

FACTORS AFFECTING AWARENESS OF OBSTETRIC DANGER SIGNS AMONG RURAL WOMEN OF REPRODUCTIVE AGE IN ABESHIGE DISTRICT, GURAGHE ZONE, SNNPR, ETHIOPIA

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Abstract

Background: Even though Child birth is a unique time for parents, families and communities, it is also a time that mothers may confront several health risks in connection to it. In many developing countries including Ethiopia, maternal morbidity and mortality still pose a Substantial burden. Raising awareness of women about obstetric danger is the crucial step in proper and timely obstetric care.

Objective: This study intends to assess the awareness of obstetric danger signs and associated factors among rural women of reproductive age in Abeshige district, Guraghe zone, SNNPR, Ethiopia.

Methods: A community-based cross-sectional study was conducted from February to March 2017. A total of 454 women were randomly selected and interviewed using pretested structured questionnaires, while opinion leaders, health extension workers, and selected women in the community were engaged in in-depth interviews and focus group discussions, using checklists prepared to guide the interviews. Data from different sources were analyzed, triangulated, and interpreted to respond to the objectives.

Results: A total of 449 mothers were involved in the study, making a response rate of 98.9%. About 34.9%, 23.6% and 20% of the respondents were found to have good awareness on obstetric danger signs in connection to pregnancy, labour/delivery and postpartum respectively. Respondents awareness of obstetric danger signs was higher among women who lived within a 1-hour walk from a health center (adjusted odds ratio [AOR] =3.01, 95% confidence interval [CI]: 1.78, 24.10) and Among women who got maternal health information from health extension workers and one-to-five women networks (AOR =2.30, 95% CI: 1.42, 5.21) and (AOR =2.01, 95% CI: 1.21, 4.39), respectively. Qualitative finding revealed that the community level health structures had a great role in improving women's awareness of obstetric danger signs and service utilization.

Conclusion: In this study mother's awareness of obstetric danger signs found to be relatively poor, making health facility accessible and further strengthening the community level health structure calls for more attention. Therefore, it is critical to build capacity of HEWs and the women one-to-five networks on mobilization and awareness creation. This may improve mother's awareness of obstetric danger signs and thereby improving maternal health.

Keywords: Awareness, Obstetric, Danger sign, Ethiopia.

INTRODUCTION

Pregnancy and child birth related complications are in a higher burden in developing countries (World Health Organization, 2016). In the year 2013, around 287,000 maternal deaths occurred worldwide because of reasons associated with pregnancy and childbirth. Eighty-five percent of these deaths occurred in sub-Saharan Africa and South Asia (World Health Organization, 2016). In Ethiopia direct obstetric complication accounts for 85% of maternal deaths (Abdella Ahmed Maternal, 2010). Awareness of danger signs during pregnancy, labour/ delivery, and post partum is crucial for safe motherhood by helping the mother and her family to prepare for potential complications in connection to pregnancy, labour/delivery and postpartum (Morsheda *et al.*, 2012). Pregnancy danger signs are symptoms these may indicate danger to a pregnant woman or her fetus and therefore require immediate medical attention. The most common danger signs during pregnancy are severe vaginal bleeding, swollen face/hand, and blurred vision: danger signs during labor and childbirth include severe vaginal bleeding, prolonged labor, convulsions and retained placenta; Danger signs during the postpartum period include severe vaginal bleeding following childbirth, fever and foul smell vaginal discharge (Sufiyan *et al.*, 2016). Maternal death has profound bad consequences for her family, particularly for children left without care taker and has a negative impact on the society and economies of their nations at large (WHO, 2005).

