

*Full Length Research Paper*

# Health care seeking behaviour on neonatal danger signs among mothers in Tenta District, Northeast Ethiopia: Community based cross-sectional study

Gebeyaw Molla<sup>1\*</sup>, Alemayehu Gonie<sup>2</sup>, Tefera Belachew<sup>3</sup> and Bitiya Admasu<sup>3</sup>

<sup>1</sup>Amara Regional Private Health Facility and Professional Association, Bahirdar, Ethiopia

<sup>2</sup>College of Medicine and Health Sciences; Maddawalabu University, Robe, Ethiopia.

<sup>3</sup>College of Medicine and Health Sciences; Jimma University, Jimma, Ethiopia.

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Health care seeking behaviour is any action undertaken by individuals who perceive to have a health problem or to be ill for finding an appropriate remedy. It involves recognition of symptoms, perceived nature of illness, followed initially by appropriate home care and monitoring. In Ethiopia, little is known about mother's health care seeking behaviour on neonatal danger signs. Therefore, this study assessed the health care seeking behaviour on neonatal danger signs among mothers in Tenta district, Northeast Ethiopia. Community based cross-sectional study was conducted from October 23 to November 17, 2015. The study district was stratified into urban and rural kebeles. From each stratum, 1 out of 3 urban and 7 out of 25 rural kebeles were selected by simple random sampling technique. A total of 527 mothers were interviewed using structured and pre-tested questionnaire. The data were checked for missing values and outliers, and analysed using SPSS version 20.0. Logistic regression analyses were employed to see the association between dependent and independent variables. Mothers who sought medical care for neonatal danger signs were 167 (41.3%). Mothers' secondary educational level (AOR=4.64, 95% CI=1.1-19.81), have given birth in health center (AOR=3.35, 95% CI=1.31-8.56), practicing optimal thermal care (AOR=2.52, 95% CI=1.08-5.85), and having higher decision-making abilities in seeking neonatal health care (AOR=11.28, 95% CI=4.36-29.22) were significant predictors of mother's health seeking behaviour towards neonatal danger signs. Long distance of the residence from health facility, experiencing less serious neonatal danger signs, and beliefs that some danger signs were caused by evil spirits were the most common reasons cited by mothers who did not seek neonatal medical care. In this study, more than half of mother's did not seek medical care for neonatal danger signs. Maternal education and improving their decision-making abilities, and promoting institutional delivery are the recommended interventions to improve mother's health care seeking for neonatal illness. Health facilities should integrate essential neonatal care service during ANC and PNC follow up to improve the quality of health information about neonatal danger signs. At the community level, health extension workers should educate mothers about newborn care practices and neonatal danger signs.

**Key words:** Mothers' health care seeking behaviour, neonatal danger signs, Tenta district.

## INTRODUCTION

Worldwide, in 2012, 2.9 million babies died within 28 days of life. About two-thirds of neonatal deaths occur in the African and southeast-Asian regions (Save the Children, 2014). Sub-Saharan Africa generally has higher rates of neonatal mortality (Mrisho et al., 2012). Ethiopia has made notable progress in decreasing infant mortality ratio from 97 deaths per 1,000 live births to 59 deaths per 1,000 live births in 2011, and to 48 deaths per 1,000 live births in 2016 (EDHS, 2016).

The largest proportion of neonatal deaths occur at home, where a few families sought medical care for signs of new-born illness and nearly no neonates were taken to health facilities when they were sick. Delayed health care seeking can contribute neonatal mortality (Herbert et al., 2012). Understanding the care-seeking behaviour minimize potential delays and effectively improve new-borns health (Mrisho et al., 2012).

Health care seeking behaviour is any action undertaken by individuals who perceive to have a health problem or to be ill for finding an appropriate remedy. It involves recognition of symptoms, perceived nature of illness, followed initially by appropriate home care and monitoring. Health care seeking behaviour is not only a matter of knowledge about the cause and treatment of the disease, but also of perceived seriousness and duration, cultural practices and socio-economic status (Anyanwu and Okeke, 2014).

Millions of mothers and their new-borns throughout the world are living in a social environment that does not encourage health care seeking behaviour (Herbert et al., 2012). Thus, many mothers did not generally seek formal healthcare during pregnancy, childbirth and puerperium, which have a major impacts on health care seeking for mothers and survival of their new-borns (Gelaw et al., 2014).

