

## Review Article

# Mother's Level of Knowledge on Neonatal Danger Signs and Its Predictors in Chench District, Southern Ethiopia

Abera Mersha<sup>1,\*</sup>, Nega Assefa<sup>2</sup>, Kedir Teji<sup>2</sup>, Agegnehu Bante<sup>1</sup>, Shitaye Shibiru<sup>1</sup>

<sup>1</sup>Department of Nursing, College of Medicine and Health Sciences, Arba Minch University, Arba Minch, Ethiopia

<sup>2</sup>School of Public Health, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia

### Email address:

mershaabera@gmail.com (A. Mersha), negaassefa@yahoo.com (N. Assefa), kedir.t.roba@gmail.com (K. Teji),

agegnehubante@gmail.com (A. Bante), shitayeshibiru@yahoo.com (S. Shibiru)

\*Corresponding author

### To cite this article:

Abera Mersha, Nega Assefa, Kedir Teji, Agegnehu Bante, Shitaye Shibiru. Mother's Level of Knowledge on Neonatal Danger Signs and Its Predictors in Chench District, Southern Ethiopia. *American Journal of Nursing Science*.

Vol. 6, No. 5, 2017, pp. 426-432. doi: 10.11648/j.ajns.20170605.17

**Received:** July 30, 2017; **Accepted:** August 14, 2017; **Published:** October 29, 2017

---

**Abstract:** Introduction: Neonates and young infants often present with non-specific symptoms and signs of severe illness that indicate presence of severe infection which may require immediate care. So, mother's knowledge is very important to recognize those symptoms to prevent further complications even death. But there is a gap in assessing mothers knowledge in neonatal danger signs. Because, almost all studies in Ethiopia assessed mother's knowledge based on only one danger sign out of nine WHO recognized danger signs. So, the main aim of this study was to assess level of knowledge about neonatal danger signs based on 10 WHO recognized danger signs in Chench District, Southern Ethiopia. Methods: Community based cross sectional study was conducted in 630 mothers from February 8- 28, 2017 by using one-stage cluster sampling method. Structured interviewer administered pre-tested questionnaire was used to collect the data. The collected data were entered into Epi data version 3.1 and then exported into SPSS window version 22 for analysis. Bivariate and multivariate analysis was done by using binary logistic regression to see the association between each independent variable and the outcome variable. The goodness of fit was tested by Hosmer-Lemeshow statistic and Omnibus tests. Multi co-linearity test was carried out to see the correlation between independent variables using standard error and collinearity statistics. Variables with  $P < 0.2$  in the bivariate analysis were included in to final model and statistical significance were declared at  $P < 0.05$ . Result: In this study 50.3% (95%CI: 46.4%, 54.2%) of mothers had good level of knowledge who knows three or more neonatal danger signs out of WHO stated 10 neonatal danger signs. Place of residence, presence of radio in the household and knowledge about essential newborn care were statistically significant association with knowledge about neonatal danger signs with odds (AOR=1.58, 95%CI: 1.05, 2.37), (AOR=1.67, 95%CI: 1.13, 2.49) and (AOR=5.29, 95%CI: 3.61, 7.78) respectively. Conclusion/recommendations: This study revealed that mothers level of knowledge about neonatal danger signs were low. Therefore, strengthening the provision of health information and ENC by designing appropriate strategies like Information Education Communication and Behavioural Change Communications both at facility and community level and advocate to use media as source of information should be promoted.

**Keywords:** Neonatal Danger Signs, Warning Signs in Neonate, Chench District

---

## 1. Introduction

Neonates and young infants often present with non-specific symptoms and signs of severe illness. These signs might be present at or after delivery or in a newborn presenting to hospital or develop during hospital stay. Neonates are more

prone to show subtle signs of illness. These signs indicate severe infection and require immediate care [1-3].

Newborns that experienced danger signs after delivery were two times more likely to die compared to those who never experienced any danger sign [4]. The study result which was conducted in Indonesia stated that neonatal illness during the

first month of life and knowledge of neonatal danger signs were identified as the second major risk factors for neonatal death [5]. Study concluded that the health seeking behavior of mothers has been found appropriate, however, their knowledge regarding the danger signs and illness of their children was reported low [6].

