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OBSTETRICS & GYNECOLOGY | RESEARCH ARTICLE

Knowledge of pregnancy danger signs and associated factors among pastoral women in Afar Regional State, Ethiopia

Misgan Legesse Liben[1]*, Abel Gebre Wuneh[2] and Nejimu Biza Zepro[3]

*Corresponding author: Misgan Legesse Liben, Department of Public Health, Faculty of Health Sciences, Woldia University, P.O.Box: 400, Amhara, Ethiopia.
E-mail: lmisganl@gmail.com

Abstract: **Introduction**: Knowledge of pregnancy danger sign is the vital step in receiving appropriate and timely referral to maternal and newborn care units. Therefore, the current analysis assesses knowledge of pregnancy danger signs and associated factors among women who gave birth in the two years preceding the survey among pastoralist communities in Afar Regional State, Northeastern Ethiopia. **Methods**: A cross-sectional study was employed in Afar National Regional State in February 2016. A multistage cluster sampling was employed to select study women. Data were cleaned, coded and entered into EpiData version 3.02, and were exported to SPSS version 20 statistical package for analysis. **Results**: Eighty-nine [7.9; 95% CI (6–9%)] of the study women knew at least two key pregnancy danger signs. Women who attended antenatal care visit [AOR: 4.88; 95% CI (2.83, 8.41)], who had more than three family members [AOR: 2.25; 95% CI (1.26, 4.01)] and who attended formal education [AOR: 2.0; 95% CI (1.15, 3.47)] were positively associated with knowledge of key pregnancy danger signs. On the other hand, women who reported pastoralist as their occupation were associated with lower odds of knowledge on key pregnancy danger signs [AOR: 0.60; 95% CI (0.437, 0.831)]. **Conclusion**: This study showed that nearly 1 women in every 13 had knowledge on key danger signs of pregnancy. Therefore, strengthening pastoralist-based maternal health information system could be important to improve maternal knowledge of pregnancy danger signs in Afar Regional State.

ABOUT THE AUTHOR

Misgan Legesse Liben, MPHNut, is Assistant Professor of Public Health Nutrition at Department of Public Health in Woldia University of Ethiopia. He is interested in nutrition, reproductive health and child health researches. This report shows nearly 1 women in every 13 had knowledge on key danger signs of pregnancy, and implies strengthening pastoralist-based maternal health information system could be important to improve maternal knowledge.

Misgan Legesse Liben

PUBLIC INTEREST STATEMENT

Danger signs in pregnancy are life-threatening signs, which indicate that something is going wrong with pregnant woman or the pregnancy itself. The danger signs during pregnancy include vaginal bleeding, severe headache, blurred vision, severe abdominal pain, swollen hand or face, fever, reduced fetal movement, weakness and difficulty of breathing. Vaginal bleeding, swollen hands/face and blurred vision are considered the key danger signs of pregnancy. Pastoral communities' reproductive health is a critical issue due to their mobile lifestyle which deprives basic services which results in many complications during pregnancy. Therefore, this report aimed to assess knowledge of pregnancy danger signs and associated factors among pastoralist women who gave birth in the two years preceding the survey in Afar Regional State, Northeastern Ethiopia.

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Keywords: knowledge; pregnancy; danger sign; pastoralist; Afar; Northeastern Ethiopia

1. Introduction

Danger signs in pregnancy are life-threatening signs, which indicate that something is going wrong with pregnant woman or the pregnancy itself (Mengesha & Taye, 2014; Nambala & Ngoma, 2013). The danger signs in pregnancy include vaginal bleeding, severe headache, blurred vision, severe abdominal pain, swollen hand or face, fever, reduced fetal movement, weakness and difficulty of breathing (Mengesha & Taye, 2014). Vaginal bleeding, swollen hands/face and blurred vision are the three key danger signs of pregnancy (Damme, 2016; Hailu & Berhe, 2014; Kaso & Addisse, 2014; Maseresha, Woldemichael, & Dube, 2016; Mengesha & Taye, 2014). Of these, vaginal bleeding is among the main causes of maternal mortality (WHO, 2015).