Many new-borns are often dying due to delay in recognizing danger signs, delay in deciding to get medical care and delay in reaching a health worker or facility (Awasthi et al., 2009). Behaviourally, modifiable factors such as poor recognition of neonatal danger signs, local illness beliefs, use of traditional/home remedies, and inability of mothers to identify health providers delayed the health care-seeking behaviour of mothers for their new-borns (Beck et al., 2004). Delayed health care seeking behaviour for ill neonates contribute to high infant mortality rates (Sandberg et al., 2014; Syed et al., 2006). The vast majority of neonates (73%) died at home due to mothers who did not seek care during the neonatal period (Dongre et al., 2009). Early detection of neonatal illness and increasing facility births improve

care-seeking behaviour for neonatal illness (Marsh et al., 2002; Dongre et al., 2009).

Different studies showed that prompt health care seeking behaviour for neonatal danger signs serve as backbone in reducing neonatal mortality (Sandberg et al., 2014; Chandwani and Pandor, 2015). However, a variety of cultural barriers, norms of poor hygiene and isolation impeded neonatal health care seeking behaviour of mothers (Mrisho et al., 2012). Herbert et al. (2012) reported that 47.5 percent of neonates who were ill or suspected to be ill were taken to health facility.

In Peri-Urban of Wardha, India, about 37.5% of newborn with danger signs were taken to the doctor and only two mothers consulted faith healer for treatment (Dongre et al., 2009). Another study conducted in Rural Wardha, India, only 41.8% of such sick newborn got treatment from either government or private hospitals and 46.1% of sick babies received no treatment. The reasons for not seeking neonatal danger signs were ignorance of parents, lack of money, faith in supernatural causes, non-availability of transport, home remedy, and absence of responsible person at home (Dongre et al., 2009). In Gujarat, India, joint family structure, mass media exposure, literacy status, and socioeconomic status of mothers were found to be associated significantly with the health care seeking behaviour of the mothers (Chandwani and Pandor, 2015).

In Yemen, 51.42% of caregivers sought medical care for their sick babies. Mothers who attended secondary education were 5.8 times more likely to seek neonatal medical care for their sick neonate (Webair and Bin-Gouth, 2013). Knowledge of at least one WHO recognized danger sign were found to be significant factors for health care seeking behaviour for neonatal illness in Enugu State, Southeast Nigeria (Ekwochi et al., 2015). Yenagoa Metropolis reported that self-medication and the use of home remedies delayed health care seeking behaviour for neonatal illness. The commonest reason for not timely consultation was lack of money (Alex-Hart et al., 2014). In rural Southern Tanzania, mothers who delivered at health facilities were more likely to seek neonatal care than those who delivered at home (Mwifadhi Mrisho et al., 2012). In rural western Kenya, 32.4% of the mothers purchased and administered drugs to their sick children without seeking medical attention. The most commonly reported reasons for this behaviour were: distance of government health facilities, poor and inability to afford services at the private hospitals and clinics (Mbagaya et al., 2005).

In study conducted in Bure district, Ethiopia, marital status, completion of health extension package, and sex of child were significantly associated with health care

\*Corresponding author. E-mail: gebeyawmolla48@gmail.com.

seeking behaviour of urban mothers. Similarly, age of child, occupation of mothers, educational level of fathers, wealth quintile, and type of reported illness were significantly associated with rural mothers. For health care seeking behaviour (Gelaw et al., 2014). In Bihar Dar, Ethiopia (Ababa, 2008) mother's decision-making level had significant effect on health seeking behaviours for child health services. Another study in Jabitenan district, Ethiopia, mothers who delivered at health facilities were more likely to seek neonatal care than those who delivered at home (Workineh and Hailu, 2014).

Generally, early determination of health care seeking behaviours of mothers on neonatal danger signs could save the new-borns during life threatening complications. Therefore, understanding the factors related to health care seeking behaviour for neonatal danger signs are critical for countries like Ethiopia with alarmingly high neonatal mortality. Despite the fact that health-seeking behaviour plays a critical role in reducing neonatal morbidity and mortality, studies on the area are limited and inconsistent. Therefore, this study assessed the health care seeking behaviour on neonatal danger signs and identified associated factors among mothers in Tenta district, Northeast Ethiopia.