Evidence from different studies which was conducted in Ethiopia and other parties of world stated that mother's knowledge about neonatal danger signs were low [7-10]. Studies done in four regions of Ethiopia, Enugu state, South-East of Nigeria, Nakuru Central District, Kenya and Gondar town, North West of Ethiopia showed that mothers knowledge of three or more danger signs were 29.3%, 30.3%, 15.5% and 18.2% respectively [8, 9, 11, 12]. Recent studies identified that predictors for knowledge about neonatal danger signs were educational status, socio-economic status, the consumption of maternal and child health (MCH) services and source of information [9, 11-15].

As stated above some studies in Ethiopia assessed mother's knowledge about neonatal danger signs and identified some factors that affect the knowledge. But, most studies assessed mother's knowledge based on only one danger sign out of nine WHO recognized danger signs. So, the main aim of this study was to assess level of knowledge about neonatal danger signs based on 10 WHO recognized danger signs among mother's who gave birth within the last six months in Chench District, Southern Ethiopia.

## 2. Methods

### 2.1. Study Setting, Period and Design

This community based cross sectional survey was conducted in Chench District from February 8-28, 2017. Chench District is one of the Districts in Gamo Gofa Zone, South Nations, Nationalities and Peoples' Region (SNNPR) of Ethiopia and it is located 562 Km Southwest of Addis Ababa, the capital city of Ethiopia, 295 Km Southwest of Hawassa, the regional town of SNNPR and 37km from Arba Minch town. It is bordered on the South by Arba Minch Zuria, on the West by Dita, on the North by Kucha and Boreda, and on the East by Mirab Abaya. Chench District has 50 kebeles (five urban and 45 rural), towns in Chench District include Chench, Dorze, Dokko and Ezo. The District has a total population of 140,183 (male 68970 and female 71213), house hold of 28609, estimated live birth of 4850, surviving infants of 4471, <5 years of 21883, estimated women with child bearing age of 32,663, estimated pregnancy/delivery of 4850 and new pregnant in fertile age of 27770 until at the end 2016 [16].

### 2.2. Population

The source population for this study was all mothers who delivered within the past six months prior to the study period in the study area and study population was all mothers who found in selected clusters. The sampling unit was households and the study unit was mothers.

### 2.3. Eligibility Criteria

All mothers who delivered within the past six months prior to the study period and resident at least for 6 month in the study area was included in this study whereas mothers who were not mentally competent or any psychiatric disorders, seriously ill or known medical problems, whose delivered baby was died prior to data collection period were excluded from this study.

### 2.4. Sampling

#### 2.4.1. Sample Size Determination

Computer based Epi info 7 software Stat Cal was used to calculate the sample sizes for each objective. To assess mother's knowledge on neonatal danger signs single population proportion and to identify predictor's double population proportion was used. The final sample size was come up by adding non-response rate of 10% to the larger sample size which was 493. So, the final calculated sample size for this study was 543. But, because of cluster effect the final sample used for this study was 630. The design effect of 1.5 was used to calculate the sample size for each objective.

#### 2.4.2. Sampling Procedure

One-stage cluster sampling method was used in order to draw the final sample size. The Chench District has 50 kebeles/6 clusters based on topography and catchment area for health centers. First of all, those 6 clusters were clustered in to 17 smaller clusters. Secondly, from those 9 clusters were selected by simple random sampling method initially. But, to come up to calculated sample size one additional cluster was added again by simple random sampling from the residual clusters. So, the final clusters selected for this study were 10 out of 17.

### 2.5. Data Collection Methods

Structured interviewer administered pre-tested questionnaire was used. The data were collected by trained 7 diploma nurses and supervised by two BSc holder nurses who were fluent in local language "*Gammogna*". The data collectors were collected the information by face to face interview of mothers after going in to household level.

### 2.6. Variables

Knowledge on neonatal danger signs was the dependent variable and socio-demographic and socio-economic characteristics, knowledge about essential new care, MCH services, and source of information, birth preparedness and obstetric factors were independent variables for this study.