Maternal mortality remains a major public health challenge worldwide. Almost all maternal deaths (99%) occur in developing countries (Alkema et al., 2016). Ethiopia is one of the six countries that contribute for more than half of all maternal deaths worldwide (Hogan et al., 2010). The recent Ethiopian demographic and health survey shows maternal mortality ratio of 412 maternal deaths per 100,000 live births. This represents 25% of all deaths among reproductive age (15–49 years) women (Central Statistical Agency (CSA), 2016). A community based cross sectional study in Tigray Region of Ethiopia in 2013 revealed maternal mortality ratio of 266 per 100,000 live births. Direct obstetric causes accounted for 61% of all pregnancy related deaths in which 34% of death was attributed to hemorrhage (Godefay, Byass, Kinsman, & Mulugeta, 2015).

Knowledge of pregnancy danger signs is the first essential step in receiving appropriate and timely referral to maternal and newborn care (Nambala & Ngoma, 2013). A community survey in Mbarara district of Uganda showed that 51.8% of women mentioned at least one pregnancy danger sign (Kabakyenga, Östergren, Turyakira, & Pettersson, 2011). In Ethiopia, community-based cross sectional study showed that the percentage of women who knew at least two key danger signs of pregnancy in Robe district (Kaso & Addisse, 2014)and Tsegedie district (Hailu & Berhe, 2014)was 13% and 58.8%, respectively. In addition, 30.4% of women in Aleta Wondo district(Hailu, Gebremariam, & Alemseged, 2010), 37.3% in Illu Ababor zone (Tsegaye, Shuremu, Bidira, & Negero, 2017) and 82.5% in Mekelle City knew at least two pregnancy danger signs (Abiyot, Kassa, & Kidanu, 2015). On the other hand, 31.9% of women in Goba district knew at least three key pregnancy danger signs (Bogale & Markos, 2015). Furthermore, about 47% of women in Raya Kobo district and Debark Town knew three obstetric danger signs during pregnancy (Bililign & Mulatu, 2017; Mengesha & Taye, 2014).

Pastoral communities' reproductive health is a critical issue. The lifestyle of moving from place to place for subsistence seems to deprive these communities of basic services which result in many complications during pregnancy (Ergano, Getachew, Seyum, & Negash, 2012; Shiekh & Kwaak, 2015). Therefore, the current analysis assesses knowledge of pregnancy danger signs and associated factors among women who gave birth in the two years preceding the survey among pastoralist communities in Afar Regional State, Ethiopia. The findings of this analysis will be vital for health service providers, policy makers and program managers to design intervention strategies that will improve knowledge of pregnancy danger signs in the pastoralist communities.

2. Methodology

2.1. Study area

Afar National Regional State is one of the nine regions in Ethiopia. Administratively, the region is divided into five zones, which are further subdivided into 32 districts and 404 kebeles (the lowest

administrative units next to district in Ethiopia). According to the 2007 census report of Ethiopia, in the region 90% of the total populations are pastorals while the remaining 10% are agro-pastorals. Currently, there are 6 hospitals, 62 health centers and 314 health posts in the region.

2.2. Study design and study participants

This is a secondary analysis of cross-sectional data. A community-based cross-sectional study was conducted in February 16–27/2016 in Zone one (Afambo and Aysaita districts) and Zone three (Amibara and Awash Fentale districts) of Afar National Regional State. A multistage cluster sampling was employed to select 1152 study participants. First, among the five zones of Afar region, two zones (Zone one and Zone three) were purposively selected. Secondly, among the 14 districts (8 in Zone one and 6 in Zone three), 4 districts (2 in each zone) were randomly selected. Thirdly, a kebele was defined as a cluster and a total of 38 clusters (20 in zone three and 18 in zone one) were formed. Of these clusters, 23 (12 in zone three and 11 in zone one) were randomly selected. Finally, in the selected cluster all women who gave birth in the two years preceding the survey were included in the study. Women who were unable to communicate were excluded from the study.

2.3. Data collection process and instrument

Data were collected using a pre-tested, structured and interviewer administered questionnaire. The questionnaire was prepared first in English then translated in to Afar'af and back to English to check for consistency. Ten preparatory school female graduates who can speak both the local language (Afar'af) and Amharic were recruited as data collectors. The data collectors were trained for two days on the study instrument, consent form, how to interview and data-collection procedure.

