Awareness and perception of husbands towards obstetric danger signs in northern Ethiopia

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Abstract

Background The Ethiopian demographic and health survey indicate that maternal mortality in Ethiopia is one of the highest in the world. The national reproductive strategy of Ethiopia has given emphasis to maternal and newborn health so as to reduce the high maternal and neonatal mortality. One of the targets in the strategies is to ensure that 80% of all families recognize at least three danger signs. However, a few researches have been focused on husband’s awareness towards obstetric danger signs. Objective This study was aimed to assess awareness and perception of husbands towards obstetric danger sign and associated factors in northern Ethiopia, 2018

Methods Community based cross sectional study was done from February 2018 to March 2018, in Mekelle city, Tigray region, Ethiopia. Multi stage sampling was used to reach 620 husbands. Data were entered, cleaned using Epi info version 7 and analyzed by SPSS version 22.0.

Results are presented by frequencies, percentages, mean and standard deviation. Binary and multivariable logistic analyses were employed to identify variable associated with awareness and perception of obstetrics danger signs. In multivariable logistic analyses variables with P-value < 0.05 were declare statistically significance. Result About 49.7% and 33.4% of husbands had good awareness and high perception on obstetric danger signs respectively. Husbands with daily labor occupation had 80% (AOR=0.2:95%CI; 0.13-0.44) less likely to have good awareness than governmental employee. Husbands with monthly income of 501-1000 birr had 5.8 times (AOR= 5.8, 95% CI: 1.22-27.89) high perception compared to those with monthly income of less than 500 birr.

Conclusion one in two and one in three husbands was having good awareness and high perception about obstetric danger sign respectively. Source of information, occupation of husband, income, occupation of mother and education of husband were significantly
associated with husband’s awareness on obstetric danger sign. Moreover variables like monthly income, occupation of mother and number of children were significantly associated with of husband’s perception on obstetric danger signs of their wives. Interventions are needed in creating awareness and perception of husbands’ in obstetric danger signs to recognize its complications.

Plain English Summery

More than half million women were dying each year from the complications of pregnancy and childbirth; with the majority of death occurring in the developing world. The Ethiopian demographic health survey 2016 showed maternal mortality rate in Ethiopia was 412 per 100,000 live births. Obstetric danger signs are physical changes (signs) or verbal complains (symptoms) occur during pregnancy, childbirth and after birth, which indicates that life of unborn baby and mothers are in danger. Lots of the complications results in maternal or fetal deaths are unpredictable, and their onset can be sudden and severe. However, their occurrences could be reduced by imparting awareness about obstetric complication for pregnant women and their partners. Men awareness on reproductive issues helps for birth preparedness and complications readiness. Furthermore, evidenced reveled that increased male awareness in obstetrics danger sign reduced maternal mortality. Therefore, this study aimed to assess awareness and perception of obstetric danger signs among husbands living in Mekelle city, north Ethiopia.

A community based cross sectional study was conducted on 620 husbands’ of pregnant women or having less than one year child. The three known obstetrics danger signs are vaginal bleeding, severe headache and reduced of fetus movement. However, water breakage, retained placenta and malodorous vaginal discharge are least known obstetrics danger signs. Three hundred sixty four respondents agreed that knowing obstetric danger signs are important, to seek medical care promptly. Moreover, husbands with higher
monthly income and employed wife had good awareness and perceptions in obstetrics danger signs.

Background

Pregnancy is a normal physiologic process, although at times some of the common discomforts of pregnancy may make the pregnant woman feels ill. Problems of pregnancy range from mildly irritating to life-threatening conditions (1). Obstetric danger signs are signs and symptoms of obstetric complications which occur during pregnancy (antepartum), childbirth (intra-partum) and immediately after delivery (postpartum). Some of the danger signs women faced during antepartum, intra-partum and postpartum periods are includes: severe vaginal bleeding, swollen hands or faces, blurred vision, prolonged labor (> 12 hours), convulsions, retained placenta, high grade fever, foul smelling vaginal discharge. Additionally, danger signs that can manifest in the newborns are convulsion, spasms/rigidity, difficult of breathing, very small baby and lethargy/unconsciousness (2). Around 80% of maternal deaths worldwide are brought by direct obstetric complications. The major global causes of maternal death are severe bleeding, postpartum infections, hypertensive disorders in pregnancy (HDP) and obstructed labor. Hemorrhage alone accounts for one third of all maternal deaths in Africa, yet many of these deaths are preventable (3). In Ethiopia main causes of maternal mortality are similar to globe (4). Many of the complications leading to maternal deaths can occur without warning at any time. But their occurrences could be reduced by imparting awareness about obstetric complication for pregnant women, their partners and families as well (1).

The national reproductive strategy of Ethiopia has been given emphasis to reduce the high maternal and neonatal mortality. The strategy focuses on the need to empower women, husbands, families and communities to recognize pregnancy related risks and to take responsibility for appropriate response. One of the targets in the strategies is to ensure
that 80% of all families recognize at least three danger signs associated with pregnancy related complications by 2010 in areas where health extension program is fully implemented (4).

Awareness towards obstetric danger signs and birth preparedness are strategies aimed at enhancing the utilization of skilled care during low risk births and emergency obstetric care in complicated cases in low income countries. Creating awareness is essential for reducing delays in seeking health care and in reaching a health facility. Communities and individuals should be empowered not only to recognize pregnancy related risks, but they must also have the means to react quickly and effectively once such problems arise (5–7).

The Ethiopia cultural practices put men on top of hierarchy of decision making, including decisions of the health care of their spouses. Therefore, they become major predictor of why, when, where and how frequent a pregnant woman will access antepartum, intrapartum and postpartum cares. Moreover, men’s are also financially superior compared to women, thus are often responsible of meeting costs of transport in case of obstetric emergencies (8, 9).