### 2.7. Operational Definitions

Good knowledge on neonatal danger signs: Mothers who were mentioned three from the ten key danger signs for neonate without prompt and three or more danger signs with prompt. Poor knowledge on neonatal danger signs: Mothers who were capable of mentioned two and less key danger signs

of neonate with and without prompt [17, 18]. Key danger signs: The key neonatal danger signs include: not feeding since birth or stopped feeding, convulsion, respiratory rate of 60 or more (fast breathing), severe chest in-drawing (difficulty in breathing), temperature of  $\geq 37.5$  degree centigrade (fever), temperature  $\leq 35.5$  degree centigrade (hypothermia), only moves when stimulated or not even when stimulated (weakness or lethargy), yellow soles (sign of jaundice), umbilicus redness or draining pus, skin boils, or eyes draining pus (sign of local infection) and vomiting [19].

### 2.8. Data Quality Control

To ensure quality, questionnaire was initially drafted in English language and then translated in to local language, “Gammogna” by experts and finally before data entry again re-translated back to English. Questionnaires were pre-tested in a local area with population having similar socio-demographic status. Data were checked for completeness, accuracy, clarity and consistency before data entry in to software. Proper coding and categorization of data were maintained for the quality of the data to be analyzed. Double data entry was done for its validity and compare to the original data.

### 2.9. Data Analysis and Processing

The data were coded, cleaned, edited and entered into Epi data version 3.1 and then exported to SPSS window version 22 for analysis. Wealth quintiles were determined by using Principal Component Analysis (PCA). Bi-variate analysis and multivariate analysis was done to see the association between each independent variable and the outcome variable by using binary logistic regression. The goodness of fit was tested by Hosmer-Lemeshow statistic and Omnibus tests. All variables with  $P < 0.2$  in the bivariate analysis were included in the final model of multivariate analysis in order to control all possible confounders. In addition, variables which were significant in previous studies and from context point of view included in the final model even if the above criteria was not meet. Multi co-linearity test was carried out to see the correlation between independent variables using standard error and collinearity statistics. The direction and strength of statistical association was measured by odds ratio with 95% CI. Adjusted odds ratio along with 95% CI was estimated to identify predictors for knowledge about neonatal danger signs by using multivariate analysis in the binary logistic regression. In this study  $P$ -value  $< 0.05$  was considered to declare a result as statistically significant association.

### 2.10. Ethical Considerations

Ethical clearance was obtained from Haramaya University, College of Health and Medical Sciences, Institutional Health Research Ethics Review Committee (HU-IHRERC). All the study participants were informed about the purpose of the study, their right to refuse and written and signed voluntary consent was obtained from all study participants prior to the interview. The respondents were also been told that the

information obtained from them was treated with complete confidentiality and do not cause any harm on them.

## 3. Results

### 3.1. Socio-demographic/Economic Characteristics

A total of 630 participants responded to the questionnaire giving response rate of 100%. The mean age of study participant was 29.62 ( $\pm 5.082$  SD). Married respondents constitute 584 (92.7%); Orthodox Christians constitute 489 (77.6%) and 400 (63.5%) were rural residents (See table 1 below).

**Table 1.** Socio-demographic/economic characteristics of study participants who delivered in the past six months in Chench District, Southern Ethiopia, 2017(n=630).

Variables	Frequency	Percentage
Age		
15-24	94	14.9
25-34	420	66.7
35-44	116	18.4
Marital status		
Married	584	92.7
Divorced	9	1.4
Widowed	5	0.8
Separated due to work	32	5.1
Religion		
Orthodox	489	77.6
Protestant	141	22.4
Educational status		
Cannot able to read and write	208	33.0
Can read and write	76	12.1
Grade 1-8	183	29
Grade 9-12	99	15.7
College and above	64	10.2
Occupation of mother		
House Wife	420	66.7
Merchant	136	21.6
Government employer	59	9.4
Daily Laborer	15	2.4
Place of residence		
Urban	230	36.5
Rural	400	63.5
Wealth index in quintile		
1 <sup>st</sup> quintile	224	35.6
2 <sup>nd</sup> quintile	198	31.4
3 <sup>rd</sup> quintile	208	33.0

### 3.2. Maternal and Child Health Services

Out of the total respondents 533 (84.6%) had ANC follow up and from them 211 (39.6%) had one to three visit, 279 (52.4%) had four visits and 43 (8.1%) had five and more visits. During ANC follow up 524 (98.3%) respondents were received health information and 522 (97.9%) had advised about essential newborn care (ENC). Two hundred twenty three (35.4%) of study participants delivered at health center and 421 (66.8%) had immediate postnatal care after delivery. Immunized children constitutes of 593 (94.1%) and 102 (16.2%) of study participants faced complication during delivery. Regarding mode of delivery 538 (85.4%) had spontaneous vaginal delivery, 83 (13.2%) instrumental delivery and 9 (1.4%) had caesarean delivery (See table 2 below).