Then, the questionnaire was pretested on two kebeles which were not included in the study. The pretest was done to ensure clarity, wordings, logical sequence and skip patterns of the questions. The pretest amendments on the questionnaire were made accordingly. Finally, the Afar'af version of the questionnaire was used to collect the data.

2.4. Study variables

The dependent variable was knowledge of pregnancy danger signs. A woman was considered knowledgeable on key danger signs of pregnancy, if she can mention at least two of the three key danger signs for pregnancy (vaginal bleeding, swollen hands/face and blurred vision) sponta-neously (Hailu & Berhe, 2014; Kaso & Addisse, 2014; Maseresha et al., 2016). The independent variables were socio-demographic characteristics (age, marital status, occupation, ethnicity, edu-cational status, religion, family size), delivery place, antenatal and postnatal care attendance.

2.5. Data processing and analysis

The data were checked for completeness and inconsistencies. Data were also cleaned, coded and entered into EpiData version 3.02. Then data were exported to SPSS version 20 statistical package for analysis.

The crude odds ratios (COR) with 95% confidence interval were estimated in the univariable logistic regression analysis to assess the association between each independent variables and the outcome variable. Variables with p value <0.3 in the binary logistic regression analysis were considered in the multivariable logistic regression analysis.

The Hosmer-Lemeshow goodness-of-fit was used to assess the necessary assumptions for the application of multivariable logistic regression analysis, and a good fit test will yield a p value> 0.05. Adjusted odds ratio (AOR) with 95% confidence interval was estimated to assess the strength of the association, and a p value <0.05 was used to declare the statistical significance in the multivariable logistic regression analysis. Variables with p value <0.05 in the multivariable analysis were considered as significant and independent predictors of knowledge of pregnancy danger signs.

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2.6. Ethical consideration

A survey which produced these data received an ethical approval from Samara University. An official letter was written from Samara University to the selected district administration offices. Then permission and support letter was written to the selected Kebeles/clusters. The participants enrolled in the study were informed about the study objectives, expected outcomes, benefits and the risks associated with it. A verbal consent was taken from the participants before the interview. Confidentiality of responses was maintained throughout the study.

3. Results

3.1. Socio-demographic characteristics of the study subjects

A total of 1124 women were included in the study, resulting in a response rate of 97.6%. About 74% and 92.3% of the study participants were Afar and Muslim, respectively. By occupational status, 524(46.6%) of the women were pastoralists (Table 1).

3.2. Knowledge of pregnancy danger signs

Four hundred thirty-three (38.5%) of women who gave birth in the last two years preceding the survey attended antenatal care (ANC) visit. About 90% of the study women did not know any of the key pregnancy danger signs. Eighty-nine [7.9; 95% CI (6–9%)] of the study women knew at least two key pregnancy danger signs (Table 2).

3.3. Factors associated with knowledge of pregnancy danger signs

Univariable logistic regression analysis showed that antenatal care follow-up, maternal occupation and maternal educational status were significantly associated with knowledge on pregnancy danger signs at $p < 0.05$. However, in the multivariable logistic regression analysis maternal occupation, antenatal care follow up, family size and maternal educational status remained statistically significant at $p < 0.05$ (Table 3).

Women who attended antenatal care visit were about five times [AOR: 4.88; 95% CI (2.83, 8.41)] more likely to know danger signs of pregnancy as compared to women who lack antenatal care checkups. Compared to women who had three and less family members, women who had more than three family members were more likely [AOR: 2.25; 95% CI (1.26, 4.01)] to know danger signs of pregnancy. Women who attended formal education were two times more likely [AOR: 2.0; 95% CI (1.15, 3.47)] to know pregnancy danger signs as compare to women without formal education. Pastoralist women were less likely [AOR: 0.21; 95% CI (0.11, 0.39)] to know danger signs of pregnancy as compared to those women who reported having other occupational status.

3.4. Discussion

This study revealed that only 7.9% of the study women who gave birth in the last two years preceding the survey knew at least two key pregnancy danger signs. This was lower than the findings at different parts of Ethiopia (Abiyot et al., 2015; Bililign & Mulatu, 2017; Bogale & Markos, 2015; Hailu et al., 2010; Kaso & Addisse, 2014; Mengesha & Taye, 2014; Tsegaye et al., 2017). It was also lower than the findings at other African countries (Hailu & Berhe, 2014; Kabakyenga et al., 2011; Nambala & Ngoma, 2013).