Many of the complications that result in maternal deaths are unpredictable, and their onset can be both abrupt and severe (Kabakyenga *et al.*, 2011; Nikiema *et al.*, 2009). Maternal deaths have both direct and indirect causes. Around 85% of maternal deaths worldwide are due to direct obstetric complications such as severe postpartum bleeding, infections after delivery, unsafe induced abortion, hypertensive disorders in pregnancy and obstructed labour (WHO, 2012). Since majority of maternal mortality are due to direct causes, these are easily avoidable if the mother and family recognize the signs and seek immediate obstetric care, health facility provides quality care and transportation easily available (Rashad and Essa, 2010). Poor knowledge of danger sign is one of the most common causes of failure to recognize the complication when it occurs and delaying the decision to seek care (Federal Democratic Republic of Ethiopia, 2006). Even though the national reproductive health strategy of Ethiopia that emphasize on maternal and newborn health to reduce high maternal and neonatal death focuses on the need to empower women, men, families and communities to recognize pregnancy related risks, and to take responsibility for developing and implementing appropriate response to them. Only few studies (Hailu and Berhe, 2013; Workineh *et al.*, 2014; Mesay Hailu *et al.*, 2010) have been conducted in Ethiopia regarding the knowledge of obstetric danger sign and associated factors and as far as investigators knowledge not any in this study area. Therefore, this study is aimed to assess the current status of knowledge of obstetric danger signs and associated factors among rural women of reproductive age in Abeshige district, Gurage Zone SNNPR, Ethiopia.

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METHODS

Study area and period

The study was conducted in Abeshige district, Gurage zone of SNNPR from February to March 2017. Abeshige is one of the 15 districts in the Gurage zone. The district is located 185 km southwest of Addis Ababa. It has two urban and 26 rural kebeles. The population of Abeshige district is estimated at 76,610, of which the female population is 51%. According to data from the district health office, there were 17,926 women of reproductive age, of whom 2,528 were reported to have delivered within 12 months preceding the survey. In the district, there are four health centers (three governments and one nongovernmental organization), two urban and 26 rural health posts, twelve private clinics, one drug store, and one rural drug vendor. All the health centers and health posts provide maternal health services.

Study design and study population

A community-based, cross-sectional survey, supplemented by a qualitative study, was carried out in the Abeshige district of Gurage zone in SNNPR. All women of reproductive age who delivered within 12 months prior to the study (irrespective of place of delivery and birth outcome), who were permanent residents in the district, and who volunteered to participate in the study were considered as study participants. Yet, those women who were severely sick were excluded from the study.

Sample size determination

The sample size was calculated using a single population proportion formula, following such assumptions as 95% confidence level, 5% margin of error between the sample and the population, 16% proportion of women who aware on obstetric danger signs in reference to a previous study in one of the regions in Ethiopia (Workineh *et al.*, 2014). 10% no response rate, and 2% design effect. Accordingly, 454 women were included as study participants.

Sampling technique

All rural kebeles of the district were grouped into four clusters (Hole, Mamede, Walga, and Darge) in accordance with the distribution of four health centers. As there was no social, economic, or climatic variation between the clusters, one cluster was randomly selected for this study. All the eight kebeles in the selected cluster were included in the study. The number of participants from the respective kebeles was proportionally determined on the basis of their respective population size (women who delivered within 12 months prior to this survey). At the kebele level, a systematic random sampling technique was employed. For households with more than one eligible woman, one of the women was chosen using a lottery method. Participants in the qualitative study included mothers who were not involved in the survey, opinion leaders, health extension workers (HEWs,) and traditional birth attendants who were identified on the basis of their knowledge regarding women's health and/or had a specific role in efforts to improve maternal health in the community.

Data collection tools and procedure

A pretested structured and semi-structured questionnaire was used to collect information. The questionnaire was adapted

from monitoring birth preparedness and complication readiness tools for maternal and newborn health (JHPIGO, 2004). The questionnaire was translated into Amharic and back-translated to English to ensure consistency. The questionnaire was designed to measure sociodemographic characteristics, obstetric history and awareness of obstetric complication danger signs and personal and social factors influencing the awareness of danger signs of obstetric complication. Eight diploma nurses who were recruited from health facilities out of the study area were trained to collect data. Data collection was closely supervised by health professionals who were recruited from other health facilities. At the end of every day, completeness of data was checked, and any incomplete questionnaire was returned to data collectors, based on ID number, for completion. A 2-day training was given to both data collectors and supervisors to discuss the aim of the study, data collection methods, ethical issues, and procedures. This was complemented with practical role plays and field exercises. An open-ended checklist with probes was used to collect evidence on local understanding of barriers to awareness about obstetric danger signs. Four focus group discussions (FGD) sessions (with a total of 32 male and female participants of equal size) and eight in-depth interviews were completed by the principal investigator who was supported by an assistant who recorded the information.