**Table 2.** Maternal and child health services among study participants who delivered in the past six months in Chencha District, Southern Ethiopia, 2017 (n=630).

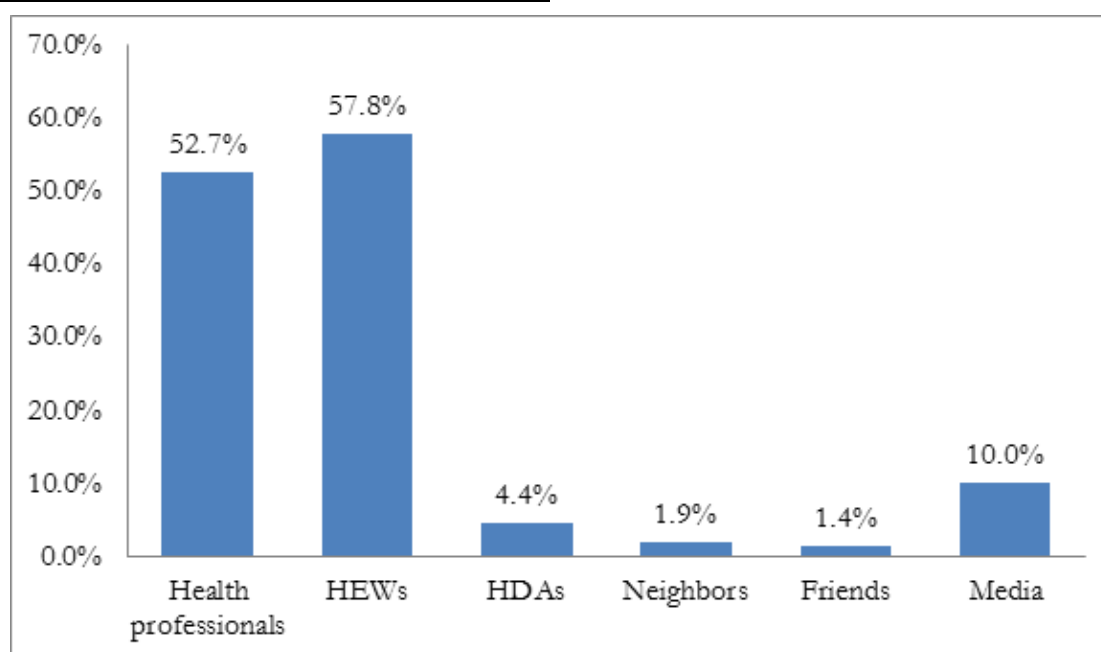
Variables	Frequency	Percentage
ANC		
Yes	533	84.6
No	97	15.4
Attended monthly pregnant mothers meeting		
Yes	517	82.1
No	113	17.9
Place of delivery		
Health center	223	35.4
Hospital	214	34.0
Health post	25	4.0
Home	168	26.6
Faced complication during delivery		
Yes	102	16.2
No	528	83.8
Care giver during postnatal period		
HEW	284	45.1
Family/mother in law	293	46.5
Neighbor	14	2.2
Mother of the women	39	6.2
Immediate postnatal care		
Yes	421	66.8

Variables	Frequency	Percentage
No Party	209	33.2
1	79	12.5
2-4	501	79.5
≥5	50	7.9

Out of the total respondents 437 (69.4%) were assisted by health care providers/skilled birth attendants and 68 (10.8%), 26 (4.1%), 43 (6.8%), 31 (4.9%) and 25 (4%) had assisted by family, neighbor, relatives/mother in law, traditional birth attendants and health extension workers during delivery respectively.