Men’s low level of awareness towards obstetric danger sign had low involvement in birth preparedness and complication readiness which had a great impact on maternal health outcome (9). Similarly, Women’s poor economic status in society and lack decision-making power significantly contribute to adverse pregnancy outcomes (10). Indeed, when a women’s are seeking care for their morbidities didn’t only depends on their own perception, but also on perception of their husbands (9). Husbands are acting as gatekeepers to women’s health therefore recognition of obstetric danger signs complications have a paramount importance (11).

Strategies for involving men in maternal health services should aim at raising their awareness about obstetric danger sign and engaging them in birth plans and complication
Men's awareness on reproductive issues enables them to support their mates to utilize obstetric services and eventually would help couples adequately prepare for birth complications. This would lead to a reduction in all three phases of delay: delay in the decision to seek care; delay in reaching care; and finally, delay in receiving care. The male partner can play a crucial role especially in the first and second phases of delay in developing countries and thereby positively impact birth outcomes (12). Literatures mentioned male involvement as vital in seeking obstetrics care for maternal outcome and the national reproductive strategy set a goal. Furthermore, increasing level of awareness and perception about obstetric danger sign is necessary to improve the women’s health (13). In Ethiopia, especially in the study area there is paucity of data which showed level of husbands' awareness and perception on obstetric danger sign and their associated factors. Thus providing evidence about awareness and perception of husbands' on obstetric danger signs will support to plan and intervene accordingly by governmental and nongovernmental organizations.

Methods

Study design and setting
Community based cross-sectional study was conducted in Mekelle. Mekelle is the capital city of Tigray region, found in northern Ethiopia. It is located around 780 kilometers north of the Ethiopian capital, Addis Ababa. Administratively, it is considered as special zone in the region, which is divided into seven sub-cities. These are Addi-Hak'i, Ayder, Haddinet, Hawelti, Qedamay - weyyane, Quiha, and Semien. The city is an economic, cultural, and political hub in the northern region of the country. According to projected central Statistical agency of Ethiopia, 2015 it has a population of more than 323,000 among these populations, 110,788 are females, 104,758 males and around 60,998 women are in reproductive age (15-49) years.
**Study population and eligibility criteria**

The study was conducted among husbands of pregnant wife or having less than one year child and who lived for 6 and above months before the study in the selected kebeles of Mekelle city. From each household unit one eligible husband was included and husbands who were unable to communicate due to disability or any other problems were excluded from the study.

**Sample size and sampling procedure**

The required sample size was determined by using a single population proportion formula; with 5% desired precision, 95% confidence level, 42.2% husband awareness of danger signs of obstetric complications (9), 10% of non-response rate, and 1.5 design effect was considered. The total sample size after computing for 10% non-response rate and 1.5 design effects was 620. Multistage sampling technique was used to select study husbands. From the 7 sub cities in the Mekelle city, two sub cities were selected by lottery method which was Ayider and Hawelti. Each sub cities have five kebeles (the smallest administrative unit in Ethiopia) and all kebless with in the sub cities were included in the study. On selected sub cities before the actual data collection pre-survey was conducted to determine the number households. The households’ Ayder and Hawelti sub cities were 3898. A total of 620 households were proportionally allocated to Ayder (279 households) and Hawelti (323 households) sub cities. The first household was identified by health extension workers the remaining study households were included by systematic random sampling.

**Data collection tools and procedures**

A structured questionnaire was adapted and used from the survey tools developed by JHPIEGO Maternal Neonatal Health Program (2). Additionally, to address for all research questions further related literatures were used to develop the structured questionnaire.
The questionnaire comprises 3 parts. The first part was about socio-demographic characteristics of the study participants. The second part was about level of awareness on obstetric danger signs on three phases with the source of information and the perception aspect included the importance of knowing danger signs and health seeking behavior of husbands. Ten BSc graduates’ midwifery students collected the data and two MSc midwifery students were recruited as supervisor. Moreover, four health extension workers were recruited as supporter for data collectors.

**Data quality measurement**

To maintain the quality of data; data collectors, supervisors and health extension workers were trained by authors for two days. The questionnaire was first prepared in English and then it was translated into Tigrigna (a local language and regional language for the study area) together with language experts for better understanding by respondents. Tigrigna version of the questionnaire was then translated back to English to check for its consistency. Additionally, definition of concepts and terms were harmonized with a local language of the district to avoid ambiguity. Pretest was done on 15 (5%) husbands at nearby town (wukro) in order to assess consistency and meaning of the instrument. Furthermore, collected data were checked by supervisor and principal investigator every day for its completeness.

**Study variables**

Awareness and perception on obstetric danger signs are dependent variable. Whereas, variables like Socio-demographic characteristics of the husband (age, educational level, household income, ethnicity, occupation and religion), Socio-demographic characteristics of the wife’s (educational status, occupation of wife’s and age), obstetrics factors (place
of last delivery, number of children and number of ANC visit) and source of information (health care providers, media, family and friend) were independent variables.

**Operational Definition**

**Obstetric danger signs**: these are signs and symptoms of obstetric complications which occur during pregnancy and childbirth and immediately after delivery.

**Good awareness**: refers to those participants who respond correctly to awareness questions and scored above the mean value.

**Poor awareness**: refers those participants who correctly respond to awareness questions and scored equal or below mean value.

**High perception**: refers to those participants who respond to perception questions and scored above the mean value.

**Low perception**: refers to those participants who respond to perception questions and scored less than mean value.

**Data management and analysis**

The data was entered and cleaned using Epi info (epidemiological information) version 7 and analyzed using SPSS 22.0. Data cleaning was done by running frequencies, cross tabulation and sorting among various variables. Results are presented in tables and figures by their frequencies and percentages. Both binary and multivariable logistic regression model was done to identify factors associated with awareness and perception towards obstetric danger signs. All factors with a p-value <0.25 in the binary logistic regression analysis was further entered into multivariable logistic regression to control confounding effects. Multiple logistic regressions were used to estimate the adjusted effect size of factors on awareness and perception towards obstetric danger signs. Magnitude of association was measured using odds ratio at 95% confidence interval and
statistical significance was declared at p-value less than 0.05.