Measurement

Danger signs are indicator of potential obstetric complications. Awareness of women about obstetric danger signs were measured by the total number of correct spontaneous answers to the awareness assessment questions. Spontaneous answer refers to the respondent's naming a sign without being asked about that sign by name. Only true obstetric complications spontaneously mentioned by individual respondents were included. Accordingly, two categories (good and poor) awareness were developed for each pregnancy, labour/childbirth and post partum complication danger signs. A woman was considered as she had good awareness of key danger signs of pregnancy complications if she spontaneously mentioned at least two of the three key danger signs (vaginal bleeding, swollen hands/face, and blurred vision). A woman was considered as she had good awareness of key danger signs of labor/childbirth complications if she spontaneously mentioned at least three of the four key dangers signs (vaginal bleeding, prolonged labor [>12 hours], convulsions, and retained placenta). A woman was considered as she had good awareness of key danger signs of postpartum complications if she spontaneously mentioned at least two of the three key danger signs (vaginal bleeding, foul smelling vaginal discharge, and high fever). A woman was considered as she had poor awareness of danger signs of obstetric complications if she had failed to respond as mentioned above in each time.

Data analysis

Survey data were first checked manually for completeness and were coded following a template prepared for this purpose. Data were entered into Epi-Info 3.5.3 statistical software, cleaned, and transferred to SPSS version 21 for analysis. Descriptive analysis was made and presented using frequency tables and percentage. Bivariate analysis was made to determine the association between awareness of obstetric danger signs and such variables as socio-demographic and obstetric history and role of Health extension workers using odds ratio.

These predictors with significant association were further tested using multivariate logistic regression at $P \leq 0.05$ and 95% confidence interval (CI). Qualitative data were transcribed into English text, read and reread and sorted into themes following the research questions. Accordingly, raw data were categorized under following sections: what is known about obstetric danger signs, and what needs to improve in the future.

Data quality control

Different steps were followed to ensure data quality. During the training, trainees were equipped with the objectives and relevance of the study, and role played on how to do interviews and record. As part of the training, study tools were pretested in one of the kebeles with similar characteristics but fairly far from the selected study cluster, and the study tools were revised on the basis of the pretest. These pretest results were further discussed with data collectors and supervisors to consolidate better understanding of the tools and data collection process. During data collection, supervisors and the principal investigator checked completeness and took timely correction. At data entry, data were entered and cleaned using Epi-Info before exporting to SPSS for analysis.

Ethical approval

Written ethical clearance was obtained from the Research and Ethical committee of the School of Public Health, Addis Ababa University. A formal letter was written to the Abeshige district health office from the School of Public Health. On the basis of this, permission was obtained from the district health office and each kebele administration to conduct the study. Written informed consent was sought and obtained from every participant who agreed to take part in the study. They were assured about the confidentiality of their responses.