### 3.3. Source of Information about Neonatal Danger Signs

Out of the study participants 592(94%) were heard or counseled about neonatal danger signs and from them 312(52.7%) heard from health professionals and 342(57.8%) heard from health extension works (See figure 1 below). Three hundred eighty seven (63%) had radio and 184(29.2%) television in the household.

**Figure 1.** Source of information for study participants about neonatal danger signs in Chencha District, Southern Ethiopia, 2017(n=630).

### 3.4. Knowledge about Essential Newborn Care

Regarding knowledge about essential newborn care 363 (57.6%) of study participants had good responded equal to median score whereas 267(42.4%) had poor knowledge responded below median score. Study participants were asked about instruments to cut the cord, material to tie the cord, breastfeeding initiation time, bathing time and knowledge about neonatal danger signs. 261(41.4%) stated new blade to cut the cord, 395(62.7%) stated cord tie to tie the cord and 389(61.7%) stated that breastfeeding initiation time was less than one hour (See table 3 below).

**Table 3.** Knowledge about essential newborn care among study participants in Chencha District, Southern Ethiopia, 2017(n=630).

Variables	Frequency	Percentage
Instrument to cut the cord		
New blade	261	41.4
Used blade	10	1.6
Knife	6	1.0
Scissor	353	56.0
Material to tie the cord		
String/thread	212	33.7
Cord tie	395	62.7
Cord clamp	9	1.4
Do not know	14	2.2
Breastfeeding initiation time		

Variables	Frequency	Percentage
Immediately after delivery	155	24.6
<1 hour	389	61.7
≥ hour	26	4.1
After placenta expulsion	56	8.9
Do not know	4	0.6
Bathing time		
Immediately after delivery	81	12.9
≥24 hour	499	79.2
<24 hour	39	6.2
Do not know	11	1.7

### 3.5. Birth Preparedness

Out of the total respondents 591(93.8%) had birth preparedness and from those respondents 490(82.9%) had arranged place of delivery for the last baby 203(41.4%), 267(54.5%) and 20(4.1%) had arranged hospital, health center and health post respectively. Five hundred fifty five (93.9%) were counseled about preparation for breastfeeding and 547(92.6%) were counseled about child feeding options. Regarding preparation done by respondents for delivery 490(82.9%) were prepared by identification of facility before delivery and 420(71.1%), 150(25.4%), 439(74.3%), 176(29.8%), 10(1.7%), 139(23.5%) and 201(34%) were prepared by financially, transport, food, skilled birth attendant, blood, clean delivery kit and clothes for newborn respectively.

### 3.6. Mother's Level of Knowledge about Neonatal Danger Signs

Based on summery scores 50.3% (95%CI: 46.4, 54.2%) had good knowledge about neonatal danger signs who had mentioned three and more neonatal danger signs out of ten World Health Organization (WHO) recognized neonatal danger signs with and without prompt. Out of the total respondents 360(57.1%) mentioned fever and 13(2.1)

mentioned jaundice or yellowish discoloration of palms/soles (See table 4 below).

**Table 4.** Mothers knowledge on neonatal danger signs with prompt in Chench District, Southern Ethiopia, 2017(n=630).

Danger Signs	Frequency (%)	
	Yes	No
Poor sucking or not able to breastfeeding	353(56.0)	277(44.0)
Fever	360(57.1)	270(42.9)
Fast breathing	153(24.3)	477(75.7)
Difficulty of breathing	114(18.1)	516(81.9)
Lethargic or unconscious or weakness	265(42.1)	365(57.9)
Hypothermia	37(5.9)	593(94.1)
Convulsion	38(6.0)	592(94.0)
Umbilical infection/such as redness of the cord	58(9.2)	572(90.8)
Jaundice or yellowish discoloration of palms/soles	13(2.1)	617(97.9)
Vomiting	139(22.1)	491(77.9)

### 3.7. Predictors for Mothers Level of Knowledge about Neonatal Danger Signs

In order to identify predictors for mother's level of knowledge about neonatal dangers signs binary logistic regression was done with assumptions. After controlling for cofounders in multivariate model place of residence, presence of radio in the household and knowledge about essential newborn care were significantly associated with knowledge about neonatal danger signs. Mothers who lived in urban were 1.58 times more likely knowledgeable as compare to mothers who lived in rural area (AOR=1.58, 95%CI: 1.05, 2.37). The odds of knowledge were 1.67 among mothers who had radio in the household (AOR: 1.67, 95%CI: 1.13, 2.49). Mothers who had knowledge about essential newborn care were 5.29 times more likely knowledge about neonatal danger signs with odds (AOR=5.29, 95%CI: 3.61, 7.78)(See table 5 below).

