

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

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## Research

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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 revealed 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, intra-partum 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 readiness (2). Men 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 out come 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 kebles 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  $40 \pm 6$ . 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  $30 \pm 5$ . 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].Over all, 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 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

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).

Variables	Categories	Awareness		Perception	
		Poor	Good	Low	High
Source of information	Health institution	93 (39.7%)	141(60.3%)	157 (67.1%)	77 (32.9%)
	Media	102 (52%)	94 (48%)	132 (67.3%)	64 (32.7%)
	Family	65 (53.7%)	56 (46.3%)	81(66.9%)	40 (33.1%)
	Friends	52 (75.4%)	17 (24.6%)	43 (62.3%)	26 (37.7%)

**Table 2: Perception of husbands towards obstetric danger signs in Mekelle city, northern Ethiopia, March 2018 (n=620).**

Factors of perception

	Likert scale									
	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Freq.	Per.	Freq.	Per.	Freq.	Per.	Freq.	Per.	Freq.	Per.
It is important for husband to know obstetric danger signs during pregnancy.	0	0	0	0	31	5	370	59.7	219	35.3
Having awareness about obstetric danger signs is important because women will seek medical care	0	0	0	0	36	5.8	346	55.8	238	38.3
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	58	203	32.7
Women who develop obstetric danger signs should seek medical advice.	2	0.3	8	1.29	64	10.3	355	57.2	191	30.8
Women who develop obstetric danger signs should seek help from traditional birth attendants.	110	17.7	306	49.3	79	12.7	87	14	38	6.12

**Table3: Status of awareness and perception with socio-demographic characteristics of husbands in Mekelle city, northern Ethiopia, March 2018**

**(n=620).**

Variables	Categories	Awareness		Perception	
		Poor	Good	Low	High
Age	21-30	46(43.8%)	59 (56.2%)	79 (75.2%)	26 (24.8%)
	31-40	156(52.9%)	139(47.1%)	174 (59%)	121 (41%)
	41-50	100 (50%)	100 (50%)	145 (72.5%)	55 (27.5%)
	>=51	10 (50%)	10 (50%)	15 (75%)	5 (25%)
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 (77.1%)	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%)
	Tailor	52 (59.1%)	36 (40.9%)	59 (67%)	29 (33%)
Monthly income (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	Categories	Awareness		Perception	
		Poor	Good	Low	High
Age of wife	<=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	14 (70%)	6 (30%)	20 (100%)	0 (0%)
	Read & write	15 (44.1%)	19 (55.9%)	30 (88.2%)	4(11.8%)
	Elementary	122 (66.3%)	62 (33.7%)	138 (75%)	46 (25%)
	Secondary	118 (63.1%)	69 (36.9%)	120 (64.2%)	67 (35.8%)
	Diploma & above	43 (22.1%)	152 (77.9%)	105 (53.8)	90 (46.2%)
Occupation	House wife	190(57.2%)	142 (42.8%)	216(65.1%)	116 (34.9%)
	Government employee	21 (20.2%)	83 (79.8%)	56 (53.8%)	48 (46.2%)
	Own business	52 (46.4%)	60 (53.6%)	89 (79.5%)	23 (20.5%)
	daily labor	31 (77.5%)	9 (22.5%)	30 (75%)	10 (25%)
	Student	5 (45.5%)	6 (54.5%)	9 (81.8%)	2 (18.2%)
	Other	13(61.9%)	8 (38.1%)	13 (61.9%)	8 (38.1%)
Place of last delivery	Hospital	252(49.4%)	258(50.6%)	337(66.1%)	173(33.9%)
	Home	60(54.5%)	50(45.5%)	76(69.1%)	34(30.9%)
Number of children	One	85(47%)	96(53%)	107(59.1%)	74(40.9%)
	Two	100(52.6%)	90(47.4%)	115(60.5%)	75(39.5%)
	Three	81 (48.8%)	85(51.2%)	127(76.5%)	39(23.5%)
	Four	35(56.5%)	27(43.5%)	48(77.4%)	14(22.6)
	>=Five	11(52.4%)	10(47.6%)	16(76.2%)	5(23.8%)
Number of ANC visit	One	6(35.3%)	11(64.7%)	11(64.7%)	6 (35.3%)
	Two	42(73.7%)	15(26.3%)	45(78.9%)	12(21.1%)
	Three	104(65.5%)	54(34.2%)	109 (69%)	49(31%)
	>=Four	160(41.2%)	228(58.8%)	248 (63.9%)	140(36.1%)

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

Table 5: Awareness of husbands towards obstetric danger signs during antepartum, intra-partum 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 husbands awareness on obstetric danger signs in Mekelle city, northern Ethiopia, March 2018 (n=620).