RESULTS

Socio-demographic characteristics of the study population

A total of 449 women out of 454, who gave birth within 12 months prior to this study, participated, making a response rate of 98.9%. Age of participants ranged from 17 to 44 years with a mean of 29 ± 6 years. The majority (60.4%) of the respondents were found to be 25–34 years of age, while 101 (22.5%) were 35–44 years of age. More than half (57.2%) of the respondents were Muslims, while Orthodox and Protestants made up 191 (42.6%) and 1 (0.2%), respectively (Table 1). The majority (96.6%) of the respondents were found to be currently married, while the remaining proportion were separated, divorced, widowed, or single. Out of the total respondents, 378 (84.2%) belong to Guraghe ethnic group, while the remaining were Amhara, Kebena, or Oromo. Regarding their educational status, about 250 (55.7%) reported as not able to read and write, 167 (37.2%) had primary education (grades 1–8), 17 (3.7%) had secondary education, and approximately 15 (3.4%) had informal education (Table 1). Occupational characteristics of respondents showed that more than half (53.9%) were housewives, followed by merchants (98 [21.8%]), and farmers (90 [21.4%]). The mean family size was 5.5 ± 1.6 standard deviation (SD) with a range of 2–10 people in a household. About 43.4% of the women reported to live within a 30 to 60-minute walk from the health center, while a 30.3% resided more than 1 hour walk away from the health center (Table 1).

Table 1. Socio demographic characteristics of women of reproductive age group, Abeshige district January 2017 (n=454)

Variables	Frequency	Percent
Age		
15-24	77	17.1
25-34	271	60.4
35-44	101	22.5
Religion		
Muslim	257	57.2
Orthodox	191	42.6
Protestant	1	0.2
Marital status		
Married	434	96.7
Separated	6	1.3
Divorced	3	0.7
Widowed	1	0.2
Single	5	1.1
Ethnicity		
Guraghe	378	84.2
Amhara	26	5.8
Kebena	26	5.8
Oromo	19	4.2
Educational status		
Illiterate	250	55.7
Read and write(informal)	16	3.4
Primary education (1-8)	167	37.2
Secondary and above	17	3.7
Occupational status		
House wife	242	53.9
Merchant	98	21.8
Farmer	96	21.4
Daily laborer	7	1.6
Employee	4	0.9
student	2	0.4
Time it take from home to health center in minute/hour		
<30 min	120	26.7
30min-60 min	193	43.0
>1hr	136	30.3

Obstetric history of the respondent

Sixty-one (13.6%) of the respondents were primigravida, while 158 (35.2%) of them had five or more pregnancies. Among the respondents, more than half (52.3%) were found to have 2–4 children, while the proportion of respondents who had ≥ 5 children was 148 (33%). Mean gravidity and parity were found to be 3.8 ± 1.9 and 3.6 ± 1.9 SD, respectively. More than one-third (34.1%) of women became pregnant for the first time below the age of 25 years, while 296 (65.9%) of the respondents became pregnant for the first time at the age of 25–34 years. Forty (8.9%) of the respondents had history of abortion, while 15 (3.3%) of them had history of stillbirth.

Maternal health service utilization

Almost all (99.3%) participants reported to have at least one ANC visit during their recent pregnancy. Among those who attended ANC, more than three quarters (78.4%) attended four or more visits, while three (0.7%) had made only one visit.

The majority (87.5%) of them attended their first ANC between 4 and 6 months of their pregnancy and 46 (10.2%) attended their first ANC before 3 months of their pregnancy. Three hundred and thirty-two (73.9%) mothers were supported on their ANC attendance by a skilled health care provider, while 114 (25.4%) of them received ANC service from a HEW. Four hundred and twenty-two (94%) respondents gave birth at health institutions supported by skilled health care providers, whereas 27 (6%) of respondents gave birth at home (Table 2).

Table 2. Mothers maternal health service utilization, Abeshige district January 2017(n=454)

Variables	Frequency	Percent
ANC visit		
Yes	446	99.3
No	3	0.7
Get ANC service from		
Health professional	332	73.9%
Health extension worker	114	25.4%
ANC frequency/number of time attend		
1	3	0.7
2-3	91	20.2
≥4	352	78.4
Month start ANC		
≤3 month	46	10.2
4-6	393	87.5
≥7 month	7	1.6
History of previous health facility delivery		
Yes	259	57.7
No	150	33.4
Place of delivery in recent pregnancy		
Hospital	38	8.5
Health center	356	79.3
Health post	28	6.2
Home and elsewhere out of health institution	27	6
Mothers who get support from relative		
Yes	356	79.3
No	93	20.7