Results

**Socio-demographic characteristics husbands**

The study was conducted among 620 husbands of women in selected kebeles of Mekelle city with 100% response rate. The mean age and standard deviation of respondents were 40±6. Regarding to husbands religious status 495(79.8%) were orthodox and 102(16.5%) were Muslims. Moreover, majority of husbands’ occupational status were 175 (28.2%) governmental employee and 168 (27%) daily labor [Table 3].

**Socio-demographic and obstetrics characteristics of wife’s**

The mean age and standard deviation of study participants’ wives was 30±5. About 20(3.2%) study participants’ wives educational status were illiterate and 195(31.5%) were having diploma and above. Considering their occupation 332(53.5%) were housewife and 104(16.8%) were government employees. More than half 510(82.3%) study participants’ wives were gave birth in health institution. Regarding their ANC visit, 388(62.6%) study participants’ wives had four and above ANC visit and about 181(29.2%) study participants’ wives has one child [Table 4].

**Awareness of husbands towards obstetric danger signs during Antepartum, intra-partum and postpartum periods**

From the study participants 556 (10.3%), 543 (87.6%) and 502 (81%) aware’s presence obstetrics danger signs during antepartum, intra-partum and postpartum periods respectively. However, after calculating the mean score value the awareness of husbands on obstetric danger signs in the three phases (Antepartum, intra-partum and postpartum periods) will be 308(49.7%) [Figure1]. During antepartum period first three commonly known obstetrics danger signs by study participants are vaginal bleeding 449(72.4), Severe headache 290(46.8%) and reduced or absence of fetus movement 204(32.9%).
Similarly, majority of husbands know vaginal bleeding as obstetric danger sign during intra-partum 505 (81.5) and postpartum period 449 (72.4). However, water breakage/leakage 81 (13.1%), retained placenta 63 (10.2%) and malodorous vaginal discharge 81 (13.1%) are least known obstetrics danger sign during antepartum, intra-partum and postpartum period respectively [Table 5]. Regarding to source of information around 234 (37.7%) husbands has gained information about obstetric danger signs from health institution (health professionals) [Table 1].

**Perception of husbands towards danger signs during antepartum, intra-partum and postpartum periods**

Two hundred nineteen (35.3 %) of the study respondents were strongly agreed with importance of knowing obstetric danger signs and 364 (55.8 %) the study participants agreed that knowing obstetric danger signs is important because women will seek medical care on time. Regarding the prevention of obstetric danger signs 360 (58%) of the respondents were agreed and 49 % disagree on the idea that mothers who develop obstetric danger signs should seek help from traditional birth attendants [Table 2]. Overall, about 413 (66.6%) of the study participants were found to have low perception towards obstetric danger signs scoring below the mean value [figure 2].

**Factors associated with awareness and perception of husbands towards obstetric danger signs.**

**Factors associated with awareness of husbands towards obstetric danger signs**
To identify the associated factors with awareness of husbands on obstetric danger sign, binary and multivariable logistic regression analysis was done between the dependent and independent variables. In the binary logistic regression; source of information, occupation of husband, income, ANC visit, age, occupation of mother and education of husband were significantly associated with awareness of husbands towards obstetric danger signs. However, in the multiple logistic regression models age and ANC visit were not statistically associated with awareness of obstetric danger signs [Table 6].

Husbands who got information on obstetric danger signs from friends were 70% (AOR=0.3; 95% CI: 0.13-0.55) less likely to have good awareness on obstetric danger signs compared to those who got information from health professionals. Husbands with trade occupational status were 50% (AOR=0.5; 95% CI: 0.29-0.93) less likely to have good awareness on obstetric danger signs compared to those governmental employees. Furthermore, husbands with a monthly income of 1001-1500 birr were 10.5 times (AOR= 10.5; CI 95% CI: 2.38-46.26) more likely to have good awareness compared to those with monthly income of less than 500 birr. Additionally, husbands who have governmental employee wife’s were 2.2 times (AOR=2.2; 95% CI: 1.10-4.49) more likely to aware than those with housewife [Table 6].

Husbands who completed elementary school and Secondary school were 6.7 (AOR=6.7; 95% CI: 1.95-22.76) and 13.3 (AOR= 13.2; 95% CI: 3.23-54.0) times more likely to have good awareness compared to illiterate husbands respectively [Table 6].

**Factors associated with perception of husbands towards obstetric danger signs**

To identify the associated factors with perception of husbands towards obstetric danger
signs, binary and multivariable logistic regression analyses were done. In the binary logistic regression education of husband, monthly income, age of husbands, occupation of mother and number of children were significantly associated with perception of husbands towards obstetric danger signs of their wives. After controlling potential confounders, monthly income, occupation of mother and number of children were statistically associated with perception of husbands towards obstetric danger signs [Table 7]. Husbands with monthly income of 501-1000 birr have 5.8 times (AOR= 5.8, 95% CI: 1.22-27.89) high perception compared to those with monthly income of less than 500 birr. Husbands with four children and own business were 60% (AOR= 0.4, 95% CI, 0.17-0.97) and 60% (AOR=0.2: 95% CI; 0.04-0.94) less likely to have high perception towards obstetric danger signs compared to those with one child and housewife respectively [Table 7].