This study showed that pastoral women were 79% less likely to know key pregnancy danger signs as compared to those women who reported having other occupational status. It is reasonable to assume that women who entirely depend on pastoralism might be unable to get basic information about danger signs of obstetric complication in pregnancy due to their nomadic lifestyle and less access to health services. This lifestyle may provide an explanation for the decreased likelihood of knowledge on key pregnancy danger signs among women reporting pastoralist occupation in Afar Regional State.

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Table 1. Socio-demographic characteristics of the study subjects in Afar Regional state, 2016		
Variables	**Frequency**	**Percentage (%)**
Age of mother		
<20	59	5.3
20–34	840	74.7
>34	225	20.0
Mean (±SD) age of mothers	28.76(±6.45) years	
Religion		
Muslim	1037	92.3
Orthodox	61	5.4
Protestant	26	2.3
Ethnicity		
Afar	831	73.9
Amhara	240	21.4
Oromo	39	3.5
Tigray	14	1.2
Maternal educational status		
Non formal education	853	75.9
Formal education	271	24.1
Family size		
2	66	5.8
3–4	494	44.0
>4	564	50.2
Current maternal occupation		
Pastoralist	524	46.6
House wife	494	44.0
Government employee	47	4.2
Private business	47	4.2
Daily laborer	12	1.0
Marital status		
Single	16	1.4
Married	1061	94.4
Divorced	23	2.0
Widowed	24	2.2

Antenatal care follow-up was significantly associated with knowledge of pregnancy danger signs. Women who attended antenatal care visit were about five times more likely to know pregnancy danger signs as compared to women who lack antenatal care checkups. Similarly, in Somali region of Ethiopia, women who utilized ANC services were five times more likely to be knowledgeable about the obstetric danger signs as compared to their counterparts (Maseresha et al., 2016). This finding was in line with other studies (Bililign & Mulatu, 2017; Bogale & Markos, 2015; Dile, Taddesse, Gedefaw, & Asmama, 2015; Okereke et al., 2013). This could be due to the fact that antenatal care provides an opportunity to counsel women about danger signs of pregnancy (Aborigo et al., 2014; Nambala & Ngoma, 2013).

Compared to women who had three and less family members, women who had more than three family members were more likely to know danger signs of pregnancy. This could be explained in such a way that women would get important information about pregnancy

Table 2. Maternal health service utilization and knowledge of pregnancy danger signs among women who gave birth in the last two years in Afar Regional State, Northeast Ethiopia, 2016		
Variables	**Frequency**	**Percentage (%)**
Attended ANC visit (*n* = 1124)***		
Yes	433	38.5
No	691	61.5
Number of ANC visits (*n* = 433)		
1	21	4.9
2–3	276	63.7
≥4	136	31.4
Place of delivery (*n* = 1124)		
Home	702	62.5
Health institution	422	37.5
PNC service utilization (*n* = 1124)***		
Yes	311	27.7
No	813	72.3
Maternal knowledge on key pregnancy danger signs (*n* = 1124)		
Yes	89	7.9
No	1035	92.1
Key pregnancy danger signs (*n* = 1124)[†]		
Hand/face swelling	96	8.5
Vaginal bleeding	52	4.6
Blurred vision	50	4.4
Do not know	1015	90.3
Information source on pregnancy danger signs (*n* = 109)[†]		
Health personnel	107	98.2
Traditional birth attendant	71	65.1
Mother coordinators	45	41.3
Others[$]	16	14.7

*at least one visit. [†]multiple answer possible. religious leaders, clan leaders, family members. ANC: antenatal care.

danger signs from their family members. In Ghana, grandmothers provide information to pregnant women on the management of pregnancy danger signs (Aborigo et al., 2014).

Women who attended formal education were two times more likely to know two key pregnancy danger signs as compare to women without formal education. In line with this, in Raya Kobo district women who attended formal education were more likely to know three pregnancy danger signs as compare to women without formal education (Bililign & Mulatu, 2017). Similar findings were reported from other studies (Bogale & Markos, 2015; Damme, 2016; Dile et al., 2015; Hailu & Berhe, 2014; Hailu et al., 2010; Okereke et al., 2013; Tsegaye et al., 2017). This can be possibly explained in such a way that education has role in understanding and recognizing pregnancy danger signs.