Awareness of danger signs of obstetric complications

Ninety percent of the participants reported that they were informed about danger signs related to pregnancy complications. Among these, 328 (73.1%), 139 (31.0%), and 97 (21.6%) women spontaneously mentioned vaginal bleeding, swollen hands/face, and blurred vision respectively as danger signs during pregnancy. Besides this, one-third (34.9%) of the respondents spontaneously mentioned at least two danger signs of pregnancy complications (Table 3). The qualitative findings substantiated that vaginal bleeding is the most common danger sign associated with pregnancy. Besides this, twin pregnancy and death of baby in the womb were identified as danger signs in connection to pregnancy. One of the respondents explained: As I said, a woman is in a dangerous condition when she has been confronted with vaginal bleeding during pregnancy. As you all know [referring to discussants], three years back my neighbor faced vaginal bleeding during her pregnancy, due to that she lost her unborn baby. This shows the danger posed by vaginal bleeding during pregnancy. [FGD participants, woman, 25 years old]

Unlike women, men (husbands) were found to be inexperienced about danger signs associated with pregnancy. One of the men who participated in the study tinted what was agreed by other male members who

Participated in the study:

I do not know much about these complications. However, I think abdominal pain and prolonged pregnancy beyond nine months are the main danger signs. [FGD participant, husband, 35 years old]. The majority of the respondents (91.5%) reported to be informed about danger signs during labor and delivery. Among those who had information, 333 (74.2%), 131 (29.3%), 121 (26.9%), and 65 (15.4%) of the respondents spontaneously mentioned vaginal bleeding, retained placenta, prolonged labor, and convulsions, respectively, as danger signs associated with labor/delivery (Table 3). On the other hand,

106 (23.6%) of the respondents spontaneously mentioned at least three of the key danger signs associated with labor/delivery. The qualitative findings ascertained that vaginal bleeding, malpresentation, and retained placenta are common danger signs in connection to labor and delivery. An FGD participant pointed out that:

If there is vaginal bleeding at any time during pregnancy, labour /delivery and post partum, if feet or hand of the fetus comes first during labor and placenta remains inside after delivery, the mother is considered to be in a dangerous condition and she may even die. [Woman, 27 years old]

Another in-depth interview participant pointed out:

When I was working as a local birth attendant in this community, if I encounter women during labor and if her labor takes longer than half a day, I escort her to health center since this considered dangerous for the life of a woman as well as the fetus. [In-depth interviewee, Traditional Birth Attendant, 49 years old]

Three hundred and ninety-nine (88.8%) of the research participants reported that they were informed about danger signs during postpartum. Three hundred and twenty (71.3%), 96 (21.4%), and 37 (8.2%) of the respondents spontaneously mentioned severe vaginal bleeding, high fever, and foul smelling vaginal discharge, respectively, as danger signs associated with the postpartum period. In addition, 90 (20.3%) respondents spontaneously mentioned at least two of the danger signs of postpartum mentioned earlier (Table 3). The most frequently mentioned danger sign was vaginal bleeding which spontaneously mentioned by 73.1% , 74.2% and 71.3 % of the respondents during pregnancy, labor/ delivery and postpartum respectively while Convulsion during labor(15.4%) and foul smell vaginal discharge during postpartum(8.2%) were mentioned by very few respondents.

Among the total respondents; 34.9% had good awareness on danger signs of pregnancy, 23.6 % had good awareness on danger signs of delivery and 20% had good awareness on danger signs of postpartum.(Table 3).

