes	NA	NA	297	59.0	NA	NA
	No	NA	NA	206	41.0	NA	NA
Placenta not delivered 30 min after baby	Yes	NA	NA	317	63.0	NA	NA
	No	NA	NA	186	37.0	NA	NA
Offensive vaginal discharge	Yes	NA	NA	NA	NA	281	64.7
	No	NA	NA	NA	NA	153	35.3

NA indicates that the specific danger sign was not asked under the specified category.

women whose occupation was housewife compared to employed women (AOR = 0.5, CI: 0.28–0.87).

Other important predictors were the number of pregnancies and the number of deliveries wherein both cases primigravida and primipara pregnant women were less likely to have good obstetric knowledge. The chance of having good knowledge of obstetric danger signs was 91% less among primigravida compared to those multigravida pregnant women (AOR = 0.09, CI: 0.04–0.18). Also, primipara pregnant women were 85% less likely to have good obstetric knowledge compared to multipara pregnant women (AOR = 0.15, CI: 0.07–0.30) (Table 3).

Discussion

In the present study, the prevalence of good knowledge of obstetric danger signs was 16.8%; maternal age, average monthly income, maternal occupation, parity, and gravidity were identified as independent predictors of knowledge of obstetric danger signs. Every pregnant woman faces the risk of sudden, unpredictable complications that could contribute to maternal and child death.[27] Pregnant women can avoid risks of obstetric complications if they are capable of identifying the forewarning obstetric danger signs. In resource-limited countries like Ethiopia, increasing the level of obstetric danger signs awareness among women is one of the feasible strategies to reduce maternal mortality and morbidity due to obstetric complications. But, the level of this knowledge is very low among women of Sub-Saharan Africa including Ethiopia.[9,11,12,14–16,28] Thus, this study was conducted to disclose the current level of knowledge about obstetric danger signs and associated factors among pregnant women in Wolaita Sodo town, Wolaita zone, South Ethiopia.

Table 3. Factors associated with knowledge of obstetric danger signs in Wolaita Sodo town, South Ethiopia, 2017.

Variables	Category	Knowledge of obstetric danger signs		COR, 95% CI	p value	AOR, 95% CI	p value
		Good (N = 124)	Poor (N = 616)				
Age (years)	<19	10 (8.1)	147 (23.9)	0.40 (0.09–0.71)	0.851	1.25 (0.38–4.09)	0.717
	20–24	46 (37.1)	159 (25.8)	1.74 (1.05–2.43)	0.001	6 (2.67–17.44)	**<0.001**
	25–29	53 (42.7)	220 (35.7)	0.69 (0.26–1.12)	0.213	2.4 (1.14–5.10)	**0.022**
	>30	15 (12.1)	90 (14.6)	1		1	
Monthly income	≤1000	50 (40.3)	402 (65.3)	0.12 (0.017–0.21)	0.06	0.24 (0.12–0.46)	**<0.001**
	1001–2500	23 (18.5)	167 (27.1)	0.13 (0.020–0.23)	0.003	0.24 (0.120–0.465)	**<0.001**
	>2500	51 (41.1)	47 (7.6)	1		1	
Maternal occupation	Housewife	40 (32.3)	333 (54.1)	0.41 (0.17–0.65)	0.01	0.5 (0.28–0.87)	**<0.001**
	Employee	84 (67.7)	283 (45.9)	1		1	
Pregnancy number	Primigravida	27 (21.8)	286 (46.4)	0.24 (0.05–0.43)	0.24	0.09 (.04–0.18)	**0.001**
	Multigravida	97 (78.2)	330 (53.6)	0.75 (0.14–1.36)		1	
Parity	Nullipara	27 (21.8)	286 (46.4)	0.24 (0.05–0.43)	0.84	3.25 (0.38–4.09)	0.999
	Primipara	21 (16.9)	136 (22.1)	0.39 (0.19–0.59)	0.003	0.15 (0.07–0.30)	**<0.001**
	Multipara	76 (61.3)	194 (31.5)	1		1	

COR: crude odds ratio; AOR: adjusted odds ratio; CI: confidence interval.
1.00: reference group.
A value of p < 0.05 is statistically significant.

Of the 740 pregnant women who were interviewed in this study, 353 (47.7%), 207 (28.0%), and 276 (37.3%) knew at least two danger signs during pregnancy, childbirth, and the postpartum period, respectively. The finding is comparable with studies done in different parts of Ethiopia such as Aleta Wondo,[22] Tsegedie District,[14] Mizan Aman town,[15] and Addis Ababa.[29] However, it is lower than the study done in rural Tanzania, specifically during pregnancy (52.1%), childbirth (53.3), and the postpartum period (46.4%).[30] This inconsistency might be due to a difference in socio-demographic characteristics, study setting, and utilization of ANC service.