Discussion
This study was aimed to assess the awareness and perception of husbands towards obstetric danger sign and associated factors in Mekelle city, Tigray region, Ethiopia, 2017/2018. This study showed that ( 49.7% ) high level of status awareness among husband’s towards obstetric danger sign when compared to a cross sectional study done in Tanzania (32%) (14). This high variation of finding might be due health care system difference of the countries especially utilization of community mobilization on maternal health in Ethiopia by health extension workers. Similarly, it is also higher than a cross sectional study conducted in southern part of Ethiopia (42.2%) (9). This higher prevalence might be due to the study time variation and socio-demographic difference, this study was done on the capital city of the Tigray region whereas study conducted in southern region was includes the rural and urban areas. This implies rural dwellers husbands compared to urban areas needs more health education on obstetrics danger signs.
This study indicated that occupation of husbands was significantly associated with awareness of obstetric danger signs. Husbands who were daily laborer were 80% less likely to know obstetric danger signs compared to those who were governmental workers. Similar finding was reported by study conducted is in southern part of Ethiopia where husbands whose occupation were government employee, 4 times more aware than their farmer counterparts (9). This might be due to governmental worker’s husbands are probably more educated and have information access in obstetrics danger signs through different electronics media.

In line with study conducted in Tanzania, this study revealed educational status of husbands was significantly associated with awareness of husbands towards obstetric danger signs (14). Similarly, a cross sectional study showed in Kenya, more educated husbands had good awareness about obstetric danger sign than less educated husbands (12). In addition this study showed that monthly income was significantly associated with husband awareness towards obstetric danger sign. Consistent findings were also reported in a study in Ethiopia’s Gamo gofa zone where husbands in the highest wealth quintile (wealthiest) were 3 times more aware compared to the lowest wealth index quintile (poorest) (9). Similar report also revealed from Uganda’s Mbarara district. (6). This might be due to the fact that the highest economic status could had different social media materials to get information about maternal health and with the highest economic status they might seek delivery service from health facility ,this exposed them to know about obstetrics danger signs.

In this study husbands who got information towards obstetric danger sign from friends were 70% less aware compared with husbands who got information from healthcare providers. This might be due to professional difference between friends and healthcare providers’. This implies health care providers are the core to improve maternal health
even through dissemination of information to the families during delivering care.

This study revealed that occupation of wife was significantly associated with awareness’s of husbands on obstetric danger signs. Husbands with governmental employee wife’s were 2.2 times more likely to be aware than those with housewives. This finding was similar with a study done in southern part of Ethiopia where husband’s wife’s have an occupation was weaver had 6 times higher odd of being aware of danger sign than husbands with housewives (9). This could be explained by the fact that working women have better opportunity to share experiences with her husband and others. Additionally, she may have autonomy in utilization of maternal health services. This implies women’s empowerment in socioeconomic status have a huge impact on family. An economically stable woman could easily understand and have influence her husband’s or the family on creating awareness of obstetrics danger signs.

In the present study, high perception among husbands towards obstetric danger sign was low (33.4%) when compared with previously reported cross sectional study conducted in Amhara region of Ethiopia on women’s on obstetric danger sign where the positive attitude among women towards obstetric danger (47.3%) (13). This discrepancy might be due to sex difference in which women had more concern to their obstetric danger sign than males. This implies the need of familial involvement in obstetrics related care to improve maternal health. In this study husbands with monthly income of 501–1000 birr had 5.8 times high perception compared to those with monthly income of less than 500 birr. This finding was in line with the study done in Lusaka revealed that the hindrances to positive attitude of women’s towards obstetric danger signs were low income (15). As strength, this study addressed awareness and perception of husbands on obstetrics danger signs with a relatively large sample size. However, this study was conducted in urban area it may not represent rural area dwellers. Additionally, due to the nature of the
design, absence of important variables is the limitation of the study.

Conclusion

In this study one in every two and one in three husbands have good awareness and high perception on obstetric danger signs respectively. The most frequently mentioned obstetrics danger signs in antepartum, intra-partum and postpartum was severe vaginal bleeding. Source of information, occupation of husband, income, occupation of mother, and education of husband were significantly associated with husband’s awareness on obstetric danger sign. Moreover variables like monthly income, occupation of mother and number of children were significantly associated with of husbands' perception on obstetric danger signs. Intervention is needed in creating awareness and perception of husbands’ in obstetric danger signs to recognize its complications which are an indication for serious emergency care to be sought from skilled attendant and which in turn increase their involvement from pregnancy to child birth process. Additionally, strengthen health education system in health institution and women empowerment increase the status of awareness and perception of husbands in obstetrics danger signs. Furthermore, qualitative research is needed to get detail factors and to utilize the findings in good manner.

Abbreviations

| Acronym | Description                                               |
|---------|-----------------------------------------------------------|
| ANC     | Antenatal Care                                            |
| AOR     | Adjusted Odds Ratio                                       |
| CI      | Confidence Interval                                       |
| COR     | Crude Odds Ratio                                          |
| DHS     | Demographic and Health Survey                             |
| EDHS    | Ethiopian Demographic and Health Survey                   |
| JHPIEGO | Johns Hopkins Program for International Education in Gynecology and |
Obstetrics

MMR	Maternal mortality rate

SPSS	Statistical Package for Social Science

WHO	World Health Organization

Declarations

**Ethical consideration**

Ethical clearance for the study was obtained from the Institutional Review Board of College of Health Sciences of Mekelle University, permission letter was taken from Mekelle health offices, and written consent was taken from individual participant. No form of identifiers was included in the questionnaires to maintain confidentiality.

**Consent for publication**

Not applicable

**Data availability**

The datasets used in this study are available from the corresponding author upon reasonable request.

**Conflict of interest**

The authors declare that no conflicts of interest exist.

**Funding for the research**

Not applicable

**Author’s contributions**

Awet Fitwi participated in the study design, data collection and wrote first draft of the manuscript. Henok kumsa participated in analysis and wrote the final draft of the manuscript. Gerezgiher Buruh and Mohammedseid Rejeu contributed in selection of study design, analysis and reviewed the manuscript. Yemisrach Belete participated in data
collection and performed statistical analysis. Mikias Amare and Addisu Getie reviewed the manuscript. All authors are read and approved the final manuscript.