Source of information about obstetric danger signs

The vast majority of respondents (95.8%) reported to have been informed about obstetric danger signs. Multiple responses revealed that HEW 372 (82.9%), health workers at the health facility level 222 (49.4%), information shared through radio 98 (21.8%), one-to-five women networks at the village level 44 (9.8%), and conferences of pregnant mothers 16 (3.6%) were major sources of information about obstetric danger signs. The qualitative findings showed that health workers, including HEWs and community-level discussions, are important sources of information about obstetric danger signs. One of the HEWs has commented that:

Currently our (HEW) role among others is to create awareness about maternal health service utilization and encourage women to take necessary precautions during pregnancy, delivery and postpartum. Guided by family manual, I provide specific information on obstetric danger signs to all of my clients. In my catchment, every mother plans for birth during pregnancy to deliver at health facility. [In-depth interviewee, HEW, 35 years old]

Table 3. Awareness on obstetric danger signs among women of reproductive age group, Abeshige district, January 2017. (n=454)

Variables	Spontaneous response	Category	Frequency(Percent)
Danger signs of pregnancy	Sever vaginal bleeding	Yes	328 (73.1)
		No	121 (26.9)
	Swollen hand/ face	Yes	139 (31.0)
		No	310 (69.0)
Danger signs of labor/delivery	Blurred vision	Yes	97 (21.6)
		No	352 (78.4)
	Sever vaginal bleeding	Yes	333 (74.2)
		No	116 (25.8)
Danger signs of Postpartum	Prolonged Labor >12hrs/	Yes	121 (26.9)
		No	328 (73.1)
	Convulsion	Yes	69 (15.4)
		No	380 (84.6)
Awareness on obstetric danger sign during	Retained placenta	Yes	131 (29.2)
		No	318(70.8)
	Sever vaginal bleeding	Yes	320 (71.3)
		No	129 (28.7)
Awareness on obstetric danger sign during	Foul smelling vaginal discharge	Yes	37 (8.2)
		No	412(91.8)
	High fever	Yes	96 (21.4)
		No	353 (78.6)
Awareness on obstetric danger sign during	Pregnancy	Good	157 (34.9)
		Poor	292 (65.1)
	Labor/delivery	Good	106 (23.6)
		Poor	343 (76.4)
Postpartum	Good	90 (20.3)	
	Poor	359(79.7)	

Table 4. Factors influencing awareness of obstetric danger signs adjusted for confounding variables, in Abeshige district, January 2017 (n=454)

Variables	Aware on Obstetric Danger signs			
	Yes	No	COR(95%CI)	AOR(95%CI)
Literate	92 (46.2)	107 (53.8)	2.01 (1.36, 2.95)*	1.20 (0.75, 1.91)
Illiterate	75 (30.0)	175 (70.0)	1.00	1.00
Support from relatives				
Yes	145 (40.7)	211 (59.3)	2.22 (1.31, 3.74)*	1.64 (0.89, 3.01)
No	22 (23.7)	71 (76.3)	1.00	1.00
Access to health center				
≤1 hour	118 (37.7)	195 (62.3)	3.5(2.00, 38.05)*	3.01(1.78,24.10)*
>1 hour	49 (36.0)	87 (64.0)	1.00	1.00
Started ANC within three months of pregnancy				
Yes	26 (56.5)	20 (43.5)	3.02 (2.02, 4.53)*	1.25 (0.04, 2.94)
No	146 (36.2)	257 (63.8)	1.00	1.00
Got maternal health information from Health extension worker				
Yes	154 (41.4)	218 (58.6)	2.01(1.26, 5.72)*	2.3 0(1.42, 5.21)*
No	10 (17.2)	48 (82.8)	1.00	1.00
One-to-five women network				
Yes	30 (68.2)	14 (31.8)	3.00 (1.54, 6.66)*	2 .01(1.21, 4.39)*
No	134 (34.7)	252 (65.3)	1.00	1.00

Note: *Statistically significant.

Abbreviations: AOR, adjusted odds ratio; COR, crude odds ratio; CI, confidence interval.