## MATERIALS AND METHODS

### Study area and period

The study was carried out in Tenta district, Northeast Ethiopia, from October 23 to November 17, 2015. Tenta district is located 608 km away from East of Bihar Dar and 528 km from North of Addis Ababa. This district has three urban and 25 rural kebeles (the *smallest administrative units*). Based on Tenta district health office report, there are nine health centres, 28 health post, three private lower clinics and two private drug stores. There were 3179 mothers who had infant age 28 to 364 days during study period ((unpublished Tenta District health office report, 2015).

### Study design and population

A community-based cross sectional study design was employed. All mothers who had infant age of 28 to 364 days in the district were included in the study. Mentally and physically incapable women's to provide response during data collection period were excluded.

### Operational definitions

#### Health care seeking behaviour

Seeking medical or non-medical care in response to neonatal danger signs to reduce severity and complication after recognizing the danger signs and perceived nature of illness. It was measured by calculating all individual answers to health care seeking questions and then categorized as having health care seeking behaviour (if participants initiate home care and necessitate seeking care at the health facility) or not having health care seeking behaviour (if participants do not initiate home care and care at the

health facility).

#### Have newborn care practices

These are activities taken by the mothers to protect against newborn danger signs and perceived nature of illness. It is measured if participants practiced safe cord care, optimal thermal care and neonatal breast-feeding.

#### Have optimal thermal care practice

Mothers who bathed their new-born after 24 h of birth. It is measured if participants bathed their new-born after 24 h of birth.

#### Have decision-making ability

This is the way an individual put decision by him/herself or with somebody else. It is measured by calculating all individual answers of decision-making ability questions; and then categorize as having decision-making ability (if participants make decision by herself and with her husband to get medical care and to select treatment place for their ill infant) or not having decision-making ability (if participants do not make decision by herself and with her husband to get medical care and to select treatment place for their ill infant).

#### Sample size determination

The sample size was determined using single population proportion formula.

$$n = (Z\alpha/2)^2 p (1-p) / W^2$$

with considering the following assumptions where P=proportion of mothers who sought medical care for their newborn illness as 47.7% ( $p=0.477$ ) (Ekwochi et al., 2015), W=margin error of 5%, design effect=1.5. Z  $\alpha/2$ =critical value for normal distribution at 95% confidence level. With these assumptions, the formula yields 383. Since the number of mothers who had an infant age of 28 to 364 day in Tenta district were 3179 (which was less than 10,000), correction formula was used as follows:

$$cf = \frac{n}{1 + \frac{n}{N}} = \frac{383}{1 + \frac{383}{3179}} = 341.9 \sim 342$$

By adding 10% of non-response rate and design effect of 1.5, the total sample size was 564.

#### Sampling procedures

The study district was stratified into urban and rural kebeles. From each stratum, 1 out of 3 urban and 7 out of 25 rural kebeles were selected by simple random sampling technique. Family folder was used as sampling frame. These folders contained personal records of individual mothers: address, date of delivery, place of delivery, name of kebele, development group leader, and their house number. The calculated sample size was proportionally allocated to (one urban and seven rural) kebeles. The study participants were selected from the sampling frame through computer-generated

method. Data collectors used name of kebeles, their house numbers, and health extension workers for guidance.

### Data collection

Structured interviewer administered questionnaire was designed by researchers after reviewing literatures which had previously been done on this topic (Webair and Bin-Gouth, 2013; Mbagaya et al., 2005). The questionnaire was prepared in English language and then translated to Amharic (local language) and re-translated back to English to check for any inconsistencies.

The questionnaire was pre-tested on 5% of the sample in Mekidella district, which had similar socio-demographic characteristics with Tenta district and modification was done. Training was given for data collectors before the pre-test and the beginning of the actual interviews. The investigator checked data completeness. Double entry of data was carried out to prevent data entry errors.

### Data processing and analysis

Data were entered in Epi-data version 3.1 and exported to SPSS version 20.0. The completeness and consistency of the data were checked and cleaned. Descriptive analysis was made and measures of central tendency were also determined. Logistic regression was applied to see the association between dependent and independent variables. Independent variables, which had association in bi-variable analysis with p-value <0.25 were included in multiple logistic regression model to handle potential confounding variables. Independent variables with p-value <0.05 in multiple logistic regression model were considered as significant predictors of health seeking behaviour of neonatal danger sign. The results were presented as odds ratios (OR) with 95% confidence intervals (CI).