Variables		Antepartum period		Intra-partum period		Postpartum period	
		Freq.	Per.	Freq.	Per.	Freq.	Per.
Vaginal bleeding	Yes	449	72.4	505	81.5	449	72.4
	No	171	27.6	115	18.5	171	27.6
Severe headache	Yes	290	46.8	296	47.7	272	43.9
	No	330	53.2	324	52.3	348	56.1
Blurred vision	Yes	171	27.6	NA	NA	152	24.5
	No	449	72.4	NA	NA	468	75.5
Severe abdominal pain	Yes	153	24.7	NA	NA	NA	NA
	No	467	75.3	NA	NA	NA	NA
Swollen hands and face	Yes	162	26.1	NA	NA	128	20.6
	No	458	73.9	NA	NA	492	79.4
High fever	Yes	160	25.8	242	39.0	111	17.9
	No	460	74.2	378	61.0	509	82.1
Fetus movement absence	Yes	204	32.9	NA	NA	NA	NA
	No	416	67.1	NA	NA	NA	NA
Water breaking/leaking	Yes	81	13.1	NA	NA	NA	NA
	No	539	86.9	NA	NA	NA	NA
Convulsion	Yes	NA	NA	123	19.8	93	15.0
	No	NA	NA	497	80.2	527	85.0
Loss of consciousness	Yes	NA	NA	93	15.0	60	9.7
	No	NA	NA	527	85.0	560	90.3
Prolonged labor	Yes	NA	NA	76	12.3	NA	NA
	No	NA	NA	544	87.7	NA	NA
Retained placenta	Yes	NA	NA	63	10.2	NA	NA
	No	NA	NA	557	89.8	NA	NA
Difficulty of breathing	Yes	NA	NA	NA	NA	60	9.7
	No	NA	NA	NA	NA	560	90.3
Sever weakness	Yes	NA	NA	NA	NA	106	17.1
	No	NA	NA	NA	NA	514	82.9
Malodorous vaginal discharge	Yes	NA	NA	NA	NA	13	2.1

No NA NA NA NA 607 97.9

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Variables	Categories	Awareness		COR(95%CI)	AOR(95%CI)
		Poor	Good		
Source of information	Health professional	93(39.7)	141(60.3)	1	1
	Media	102(52)	94(48)	0.6(0.41-0.89)	0.7(0.45-1.16)
	Family	65(53.7)	56(46.3)	0.6(.36-0.88)	0.7(0.38-1.19)
	Friends	52(75.4)	17(24.6)	0.2(0.12-0.39)	0.3(0.13-0.55)
Occupation of husband	Government Employee	42(24)	133(76)	1	1
	Trade	73(46.5)	84(53.5)	0.4(0.23-0.58)	0.5(0.29-0.93)
	Farmer	17(77.3)	5(22.7)	0.1(0.03-0.27)	0.3(0.08-1.01)
	Daily labor	122(72.6)	46(27.4)	0.1(0.07-0.19)	0.2(0.13-0.44)
	Student	6(60)	4(40)	0.2(0.06-0.78)	0.5(0.11-2.23)
	Tailor	5(59.1)	36(40.9)	0.2(0.13-0.38)	0.4(0.18-0.69)
Income	<=500	19(82.6)	4(17.4)	1	1
	=501-1000	55(47.8)	60(52.2)	5.2(1.66-16.18)	2.6(0.69-9.80)
	1001-1500	10(22.7)	34(77.3)	16.2(4.45-58.5)	10.5(2.38-46.2)
	1501-2000	36(39.1)	56(60.9)	7.4(2.32-23.49)	3.6(0.86-13.09)
	>=2001	192(55.5)	154(44.5)	3.8(1.27-11.43)	0.9(0.27-3.65)
ANC visit	One	6(35.3)	11(64.7)	1	1
	Two	42(73.7)	16(26.3)	0.2(0.06-0.62)	0.4(0.08-1.57)
	Three	104(65.8)	54(34.2)	0.3(0.09-0.81)	0.7(0.17-2.62)
	>=Four	160(41.2)	228(58.8)	0.8(0.28-2.14)	1.2(0.32-4.58)
Age husband	21-30	46(7.41)	59(9.5)	1	1
	31-40	156(25)	139(22.4)	1.28(0.5-3.34)	0.75(0.18-3.06)
	41-50	100(16)	100(16)	0.89(0.36-2.2)	0.61(0.16-2.35)
	>=51	10(1.61)	10(1.61)	1.0(0.39-2.51)	0.68(0.18-2.63)
Occupation of mother	House wife	190(57.2)	142(42.8)	1	1
	Government employee	21(20.2)	83(79.8)	5.3(3.13-8.95)	2.2(1.10-4.49)
	Own business	42(46.4)	60(53.6)	1.5(1.004-2.37)	1.3(0.74-2.15)
	daily labor	31(77.5)	9(22.5)	0.4 (0.18-0.84)	0.5(0.21-1.23)
	Student	5(45.5)	6(54.5)	1.6(0.48-5.37)	1.4(0.32-6.19)
	Other	13(61.9)	8(38.1)	0.8(0.33-2.04)	1.5(0.54-4.36)
Education of husband	Illiterate	39(90.7)	4(9.3)	1	1
	Read and write	41(58.6)	29(41.4)	2.9(0.92-9.54)	4.7(1.24-17.86)
	Elementary	140(53.8)	120(46.2)	1.2(0.43-3.24)	6.7(1.95-22.76)
	Secondary	64(43.2)	84(56.8)	1.4(0.50-3.71)	13.3(3.66-48.0)
	Diploma and above	28(28.3)	71(71.7)	8.2(2.99-22.75)	13.2(3.23-54.0)