The qualitative findings have also revealed that community members were well informed about the advantages of being aware of about obstetric danger signs. HEWs and health professionals at the health facility level supported to improve community awareness about maternal health. In addition to efforts made to avail information, previous pregnancy and delivery related experiences were reported to play pivotal roles in understanding pregnancy and child birth related complications. One of the FGD participants explained that:

In early days as close as five years, several mothers were buried with their pregnancy. Thanks be to Allah, today such problem is not as bad. Health extension workers as well as health workers at facility level consistently teach us as well as our women on preparations that women should do to combat pregnancy and child birth related complications. [FGD participant, husband, 38 years old]

Factors affecting Awareness of danger signs of obstetric complications

Bivariate analysis shows that the mother's educational status, relative support, distance from a health center, early initiation of ANC and sources of information were found to have a strong association with awareness of key danger signs of obstetric complication. The finding shows that literate mothers, mothers who got support from relatives and mothers who live within a one hour walk from a health center were more likely to have good awareness. Mothers who started ANC with in the first three months of their pregnancy were more likely to have good awareness than women who started later. It was also found that women's exposure to maternal health information at community level was significantly associated with awareness of obstetric danger signs. Women who got maternal health information from HEWs and from one to five networks were

more likely to have good awareness of obstetric danger signs as compared with those who didn't get information (Table 3). Despite such evidence of predictors of awareness of obstetric danger signs following bivariate analysis, multivariate logistic regression revealed that the time taken to reach a health facility and mothers's exposure to maternal health information at community level have a significant association with awareness of obstetric danger signs. Accordingly, women who lived within a 1-hour walk from a health center were 3 times more likely to be aware on danger signs of obstetric complications than those women who resided farther away (adjusted odds ratio [AOR] =3.01 [1.78, 24.10]). Women who got information from HEW were almost two times (AOR =2.30, 95% CI =1.42, 5.21) and those who received information from a one-to-five women network were two times (AOR =2.01, 95% CI =1.21, 4.39) more likely to be aware of danger signs of obstetric complications compared with women who had not got information from a HEW and/or one-to-five women networks, respectively (Table 3). The qualitative findings substantiated that health workers, including HEWs and community-level discussions, are important sources of information about obstetric complication. One of the FGD participants explained that:

In early days as close as five years, several mothers were buried with their pregnancy. Thanks be to Allah, today such problem is not as bad. Health extension workers as well as health workers at facility level consistently teach us as well as our women about maternal health emergencies these may occur unpredictably and what preparations that women should do. [FGD participant, husband, 38 years old]. One of the HEWs has also commented that:

Currently our (HEW) role among others is to create awareness about maternal health service utilization and encourage women to take necessary precautions during pregnancy, delivery and postpartum. Guided by family manual, I provide specific information on obstetric danger signs to all of my clients. In my catchment, every mother plans for birth during pregnancy to deliver at health facility. [In-depth interviewee, HEW, 35 years old]

DISCUSSION

Findings from this study revealed that nearly a quarter of the respondents had good awareness of danger signs in connection to pregnancy(34.9%), labor/delivery (23.6 %), and postpartum(20%) which is higher than other studies conducted in Uganda 19% (Kabakyenga *et al.*, 2011), and Jordan 15.2% (Hailu and Berhe, 2013), However, it was lower than the findings of Tsegedie district of Tigray region 59% and 62% of respondents were aware of danger signs related to pregnancy and delivery complications, respectively (Hailu and Berhe, 2013), south Ethiopia sidama documented 41%, and 37% respectively for delivery and postpartum danger signs (Mesay Hailu *et al.*, 2010) South Africa 52% (Hoque and Hoque, 2011). This difference might be due to socio-cultural differences and differences in implementation of health programs. The most frequently mentioned danger sign was vaginal bleeding which spontaneously mentioned by 73.1% , 74.2% and 71.3 % of the respondents during pregnancy, labor/delivery and postpartum respectively, this is higher compared with the study in Tsegedie district, Tigray in which vaginal bleeding spontaneously mentioned by 51.2% , 53% and 50.6% of the respondents during pregnancy, labor/ delivery and