### Ethical consideration

Ethical approval was obtained from ethical review committee of Jimma University. Letter of permission was obtained from Tenta district administrative and health office. Informed verbal consent was also obtained from the study participants. To assure complete confidentiality, other identifying information including name were not recorded on the questionnaires.

## RESULTS AND DISCUSSION

### Socio demographic characteristics

A total of 527 mothers were interviewed which made the response rate of 93.4%. The mean age of respondents were 30.85 ( $\pm$  6.16 SD). About fifteen percent of respondents were urban and 84.4% were rural residents. Nearly two-third (59.1%) of mothers were Christians and 40.9% were Muslims. Larger proportions (82.9%) of respondents were married and 68.9% were farmers. Regarding educational levels, majority of respondents were illiterate (47.8%), while 5.1% of mothers had completed the grade. Concerning the number of children in the family, majority (87.5%) of mothers had less than

five children in their houses (Table 1).

### Mother's newborn care practice

From the total study participants, 67.7% of mothers did not apply any substance on their infant's umbilical cord. Of those mothers who applied substances to the infant's cord, nearly half (48.2%) of mothers applied animal muck. Sixty-five percent of mothers gave only breast milk and 68.5% of mothers initiated/started breast-feeding within the first hours. Two hundred two (38.3%) of mothers bathed their new-born before 24 h of birth, and 38.3% of mothers practiced optimal thermal care (Table 2).

### Mother's experience on neonatal danger signs and their health seeking behavior

Four hundred four (76.7%) of mothers noticed one or more of their newborn danger signs. The most common neonatal danger signs recognized by mothers were unable to feed/poor sucking (43.5%) and fever (39.8%). Among 404 mothers who recognized neonatal danger signs, 41.3% of them sought medical care, while 55.2% of mothers sought non-medical care for neonatal danger signs. Among two hundred twenty-three mothers who sought non-medical care, 37.7% of them gave home remedies and 30.1% of mothers sought spiritual care. Long distance of the health facility (51.7%), perceived seriousness of neonatal danger signs (42.6%), and beliefs that some danger signs have been caused by evil spirits (34.8%) were the most common reasons cited by mothers who did not seek medical care (Table 3).

### Factors associated with health seeking behavior on neonatal danger signs

Multivariable logistic regression model showed that four independent predictors of mother's health seeking behaviour towards neonatal danger signs. Mothers who completed their secondary education were 4.64 times more likely to seek medical care for their neonates compared to those who were illiterate (AOR=4.64; 95% CI=1.1, 19.81). Institutional delivery was found to be significantly associated with mother's health seeking behaviour towards neonatal danger signs. Mothers who delivered a child in health center were 3.35 times more likely to seek neonatal medical care compared to mothers who delivered at home (AOR=3.35, 95% CI=1.31-8.56). Likewise, mother's optimal thermal practice was another significant factor for health seeking behaviour. Mothers who practiced optimal thermal care were 2.52 times more likely to seek neonatal health care than mothers who did not practice optimal thermal care (AOR=2.52, 95%

**Table 1.** Sociodemographic characteristic of mothers in Tenta district, Northeast Ethiopia, 2015.

Variable	Categories	N	%
Age in year (n=527)	≤24	79	14.9
	25-30	154	29.2
	31-35	172	32.7
	≥36	122	23.2
Residence (n=527)	Urban	82	15.6
	Rural	445	84.4
Wealth quintiles (n=527)	Poorest	105	19.9
	Poor	106	20.1
	Middle	106	20.1
	Rich	106	20.1
	Richest	104	19.8
Number of children in the family (n=527)	<5	461	87.5
	≥5	66	12.5
Marital status (n=527)	Currently married	437	82.9
	Not currently married	90	17.1
Religion of respondent (n=527)	Christian	312	59.1
	Muslim	215	40.9
Educational status of respondent (n=527)	Illiterate	252	47.8
	Primary(1-8 grade)	168	31.9
	Secondary (9-12 grade)	80	15.2
	≥12	27	5.1
Husbands' educational status (n=527)	Illiterate	176	33.4
	Primary(1-8 grade)	224	42.5
	Secondary (9-12 grade)	81	15.4
	≥12	46	8.7
Occupation of the respondents (n=527)	Government employee	33	6.3
	Self-employee	94	17.8
	Farmer	363	68.9
	Daily Labour	37	7.0
Occupation of respondents husband (n=527)	Government employee	57	10.8
	Self-employee	100	19.0
	Farmer	370	70.2

CI=1.1, 5.85). In addition, mothers who had higher decision making abilities in seeking neonatal health care were 11.28 times more likely to seek medical care compared to mothers who had lower decision making ability (AOR=11.28, 95% CI=4.36, 29.22) (Table 4).