**Table 5.** Predictors for mothers level of knowledge about neonatal danger signs in Chench District, Southern Ethiopia, 2017(n=630).

Variables	Knowledge about Neonatal Danger Signs		(95% CI)	
	Poor	Good	Crude OR	Adjusted OR
Age of the mother				
15-24	58(18.5%)	36(11.4%)	1	1
25-34	203(64.9%)	217(68.5%)	1.72(1.09, 2.72)	1.14(0.65, 1.99)
35-44	52(16.6%)	64(20.2%)	1.98(1.14, 3.45)	1.37(0.69, 2.72)
Parity				
1	46 (14.7%)	33 (10.4%)	1	1
2-4	241 (77.0%)	260 (82.0%)	1.50 (0.93, 2.43)	1.33(0.74, 2.39)
≥5	26 (8.3%)	24 (7.6%)	1.29 (0.63, 2.62)	1.10(0.47, 2.59)
Educational Status of the mother				
Not read and write	109(34.8%)	99(31.2%)	1	1
Read and write	39(12.5%)	37(11.7%)	1.05(0.62, 1.77)	0.58(0.31, 1.09)
Elementary & above	165(52.7%)	181(57.1%)	1.21(0.86, 1.70)	0.93(0.61, 1.42)
Occupation of mother				
Employed	18(5.8%)	41(12.9%)	2.44(1.37, 4.34)	1.77(0.92, 3.43)
Unemployed	295(94.2%)	276(87.1%)	1	1
Place of residence				
Urban	101(32.3%)	129(40.7%)	1.44(1.04, 1.99)	1.58(1.05, 2.37)*
Rural	212(67.7%)	188(59.3%)	1	1
ANC				
Yes	253(80.8%)	280(88.3%)	1.79(1.15, 2.79)	0.78(0.45, 1.35)
No	60(19.2%)	37(11.7%)	1	1
Immediate PNC				
Yes	185(59.1%)	236(74.4%)	2.02(1.44, 2.83)	1.37(0.90, 2.08)

Variables	Knowledge about Neonatal Danger Signs		(95% CI)	
	Poor	Good	Crude OR	Adjusted OR
No	128(40.9%)	81(25.6%)	1	1
Presence of radio in the household				
Yes	163(52.1%)	234(73.8%)	2.59(1.86, 3.63)	1.67(1.13, 2.49)**
No	150(47.9%)	83(26.2)	1	1
Knowledge about ENC				
Poor	194(62.0%)	73(23.0%)	1	1
Good	119(38.0%)	244(77.0%)	5.45(3.85, 7.71)	5.29(3.61, 7.78)***

\*Significant with  $P=0.028$ , \*\* Significant with  $P=0.011$  and \*\*\* Significant with  $P<0.001$

## 4. Discussion

In this study the overall mother's level of knowledge about neonatal danger signs was 50.3% (95%CI: 46.4%, 54.2%). Mothers who lived in urban were 58% and presence of radio in the household were 67% times more likely knowledgeable about neonatal danger signs. Mothers who had knowledge about essential newborn care were 5.29 times more likely knowledgeable about neonatal danger signs.

The prevalence of mother's level of knowledge about neonatal danger signs was higher than the studies conducted in four regions of Ethiopia (29.3%), Nigeria (30.3%), Kenya (15.5%) and North West of Ethiopia (18.2%) [8, 9, 11, 20]. The reason for this difference is extensive work of HEWs in the community and different health care institution in awareness creation on neonatal danger signs in the study area and study period difference.

In this study age, parity and educational status of mother were not significantly associated with knowledge about neonatal dangers signs. This is incongruent with studies done in Nairobi, India and central Bangalore, Egypt, Sri Lanka and Ethiopia [9, 13, 21-24]. The reason for this difference may be due to the case that HEWs and other health care providers deliver health information or counseling about neonatal danger signs regardless of age, parity and educational status of mother. Place of residence was significantly associated with mother's level of neonatal danger signs. This is incongruent with study done in Egypt [23]. The reason for this difference is mothers who live in urban were more seek to health care and health information from different sources as compare to mothers who lived in rural parts.