postpartum respectively (Hailu and Berhe, 2013). While Convulsion during labor(15.4%) and foul smell vaginal discharge during postpartum(8.2%) were mentioned by very few respondents. This study revealed that respondent's awareness of obstetric danger sign of pregnancy was relatively higher than that of their awareness of obstetric danger signs of Labour/delivery and postpartum. Compared with the findings from the other settings, the level of awareness of obstetric danger signs in our study setting is relatively lower. Especially given this study is recent as compared to the two other studies (Hailu and Berhe, 2013; Mesay Hailu *et al.*, 2010). And given extensive interventions were running in Ethiopia to improve maternal health outcomes, relatively low levels of awareness from this study flags concern regarding the quality and level of intervention. Access to a health center was found to have statistically significant association with awareness of obstetric danger signs. Women who lived within a 1-hour walk from a health center were 3 times more likely to be aware on danger signs of obstetric complications than women who resided farther away from the health center. This finding was consistent with the studies on the same themes from Tanzania (Urassa *et al.*, 2012). This witnesses the fact that distance to health facility is an important indicator for improved access to health information. Similarly, women who got maternal health information from HEW and from women 1 to 5 network were 2.3 and 2 times respectively more likely be aware on obstetric danger signs than they didn't got information. As found from the qualitative evidence, HEWs and one-to-five women networks are the major sources of information on awareness of obstetric danger signs. This suggests that community-level health structures are playing important roles on improvement of women's awareness on obstetric danger signs and health service utilization. Thus, strengthening such structures and building their capacity may improve mother's awareness and thereby improving maternal health.

Strength

To the best of the authors' knowledge, to date, this is the most comprehensive study of its kind in Guraghe zone. Also, the fact that the study has used a mixed-method approach makes the findings stronger.

Limitation

As with any cross-sectional study, the findings of the current study may not provide strong evidence on the direct cause-and-effect relationship between awareness of danger signs of obstetric complication and independent variables. As the study focused on one district, the result may not be conclusive to the region at large. Also, some of the participants in the survey were interviewed 1 year after delivery, and therefore, some recall bias may have affected the findings.

Conclusion and recommendation

As part of awareness of obstetric danger signs vaginal bleeding was found to be relatively highly mentioned key danger sign all the three periods(pregnancy, labor/delivery and postpartum). However, overall awareness of obstetric danger signs was found to be low in the Abashing district. Comprehensive community mobilization through HEWs and the one-to-five women networks is believed to have played important role. In a country where maternal mortality remains a major concern, investment in creating awareness about obstetric danger sign in its entirety is vital. From the findings,

it appears that at least seventy percent of respondent mentioned vaginal bleeding as key danger signs (in the three periods). However, overall awareness of obstetric complication is found to be limited. This suggests that perhaps the one-to-five networks may have been instructing women, as vaginal bleeding is the only danger signs of obstetric complication instead of providing information about all possible key danger signs. That may be due to their limited knowledge on the subject matter. Although social mobilization and awareness creation structure at the community level, where HEWs and the one-to-five networks are playing key roles had been already established, it is critical to build their (HEWs and the women one-to-five networks) capacity on mobilization and awareness creation. That would help to improve awareness of obstetric danger signs in the community in general and of reproductive age women in particular.

Abbreviations

AOR: Adjusted odds ratio;
CI: Confidence interval;
COR: Crude Odds ratio

Declarations

Ethical approval: Written ethical clearance was obtained from the Research and Ethical committee of the School of Public Health, Addis Ababa University. A formal letter was written to the Abeshige district health office from the School of Public Health. On the basis of this, permission was obtained from the district health office and each kebele administration to conduct the study. Written informed consent was sought and obtained from every participant who agreed to take part in the study. They were assured about the confidentiality of their responses.

Consent for publication: Not applicable

Availability of data and materials: The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no financial and non financial competing interests.

Author contributions: KZ and MK were involved in the conception, design, analysis, interpretation, report and manuscript writing. KA was involved in the design, analysis, interpretation and manuscript writing. AW was involved in the design, analysis, interpretation and manuscript writing. All authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

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