## DISCUSSION

Seeking health care for neonatal danger signs have a

great potential in reducing neonatal mortality (Workineh and Hailu, 2014). This study showed that, out of 404 mothers who experienced neonatal danger signs, about 41.3% of mothers sought medical care for their newborn danger signs. This finding was in agreement with study done in Dera district, Oromia (43.2%) (Assefa et al., 2012) and Enugu state, Nigeria (47.7%) (Ekwochi et al., 2015), but higher than study done in urban slum of India (18.1%) (Gupta et al., 2012) and Edo state, Nigeria (35.9%) (Aigbokhaode et al., 2015), and lower than

**Table 2.** New-born care practices of mothers in Tenta district, Northeast Ethiopia, 2015.

Variable	Categories	N	%
Applied substance to infant cord (n=527)	Yes	170	32.3
	No	357	67.7
Type of substance applied (n=170)	Oil or Shea butter	29	17.1
	Animal muck	82	48.2
	Shea butter with powder	36	21.2
	Ointment/body lotion	23	13.5
Pre-lacteal food given (n=527)	Yes	184	34.9
	No	343	65.1
Type of pre-lacteal food given (n=184)	Water or tea	78	42.4
	Spiritual water	5	2.7
	Butter/herbal concoction food	101	54.9
Initiated breast-feeding within 1 h (n=527)	Yes	361	68.5
	No	166	31.5
Feed colostrum (n=527)	Yes	445	84.4
	No	82	15.6
Bathed new born after 24 h (527)	Yes	202	38.3
	No	325	61.7
Practiced optimal thermal care (527)	Yes	206	39.1
	No	321	60.9

than studies in Bihar Dar (72.7%) (Awoke, 2013), Yemen (51.4%) (Webair and Bin-Gouth, 2013), peri-urban of India (92%) (Dongre et al., 2009), and Pakistan (81.1%) (Durrani et al., 2015). These discrepancies might be due to the difference in social environment that does not encourage health care seeking behaviour towards neonatal danger signs, differences in accessibility of health facilities. Educational levels also influence mother's health care seeking behaviour towards neonatal danger signs and health service utilization.

Educational status of parents and their work status had strong associations with child survival in developing countries (Ekwochi et al., 2015; Workineh and Hailu, 2014). In Yemen, mothers who attended secondary education were 5.8 times more likely to seek neonatal medical care for their sick neonate (Webair and Bin-Gouth, 2013). Similarly, in this study, mothers who attended secondary education were 4.6 times more likely to seek medical care for their sick neonate compared to illiterate mothers. The possible implications could be that formal education increases mother's knowledge about biological aspects of human beings, and health seeking habits. In addition, educated mothers are more likely to understand health education messages and seek neonatal medical care than illiterate ones.

In Rural Southern Tanzania (Mrisho et al., 2012), and Jabitenan district (Workineh and Hailu, 2014) revealed that mothers who delivered at health facilities were more likely to seek neonatal care than those who delivered at home. In this study, mothers who delivered in health facilities were 3.3 times more likely to seek neonatal medical care compared to those mothers who delivered at home. Thus, this finding further strengthens the argument that increasing institutional birth improves mother's health care seeking behaviour towards neonatal illnesses.

A study in Bihar Dar (Awoke, 2013) and Jabitanan district (Workineh and Hailu, 2014) showed that mother's decision-making level had significant effect on health seeking behaviour for child health services. Similarly, this study revealed that mothers who had higher decision-making levels were 11.28 times more likely to seek neonatal medical care compared with those mothers who had lower decision-making. The possible explanation could be that autonomous mothers have attended child health related conferences without any interference. It is also evident that autonomous mothers practiced behavioural change communications to increase medical care seeking for sick newborn, and needs scaling up with rising institutional deliveries.

**Table 3.** Mothers' health care seeking behaviour and experience of neonatal danger signs in Tenta District, Northeast Ethiopia, 2015.