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Tables

*Table 1: Husbands source of information about obstetric danger signs with status of awareness and perception in Mekelle city, northern Ethiopia, March 2018 (n=620).*
| Source of information | Awareness | Perception |
|-----------------------|-----------|------------|
|                       | Poor      | Good       |
| Health institution    | 93 (39.7%) | 141 (60.3%) |
| Media                 | 102 (52%) | 94 (48%)   |
| Family                | 65 (53.7%) | 56 (46.3%)  |
| Friends               | 52 (75.4%) | 17 (24.6%)  |

Table 2: Perception of husbands towards obstetric danger signs in Mekelle city, northern Ethiopia, March 2018 (n=620).
| Indicators of perception                                                                 | Strongly disagree | Disagree | Neutral | Agree |
|----------------------------------------------------------------------------------------|------------------|----------|---------|-------|
|                                                                                       | Freq. | Per.  | Freq. | Per.  | Freq. | Per.  | Freq. |
| It is important for husband to know obstetric danger signs during pregnancy.          | 0     | 0     | 0     | 0     | 31    | 5     | 370   |
| Having awareness about obstetric danger signs is important because women will seek medical care | 0     | 0     | 0     | 0     | 36    | 5.8   | 346   |
| Having awareness about obstetric danger signs is important because the danger signs will not go away by their own. | 0     | 0     | 4     | 0.6   | 53    | 8.54  | 360   |
| Mothers who develop obstetric danger signs should seek medical advice.                 | 2     | 0.3   | 8     | 1.29  | 64    | 10.3  | 355   |
| Mothers who develop obstetric danger signs should seek help from traditional birth attendants. | 110   | 17.7  | 306   | 49.3  | 79    | 12.7  | 87    |
Table 3: Status of awareness and perception with socio-demographic characteristics of husbands in Mekelle city, northern Ethiopia, March 2018 (n=620).

| Variables       | Categories       | Awareness | | | Perception | | |
|-----------------|-----------------|-----------|---|---|-----------|---|---|
| Age             | 21-30           | 46 (43.8%)| 59 (56.2%)| 79 (75.2%)| 26 (24.8%)|
|                 | 31-40           | 156 (52.9%)| 139 (47.1%)| 145 (72.5%)| 55 (27.5%)|
|                 | 41-50           | 100 (50%) | 100 (50%) | 15 (75%) | 5 (25%) |
|                 | >=51            | 10 (50%) | 10 (50%) | 174 (59%) | 121 (41%) |
| Religion        | Orthodox        | 238 (48.1%)| 257 (51.9%)| 323 (65.3%)| 172 (34.7%)|
|                 | Muslim          | 64 (62.7%) | 38 (38.3%) | 70 (68.6%) | 32 (31.4%) |
|                 | Protestant      | 4 (36.4%) | 7 (64.6%) | 9 (81.8%) | 2 (18.2%) |
|                 | Catholic        | 6 (50%) | 6 (50%) | 11 (91.7%) | 1 (8.3%) |
| Ethnicity       | Tigray          | 285 (51.4%)| 269 (49.6%)| 357 (64.4%)| 197 (35.6%)|
|                 | Amhara          | 18 (51.4%)| 18 (49.6%) | 27 (71.1%) | 8 (22.9%) |
|                 | Oromo           | 4 (18.2%) | 17 (81.8%) | 20 (90.9%) | 2 (9.1%) |
|                 | Other           | 5 (55.6%) | 4 (44.4%) | 9 (100%) | 0 (0%) |
| Education       | Illiterate      | 39 (90.7%)| 4 (9.3%) | 31 (72.1%) | 12 (27.9%) |
|                 | Read & write    | 41 (58.6%) | 29 (41.4%) | 49 (70%) | 21 (30%) |
|                 | Elementary      | 140 (53.8%)| 120 (46.3%)| 189 (72.7%)| 71 (27.3%) |
|                 | Secondary       | 64 (43.2%) | 84 (56.8%) | 102 (68.9%)| 46 (31.1%) |
|                 | Diploma and above| 28 (28.3%) | 71 (71.7%) | 42 (42.4%) | 57 57.6 |
| Occupation      | Government employee | 42 (24%) | 133 (76%) | 103 (58.9%) | 72 (41.1%) |
|                 | Trade           | 73 (46.5%)| 84 (53.5%) | 112 (71.3%) | 45 (28.7%) |
|                 | Farmer          | 17 (77.3%)| 5 (22.7%) | 22 (100%) | 0 (0%) |
|                 | Daily labor     | 122 (72.6%)| 46 (27.4%) | 111 (66.1%)| 57 (33.9%) |
|                 | Student         | 6 (60%) | 4 (40%) | 6 (60%) | 4 (40%) |
| Monthly income  | Tailor          | 52 (59.1%) | 36 (40.9%) | 59 (67%) | 29 (33%) |
| (in ETH birr)   | <=500           | 19 (82.6%) | 4 (17.4%) | 21 (91.3%) | 2 (8.7%) |
|                 | =501-1000       | 55 (47.8%) | 60 (55.2%) | 83 (72.2%) | 32 (27.8%) |
|                 | 1001-1500       | 10 (22.7%) | 34 (77.3%) | 41 (93.2%) | 3 (6.8%) |
|                 | 1501-2000       | 36 (39.1%) | 56 (60.9%) | 83 (90.2%) | 9 (9.8%) |
|                 | >=2001          | 192 (55.5%) | 154 (44.5%) | 185 (53.5%) | 161 (46.5) |

Note: “Other” in ethnicity category includes “Gurage, Afar, Somalia etc.”