The study could be subjected to the following limitations. First, since this was cross-sectional study, it is unable to establish causality between knowledge of pregnancy danger signs and the potential factors. This because the exposure and outcome variables are collected at the same

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Table 3. Knowledge of pregnancy danger signs and associated factors among women who gave birth in the last two years in Afar Regional State, Northeastern Ethiopia, 2016				
Variables	**Knowledge of Pregnancy danger signs**		**COR (95% CI)**	**AOR (95% CI)**
	Yes	**No**		
Religion				
Muslim	80	957	0.72 (0.35,1.50)	0.80 (0.29, 2.22)
Christian[†]	9	78	1	1
Ethnicity				
Afar	70	761	0.55 (0.12, 2.52)	1.29 (0.19, 8.66)
Amhara	16	224	0.43 (0.89, 2.08)	0.50 (0.08, 2.98)
Oromo	1	38	0.16 (0.01, 1.89)	0.25 (0.02, 3.31)
Tigray	2	12	1	1
Family size				
≤3	18	276	1	1
>3	71	759	1.43 (0.84, 2.45)	2.25 (1.26, 4.01)*
Marital status				
Living together	85	976	1.29 (0.46, 3.62)	1.1 (0.36, 3.36)
Not living together[μ]	4	59	1	1
Maternal occupation				
Pastoral	13	511	0.18(0.09, 0.32)*	0.21(0.11, 0.39)*
Other[$]	76	524	1	1
Maternal educational status				
Non formal education	52	801	1	1
Formal education	37	234	2.44 (1.56, 3.81)*	2.0 (1.15, 3.47)*
ANC follow up				
Yes	70	363	6.82 (4.04, 11.51)*	4.88 (2.83, 8.41)*
No	19	672	1	1

[$]Government employee, house wife, private business, daily laborer. [μ]Single, Divorced, Widowed, [†]Orthodox, protestant. COR = Crude odds ratio. AOR = Adjusted odds ratio. CI = confidence interval. *Significant at $p < 0.05$. Hosmer and Lemeshow Test = 0.325.

time. Second, the data was collected based on self-report of the women who gave birth in the two years preceding the survey and may be subjected to recall bias. Thirdly, data on cultural/religious factors (beliefs and cultural norms) that may influence knowledge of pregnancy danger signs were not collected.

3.5. Conclusion

This study showed that only 7.9% of the study women had knowledge on danger signs of pregnancy. Women who attended antenatal care visit, who had more than three family members and who attended formal education were associated with increased odds of knowledge on pregnancy danger signs. On the other hand, women who reported pastoralist as their occupation were associated with lower odds of knowledge on key pregnancy danger signs. Therefore, health education and information programs on danger signs of pregnancy at the village level for women without formal education, and strengthening pastoralist-based maternal health information system could be important to improve maternal knowledge of pregnancy danger signs in Afar Regional State.

Abbreviations

AMREF	African Medical and Research Foundation
ANC	antenatal care
AOR	Adjusted odd ratio
CI	confidence interval
COR	Crude odds ration

Competing Interests
The authors declare that they have no competing interests.

Author details
Misgan Legesse Liben[1]
E-mail: lmisganl@gmail.com
ORCID ID: http://orcid.org/0000-0001-7716-6787
Abel Gebre Wuneh[2]
E-mail: abelgebre21@gmail.com
Nejimu Biza Zepro[3]
E-mail: nejim76@gmail.com
[1] Department of Public Health, Faculty of Health Sciences, Woldia University, Amhara, Ethiopia.
[2] Department of Public Health, College of Medical and Health Sciences, Samara University, Afar, Ethiopia.
[3] Department of Nursing, College of Medical and Health Sciences, Samara University, Afar, Ethiopia.

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Availability of data and materials
All data generated or analyzed during this analysis are included in the manuscript.

Authors' contributions
All authors conceived, designed the primary study that produced these data and supervised the data collection. MLL conceptualized this problem, performed the data analysis, interpretation of data and drafted the manuscript. All authors had critically read, and had approved the final manuscript.

Consent for publication
Not applicable.

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