Variable	Categories	N	%
Mothers who experienced neonatal danger signs (n=527)	Yes	404	76.7
	No	123	23.3
Type of experienced neonatal danger signs (n=404)	Unable to feed/ poor sucking	176	43.5
	Fever/ hot to touch	161	39.8
	Chest in drawing	103	25.5
	Cold to touch	97	24.0
	Umbilicus Infection	86	21.2
	Lethargic or unconscious	85	20.9
	Fast breathing	61	15.1
	Yellow sole	49	12.1
	Convulsion	33	8.2
	Others	11	2.7
Health seeking behaviour of mothers for neonatal danger signs (n=404)	Sought medical care	167	41.3
	Sought non-medical care	223	55.2
	Did not take action	14	3.5
Mothers who sought non-medical care (n=223)	Sought drug seller	19	8.5
	Sought traditional care	53	23.7
	Gave home remedies	84	37.7
	Sought spiritual care	67	30.1
Reasons for not seeking medical care (n=230)	Illness was not serious	98	42.6
	had no enough money	32	13.9
	Long distance to go health facility	119	51.7
	Occupied by different work	43	18.7
	Health workers are hostile	32	13.9
	Treatment expensive	8	3.1
	Herbs are more effective	73	31.7
Illness was caused by evil sprit	80	34.8	
Decision making levels of mothers in seeking neonatal health care (n=527)	Higher	334	63.4
	Lower	193	36.6

Mothers who practiced optimal thermal care were 2.52 times more likely to seek neonatal medical care compared to those mothers who were not practicing optimal thermal care. Mothers who practiced optimal thermal care could have better access to child health services, which influence mother's decisions in seeking health care towards neonatal danger signs.

## Conclusion

Our study suggested that mothers' health seeking behaviour for neonatal medical care was low (41.3%) in the study area. This study also revealed that factors significantly associated with health-seeking behaviour of mothers towards neonatal danger sign including; educational status of mothers, health center delivery,

optimal thermal care practice and mother's decision-making ability to seek neonatal health care.

As a recommendation, improving maternal education and their decision-making abilities, and promoting institutional delivery are the recommended interventions to improve mother's health care seeking for neonatal illness. Health facilities should integrate essential newborn care service during ANC and PNC follow up to improve the quality of health information about newborn danger signs. In addition, at the community level, health extension workers should educate mothers about newborn care practices and neonatal danger signs.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.



**Table 4.** Multivariate analysis of health care seeking behaviour of mothers on neonatal danger signs in Tenta district, Northeast, Ethiopia, 2015.

Variable	Health seeking behaviour		Crude odds ratio (COR) (95% CI)	Adjusted odd ratio (AOR) (95%CI)
	Sought medical care (%)	Sought non-medical care (%)		
<b>Mothers educational status</b>				
Illiterate	54 (25.8)	155 (74.2)	1	1
Primary(1-8 <sup>th</sup> )	63 (51.2)	60 (48.8)	3.01 (1.88-4.82)**	1.43 (0.59-3.43)
Secondary(9-12th)	43 (79.6)	11 (20.4)	11.22 (5.4-23.31)**	4.64 (1.1-19.81)*
≥12	15 (78.9)	4 (21.1)	10.74 (3.42-33.84)**	0.52 (0.11-2.40)
<b>Place of delivery of last child</b>				
Home	57 (24.5)	176 (75.5)	1	1
Health post	8 (44.4)	10 (55.6)	2.47 (0.93-6.56)	1.82 (0.38-8.77)
Health center	93 (73.8)	33 (26.2)	8.7 (5.29-14.30)**	3.35 (1.31-8.56)*
Hospital	17 (60.7)	11 (39.3)	4.77 (2.11-10.78)**	1.69 (0.36-7.92)
<b>Optimal thermal care</b>				
Yes	98 (67.1)	48 (32.9)	4.83 (3.12-7.47)**	2.52 (1.08-5.85)*
No	77 (29.7)	182 (70.3)	1	1
<b>Decision making ability to seek neonatal health care</b>				
Higher	155 (63.3)	90 (36.7)	12.06 (7.06-20.59)**	11.28 (4.36-29.21)**
Lower	20 (12.5)	140 (87.5)	1	1

1: Reference category; \*P-Value <.05, \*\*P-Value ≤.001.

## ABBREVIATIONS

**ANC**, Antenatal care; **AOR**, adjusted odds ratio; **COR**, crude odds ratios; **OR**, odds ratios; **CI**, confidence interval; **HC**, health center; **SD**, standard deviation; **NMR**, neonatal mortality rate; **PNC**, post natal care; **WHO**, World Health Organization.

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