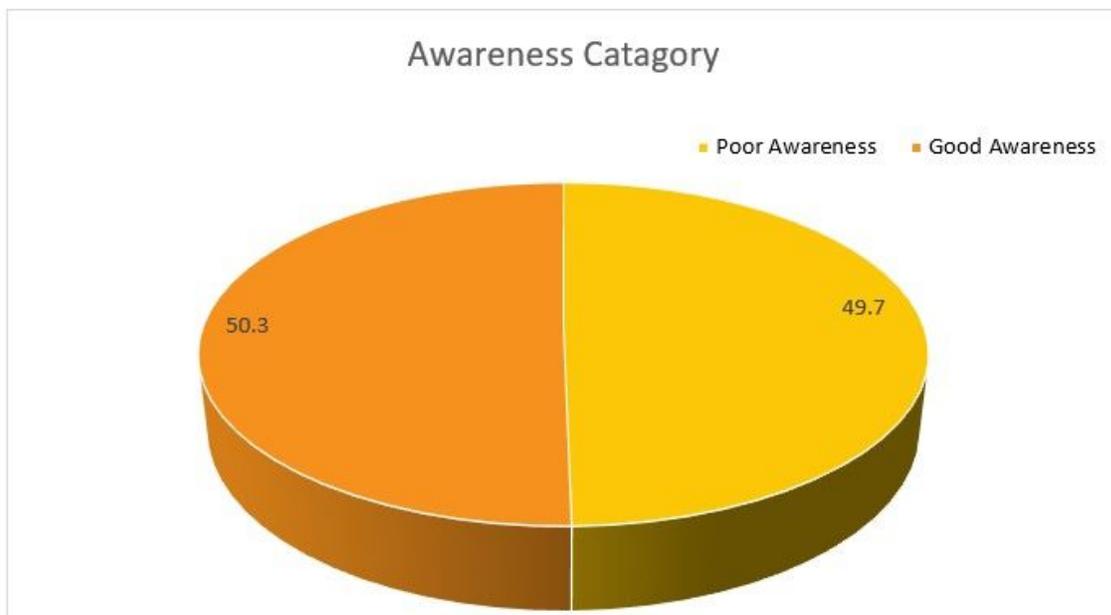
Key: \* = P value < 0.05 AOR=Adjusted Odds Ratio COR=Crude Odds Ratio \*\* = P value < 0.001

**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	Perception		COR(95%CI)	AOR(95%CI)
		Low	High		
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.(0.37-2.73)
Monthly income	<=500	21(91.3)	2(8.7)	1	1
	=501-1000	83(72.2)	32(27.8)	4(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(53.5)	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(.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(.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)

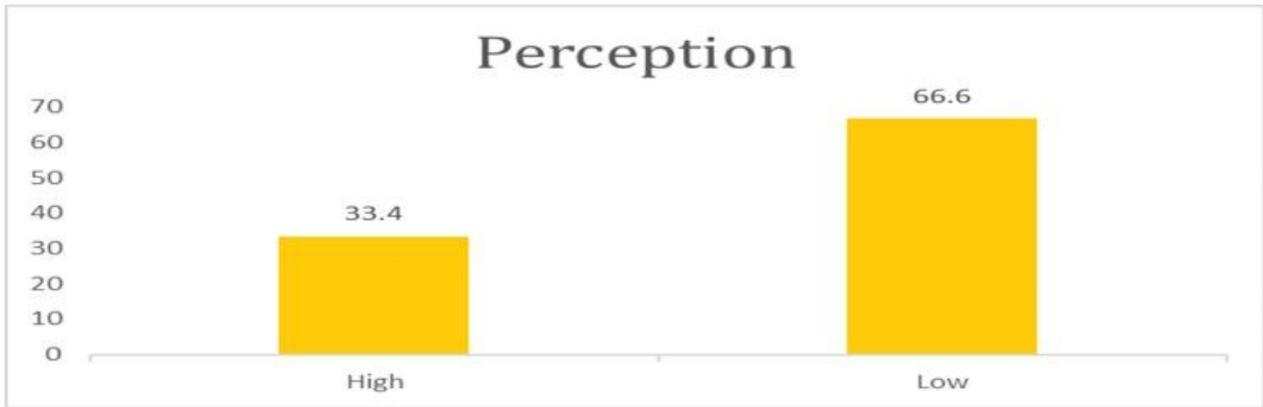
Key: \* = P value < 0.05 \*\* = P value < 0.001 AOR=Adjusted Odds Ratio COR=Crude Odds Ratio

## 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).