According to this study, the overall knowledge of obstetric danger signs was found to be 16.8%. Our study's finding is in line with studies from Uganda,[9] Ethiopia Somali region,[16] Agnuak Zone, Southwest Ethiopia,[31] and Bench Maji Zone, Southwest Ethiopia[32] where 19.0%, 15.5%, 20.0%, and 14.6% were knowledgeable about obstetric danger signs, respectively. However the finding is lower than the studies conducted in different regions of Ethiopia: Arba Minch town (68.4%),[21] Yirgachaffe town (21.9%),[23] Debra-Birhan town (38.6%),[10] East Gojjam Zone (55.1%),[33] and Farta district (23.1%).[34] Similarly, higher finding was reported from Nigeria[35] and India[36] where 76.6% and 21.2% of pregnant women were knowledgeable about obstetric danger signs, respectively. The inconsistency in the level of women's knowledge about obstetric danger signs was also observed due to the difference in the study setting. Unlike the present study, the previous studies were facility-based. In facility-based studies, the study participants may have more information about healthcare than the participants of a community-based study.[37] Furthermore, some of the previous studies do not consider pregnant women who had no ANC follow-up.

This study showed that maternal age, monthly income, maternal occupation, number of pregnancies, and delivery were predictors of knowledge of obstetric danger signs. In line with studies done in Nepal[38] and Arba Minch town,[17] the finding of this study showed that there is a significant association between maternal age and knowledge of obstetric danger signs. Pregnant women age group within 20–24 years and 25–29 years were about 6 and 2 times, respectively, more likely knowledgeable than their older counterparts. This might be explained as elder women in this age group not only own better knowledge of obstetric danger signs but also are psychologically and physically ready to accept information on danger signs.[23] In addition to this, the association between knowledge and this age group might be also explained by the difference in the educational level, as most (68%) of our study participants of this age group had secondary and above educational levels which were figured out as a predictor of knowledge of obstetric danger signs in the previous study.[23]

A significant association was observed regarding household average monthly income. It was figured out that knowledge of obstetric danger signs was poor among women with an average monthly income of less than 2500ETB. This shows that low monthly income decreases the possibility of having good knowledge. This finding is fitting with studies done elsewhere.[11,17,33] This may be explained by the fact that mothers with a higher income learn more about obstetric danger signs because they seldom face cost barriers to seek

medical care.[35] Improved income also helps the family to have access to communication materials, including television and radio, which exposes them to health information.[30]

The maternal occupation was identified as a predictor for knowledge of obstetric danger signs. Women whose occupation was housewife were less likely to have good knowledge of obstetric danger signs when compared to employed women. Similar findings from studies[11,15,20] conducted elsewhere revealed employment was significantly associated with knowledge of obstetric danger signs. Women's employment usually improves household income and satisfies the financial needs of women; hence, they can have access to health services, from which they obtain health-related information.[30,39]

In line with previous studies,[18,22,30,33,39,40] there is a significant association between knowledge of obstetric danger signs and number of pregnancies and number of deliveries. Both multigravida and multiparous women were more knowledgeable of obstetric danger signs than primigravida and primipara, respectively. This may be due to that some of them might have experienced obstetric complications during their previous pregnancy and childbirth which are an important source of their information. So they were more conscious of their health problems related to pregnancy, delivery, and the period after delivery than primes.[33]

In general, the findings of this study on knowledge of obstetric danger signs among pregnant women will strengthen the existing literature and have substantial importance for improving maternal and child health.

Strength and limitations of the study

The strength of this study was that a large sample size was used, and study participants were interviewed to collect data. The limitation of the study was data about knowledge of obstetric danger signs were self-reported; this method has the disadvantages of recall bias and eliciting only socially acceptable responses and hence, may, lead to overestimation of some of the results. In addition, bias might be provoked in prompting the participants to mention the danger signs, though the authors tried their best to avoid it.

Conclusion

The study showed a low prevalence of obstetric danger signs knowledge among pregnant women in Wolaita Sodo town. Maternal age, monthly income, maternal occupation, parity, and gravidity of respondents were identified as predictors of knowledge of obstetric danger signs. Based on the findings of this study, we recommend that stakeholders of the health sector develop a strategic plan to increase the awareness of women about signs of obstetric complications to reduce maternal death through the provision of information and education, facilitating income-generating mechanisms, and communication targeting women, family, and the community on danger signs of pregnancy and childbirth.

Ethical approval and consent to participate

Ethical approval was obtained from the ethical review committee of Adama General Hospital and Medical College (AGHMC). A legal authorization letter was written from AGHMC to the zonal health department and woreda health offices of Wolaita Sodo on 15 March 2017, with reference number AGHMCERC/497/2017. Before the start of data collection, the purpose of the study was explained to the study participants at the time of data collection and written informed consent was secured directly from each participant, and for subjects under 18 years of age, written informed consent was obtained from their legally authorized representatives. Confidentiality was ensured by not including names or other identifiers in the data collection tool. The right of the participants to refuse participation or not to answer any of the questions was respected.

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Supplemental material

Supplemental material for this article is available online.

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