Table 4: Status of awareness and perception with socio-demographic and obstetrics characteristics of wife’s in Mekelle city, northern Ethiopia, March 2018 (n=620).
### Variables

| Age of wife | Poor | Good | Low | High |
|-------------|------|------|-----|------|
| <=19        | 5 (41.7%) | 7 (58.3%) | 9 (75%) | 3 (25%) |
| 20-30       | 183 (48.9%) | 191 (51.1%) | 241 (64.4%) | 133 (35.6%) |
| 31-40       | 119 (52.9%) | 106 (47.1%) | 156 (69.3%) | 69 (30.7%) |
| 40-50       | 5 (52.6%) | 4 (44.4%) | 7 (77.8%) | 2 (22.2%) |

| Education   | Illiterate | Read & write | Secondary | Diploma & above |
|-------------|------------|--------------|-----------|-----------------|
|             | 14 (70%)   | 15 (44.1%)   | 122 (66.3%) | 43 (22.1%) |
|             | 6 (30%)    | 19 (55.9%)   | 62 (33.7%) | 152 (77.9%) |
|             |            |              | 138 (75%) | 105 (53.8%) |
|             |            |              | 46 (25%)  | 67 (35.8%) |

| Occupation  | House wife | Government employee | Own business | daily labor | Student |
|-------------|------------|---------------------|--------------|------------|---------|
|             | 190 (57.2%) | 21 (20.2%) | 52 (46.4%) | 31 (77.5%) | 5 (45.5%) |
|             | 142 (42.8%) | 83 (79.8%) | 60 (53.6%) | 9 (22.5%) | 6 (54.5%) |
|             | 216 (65.1%) | 56 (53.8%) | 89 (79.5%) | 30 (75%) | 9 (81.8%) |
|             | 116 (34.9%) | 48 (46.2%) | 23 (20.5%) | 10 (25%) | 2 (18.2%) |

| Place of last delivery | Hospital | Home |
|------------------------|----------|------|
|                        | 252 (49.4%) | 60 (54.5%) |
|                        | 258 (50.6%) | 50 (45.5%) |
|                        | 337 (66.1%) | 76 (69.1%) |
|                        | 173 (33.9%) | 34 (30.9%) |

| Number of children | One | Two | Three | Four | >=Five |
|--------------------|-----|-----|-------|------|--------|
|                    | 85 (47%) | 100 (52.6%) | 81 (48.8%) | 35 (56.5%) | 11 (52.4%) |
|                    | 96 (53%) | 90 (47.4%) | 85 (51.2%) | 27 (43.5%) | 10 (47.6%) |
|                    | 107 (59.1%) | 115 (60.5%) | 127 (76.5%) | 48 (77.4%) | 16 (76.2%) |
|                    | 74 (40.9%) | 75 (39.5%) | 39 (23.5%) | 14 (22.6%) | 5 (23.8%) |

| Number of ANC visit | One | Two | Three | Four | >=Four |
|--------------------|-----|-----|-------|------|--------|
|                    | 6 (35.3%) | 42 (73.7%) | 104 (65.5%) | 160 (41.2%) |
|                    | 11 (64.7%) | 15 (26.3%) | 54 (34.2%) | 228 (58.8%) |
|                    | 11 (64.7%) | 45 (78.9%) | 109 (69%) | 248 (63.9%) |
|                    | 6 (35.3%) | 12 (21.1%) | 49 (31%) | 140 (36.1%) |

Note: “other” in occupation category includes tailor, waiter etc.

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**Table 5:** Awareness of husbands towards obstetric danger signs during antepartum, intrapartum and postpartum periods in Mekelle city, northern Ethiopia, March 2018 (n=620).

NA= Not assessed for that period

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**Table 6:** Binary and multivariable logistic regression analysis of variables with status of
| Variables                      | Antepartum period | Intra-partum period |  |
|-------------------------------|-------------------|---------------------|---|
|                               | Freq.             | Per.                | Freq. | Per. |
| Vaginal bleeding              |                   |                     |       |      |
| Yes                           | 449               | 72.4                | 505   | 81.5 |
| No                            | 171               | 27.6                | 115   | 18.5 |
| Severe headache               |                   |                     |       |      |
| Yes                           | 290               | 46.8                | 296   | 47.7 |
| No                            | 330               | 53.2                | 324   | 52.3 |
| Blurred vision                |                   |                     |       |      |
| Yes                           | 171               | 27.6                | NA    | NA   |
| No                            | 449               | 72.4                | NA    | NA   |
| Severe abdominal pain         |                   |                     |       |      |
| Yes                           | 153               | 24.7                | NA    | NA   |
| No                            | 467               | 75.3                | NA    | NA   |
| Swollen hands and face        |                   |                     |       |      |
| Yes                           | 162               | 26.1                | NA    | NA   |
| No                            | 458               | 73.9                | NA    | NA   |
| High fever                    |                   |                     |       |      |
| Yes                           | 160               | 25.8                | 242   | 39.0 |
| No                            | 460               | 74.2                | 378   | 61.0 |
| Fetus movement absence        |                   |                     |       |      |
| Yes                           | 204               | 32.9                | NA    | NA   |
| No                            | 416               | 67.1                | NA    | NA   |
| Water breaking/leaking         |                   |                     |       |      |
| Yes                           | 81                | 13.1                | NA    | NA   |
| No                            | 539               | 86.9                | NA    | NA   |
| Convulsion                    |                   |                     |       |      |
| Yes                           | NA                | NA                  | 123   | 19.8 |
| No                            | NA                | NA                  | 497   | 80.2 |
| Loss of consciousness         |                   |                     |       |      |
| Yes                           | NA                | NA                  | 93    | 15.0 |
| No                            | NA                | NA                  | 527   | 85.0 |
| Prolonged labor               |                   |                     |       |      |
| Yes                           | NA                | NA                  | 76    | 12.3 |
| No                            | NA                | NA                  | 544   | 87.7 |
| Retained placenta             |                   |                     |       |      |
| Yes                           | NA                | NA                  | 63    | 10.2 |
| No                            | NA                | NA                  | 557   | 89.8 |
| Difficulty of breathing       |                   |                     |       |      |
| Yes                           | NA                | NA                  | NA    | NA   |
| No                            | NA                | NA                  | NA    | NA   |
| Sever weakness                |                   |                     |       |      |
| Yes                           | NA                | NA                  | NA    | NA   |
| No                            | NA                | NA                  | NA    | NA   |
| Malodorous vaginal discharge  |                   |                     |       |      |
| Yes                           | NA                | NA                  | NA    | NA   |
| No                            | NA                | NA                  | NA    | NA   |
husbands awareness on obstetric danger signs in Mekelle city, northern Ethiopia, March 2018 (n=620).

| Variables                  | Categories                        | Awareness | COR(95%CI) | AOR(95%CI) |
|----------------------------|-----------------------------------|-----------|------------|------------|
| Source of information      | Health professional               | Poor      | 93(39.7)   | 1          | 1          |
|                            | Media                             | Good      | 141(60.3)  | 1          | 1          |
|                            | Family                            | Poor      | 65(53.7)   | 0.6(0.41-0.89) | 0.7(0.45-1.16) |
|                            | Good                              | 56(46.3)  | 0.6(0.36-0.88) | 0.7(0.38-1.19) |
|                            | Friends                           | Poor      | 52(75.4)   | 0.2(0.12-0.39) | 0.3(0.13-0.55) |
|                            | Good                              | 17(24.6)  | 1          | 1          |
| Occupation of husband      | Government employee               | Poor      | 42(24)     | 1          | 1          |
|                            | Good                              | 133(76)   | 1          | 1          |
|                            | Trade                             | Poor      | 73(46.5)   | 0.4(0.23-0.58) | 0.5(0.29-0.93) |
|                            | Good                              | 84(53.5)  | 1          | 1          |
|                            | Farmer                            | Poor      | 17(77.3)   | 0.1(0.07-0.19) | 0.2(0.13-0.44) |
|                            | Good                              | 5(22.7)   | 1          | 1          |
|                            | Daily labor                       | Poor      | 122(72.6)  | 0.1(0.06-0.78) | 0.2(0.11-2.23) |
|                            | Good                              | 46(27.4)  | 1          | 1          |
|                            | Tailor                            | Poor      | 6(60)      | 0.2(0.06-0.78) | 0.3(0.18-0.69) |
|                            | Good                              | 4(40)     | 1          | 1          |
| Income                     | <=500                             | Poor      | 19(82.6)   | 1          | 1          |
|                            | Good                              | 4(17.4)   | 1          | 1          |
|                            | 501-1000                          | Poor      | 55(47.8)   | 5.2(1.66-16.18) | 2.6(0.69-9.80) |
|                            | Good                              | 60(52.2)  | 1          | 1          |
|                            | 1001-1500                         | Poor      | 10(22.7)   | 16.2(4.45-58.5) | 10.5(2.38-46.2) |
|                            | Good                              | 34(77.3)  | 1          | 1          |
|                            | 1501-2000                         | Poor      | 36(39.1)   | 7.4(2.32-23.49) | 3.6(0.86-13.09) |
|                            | Good                              | 56(60.9)  | 1          | 1          |
|                            | >=2001                            | Poor      | 192(55.5)  | 3.8(1.27-11.43) | 0.9(0.27-3.65) |
|                            | Good                              | 154(44.5) | 1          | 1          |
| ANC visit                  | One                               | Poor      | 6(35.3)    | 1          | 1          |
|                            | Good                              | 11(64.7)  | 1          | 1          |
|                            | Two                               | Poor      | 42(73.7)   | 0.2(0.06-0.62) | 0.4(0.08-1.57) |
|                            | Good                              | 16(26.3)  | 1          | 1          |
|                            | Three                             | Poor      | 104(65.8)  | 0.3(0.09-0.81) | 0.7(0.17-2.62) |
|                            | Good                              | 54(34.2)  | 1          | 1          |
|                            | >=Four                            | Poor      | 160(41.2)  | 0.8(0.28-2.14) | 1.2(0.32-4.58) |
|                            | Good                              | 228(58.8) | 1          | 1          |
| Age husband                | 21-30                             | Poor      | 46(74.1)   | 1          | 1          |
|                            | Good                              | 59(25.9)  | 1          | 1          |
|                            | 31-40                             | Poor      | 156(25)    | 1.28(0.5-3.34) | 0.75(0.18-3.06) |
|                            | Good                              | 139(75.1) | 1          | 1          |
|                            | 41-50                             | Poor      | 100(16)    | 0.89(0.36-2.2) | 0.61(0.16-2.35) |
|                            | Good                              | 100(16)   | 1          | 1          |
|                            | >=51                              | Poor      | 10(1.61)   | 1.0(0.39-2.51) | 0.68(0.18-2.63) |
|                            | Good                              | 10(1.61)  | 1          | 1          |
| Occupation of mother       | House wife                        | Poor      | 190(57.2)  | 5.3(3.13-8.95) | 2.2(1.10-4.49) |
|                            | Good                              | 142(42.8) | 1          | 1          |
| Education of husband       | Government employee               | Poor      | 21(20.2)   | 1.6(0.48-5.37) | 1.4(0.32-6.19) |
|                            | Good                              | 83(79.8)  | 1          | 1          |
|                            | Own business                      | Poor      | 42(46.4)   | 1.5(1.004-2.37) | 1.3(0.74-2.15) |
|                            | Good                              | 60(53.6)  | 1          | 1          |
|                            | daily labor                       | Poor      | 31(77.5)   | 0.4(0.18-0.84) | 0.5(0.21-1.23) |
|                            | Good                              | 9(22.5)   | 1          | 1          |
|                            | Student                           | Poor      | 5(45.5)    | 1.6(0.48-5.37) | 1.4(0.32-6.19) |
|                            | Good                              | 6(54.5)   | 1          | 1          |
|                            | Other                             | Poor      | 13(61.9)   | 0.8(0.33-2.04) | 1.5(0.54-4.36) |
|                            | Good                              | 8(38.1)   | 1          | 1          |
|                            | Illiterate                        | Poor      | 39(90.7)   | 1          | 1          |
|                            | Good                              | 4(9.3)    | 1          | 1          |
|                            | Read and write                    | Poor      | 41(58.6)   | 2.9(0.92-9.54) | 4.7(1.24-17.86) |
|                            | Good                              | 29(41.4)  | 1          | 1          |
|                            | Elementary                        | Poor      | 140(53.8)  | 1.2(0.43-3.24) | 6.7(1.95-22.76) |
|                            | Good                              | 120(46.2) | 1          | 1          |
|                            | Secondary                         | Poor      | 64(43.2)   | 1.4(0.50-3.71) | 13(3.66-48.0) |
|                            | Good                              | 84(56.8)  | 1          | 1          |
|                            | Diploma and above                 | Poor      | 28(28.3)   | 8.2(2.99-22.75) | 13(3.23-54.0) |
|                            | Good                              | 71(71.7)  | 1          | 1          |

Key: * = P value < 0.05  AOR=Adjusted Odds Ratio  COR=Crude Odds Ratio  ** = P value < 0.001
Table 7: Binary and multivariable logistic regression analysis of variables with the status of husbands perception on obstetric danger signs in Mekelle city, northern Ethiopia, March 2018 (n=620).

| Variables                      | Categories          | Low (n=317) | High (n=303) | COR (95%CI)          | AOR (95%CI)          |
|-------------------------------|---------------------|-------------|--------------|----------------------|----------------------|
| Education of husband          | Illiterate          | 31 (72.1)   | 12 (27.9)    | 1                    | 1                    |
|                               | Read & write        | 49 (70)     | 21 (30)      | 1.1 (0.48-2.56) *    | 0.6 (0.25-1.69) *    |
|                               | Elementary          | 189 (72.7)  | 71 (27.3)    | 0.9 (0.47-1.99) **   | 0.6 (0.24-1.28) **   |
|                               | Secondary           | 102 (68.9)  | 46 (31.1)    | 1.2 (0.55-2.47) **   | 0.6 (0.25-1.45) **   |
|                               | Diploma and above   | 42 (42.4)   | 57 (57.6)    | 3.5 (1.61-7.62) **   | 1.0 (0.37-2.73) **   |
| Monthly income                | <=500               | 21 (91.3)   | 2 (8.7)      | 1                    | 1                    |
|                               | =501-1000           | 83 (72.2)   | 32 (27.8)    | 4.0 (0.89-18.26)     | 5.8 (1.22-27.89)     |
|                               | 1001-1500           | 41 (93.2)   | 3 (6.8)      | 0.8 (0.12-4.96)      | 0.9 (0.13-5.85)      |
|                               | 1501-2000           | 83 (90.2)   | 9 (9.8)      | 1.1 (0.23-5.67)      | 1.5 (0.29-8.11)      |
|                               | >=2001              | 185 (58.5)  | 161 (46.5)   | 9.1 (2.11-39.57)     | 11.9 (2.57-55.7)     |
| Age husband                   | 21-30               | 79 (12.8)   | 26 (4.2)     | 1                    | 1                    |
|                               | 31-40               | 174 (28.1)  | 121 (19.5)   | 1.17 (0.15-9.0)      | 0.8 (0.2-3.13)       |
|                               | 41-50               | 145 (23.4)  | 55 (8.9)     | 1.93 (0.39-9.43)     | 1.9 (0.54-6.59)      |
|                               | >=51                | 15 (2.42)   | 5 (0.8)      | 1.55 (0.31-7.64)     | 1.24 (0.36-4.27)     |
| Occupation of mother          | House wife          | 216 (65.1)  | 116 (34.9)   | 1                    | 1                    |
|                               | Government employee | 56 (53.8)   | 48 (46.2)    | 1.6 (1.02-2.49)      | 1.02 (0.55-1.92)     |
|                               | Own business        | 89 (79.5)   | 23 (20.5)    | 0.5 (0.28-0.80)      | 0.4 (0.23-0.69)      |
|                               | Daily labor         | 30 (75)     | 10 (25)      | 0.6 (0.29-1.32)      | 0.8 (0.35-1.84)      |
|                               | Student             | 9 (81.8)    | 2 (18.2)     | 0.4 (0.08-1.95)      | 0.2 (0.04-0.94)      |
|                               | Other               | 13 (61.9)   | 8 (38.1)     | 1.1 (0.46-2.84)      | 0.7 (0.26-1.86)      |
| Number of children            | One                 | 107 (59.1)  | 74 (40.9)    | 1                    | 1                    |
|                               | Two                 | 115 (60.5)  | 75 (39.5)    | 0.9 (0.62-1.43)      | 1.1 (0.65-1.75)      |
|                               | Three               | 127 (76.5)  | 39 (23.5)    | 0.4 (0.28-0.71)      | 0.4 (0.24-0.79)      |
|                               | Four                | 48 (77.4)   | 14 (22.6)    | 0.4 (0.22-0.82)      | 0.4 (0.17-0.97)      |
|                               | >=Five              | 16 (76.2)   | 5 (23.8)     | 0.5 (0.16-1.28)      | 0.3 (0.09-1.26)      |

Key: * = P value < 0.05  ** = P value < 0.001  AOR=Adjusted Odds Ratio  COR=Crude Odds Ratio
Figures

Figure 1
Percentage of awareness of husbands towards obstetric danger signs during antepartum, intra-partum and postpartum periods, in Mekelle city, northern Ethiopia, March 2018 (n=620).
Figure 2

Percentage of perception of study participants towards obstetric danger signs antepartum, intra-partum and postpartum periods in Mekelle city, northern Ethiopia, March 2018 (n=620).