Immediate postnatal care and antenatal care were not significantly associated with mother's level of knowledge on neonatal danger signs. This is inconsistent with studies done in Chewaka, Egypt and Ethiopia [9, 23, 25]. The reason for this is may be community based interventions of HEWs and other health care providers regarding community based newborn care and interventions for neonatal illnesses.

This study indicated that media exposure was significantly associated with mother's knowledge about neonatal danger signs especially radio because more people were more access radio than other media. The reason for this is mothers who access media more likely know about different information's. Mothers who were knowledge about essential newborn care practice had significant association with knowledge about neonatal danger signs. This is due to the case that recognition of neonatal danger signs is one of the components of essential

newborn care. So, those mothers who have knowledge on essential newborn care practices are more likely knowledgeable.

The limitation of this study was it might not show cause and effect relationship because the study design was cross-sectional. It might be affected by recall bias. So, those things are considered during interpretation of findings of this study.

## 5. Conclusions and Recommendations

This study revealed that mothers level of knowledge about neonatal danger signs were low. In general, this study identified that place of residence, radio in the household and knowledge about ENC were the independent predictors for mother's level of knowledge about neonatal danger signs. Based on above finding the principal investigator would like to provide the following recommendations: Strengthening the provision of ENC by designing appropriate strategies like Information Education Communication (IEC) and Behavioural Change Communications (BCC) both at facility and community level. Advocating the mothers to use media's as source of information. Individual and community as well should actively involve in community based IEC and BCC regarding neonatal health issues and actively consume MCH services. The other researchers do further investigation to identify other factors by using other tools and other study design.

## Abbreviations

ANC: Antenatal Care, ENC: Essential Newborn Care, HEWs: Health Extension Workers, MCH: Maternal Child Health, PNC: Postnatal Care and WHO: World Health Organization

## Competing Interests

The authors declare that they have no competing interests.

## Acknowledgements

My unreserved thank goes to Haramaya University for financial assistance. I would like to forward my deepest appreciation and thanks to Haramaya University internet room workers who gave support to use internet access. My heartfelt thanks also go to the Chencha District health office workers,

data collectors and study participants. Last but not least, I would like to say thank you for all peoples who support directly or indirectly.

## Author's Contribution

AM designed the study, involved in data collection, done analysis and interpretation of the result and drafted the paper and participated in preparing all versions of the manuscript. NA, KT, AB and SS assisted in the design and in the proposal development, monitored data collection, assisted during analysis and revised subsequent drafts of the paper. All authors read and approved the final manuscript.

## References

- [1] Hospital Care for Children. Global resource for addressing the quality of care. Danger signs in newborns and young infants. 2016; Available from: <http://www.ichrc.org/chapter-36-danger-signs-newborns-and-young-infant>.
- [2] Baqui, A., et al., Population-based study of hospital admission incidence rate and bacterial etiology of acute lower respiratory infections in children aged less than five years in Bangladesh. *Journal of health, population and nutrition*, 2007. 25(2): p. 179-188.
- [3] Coutin, A., *Essential Obstetric and Newborn Care: Practical guide for midwives, doctors with obstetrics training and health care personnel who deal with obstetrics emergencies*. 2015 ed. 2015.
- [4] Kananura, R. M., et al., The neonatal mortality and its determinants in rural communities of Eastern Uganda. *Reproductive Health*, 2016. 13: p. 13.
- [5] Abdullah, A., et al., Risk factors associated with neonatal deaths: a matched case-control study in Indonesia. *Global Health Action*, 2016.
- [6] Anwar-ul-Haq, et al., Recognizing the Danger Signs and Health Seeking Behaviour of Mothers in Childhood Illness in Karachi, Pakistan. *Universal Journal of Public Health*, 2015. 3(2): p. 49-54.
- [7] Alex-Hart, B. A., D. A. Dotimi, and P. I. Opara, Mothers' recognition of newborn danger signs and health seeking behaviour. *Niger J Paed*, 2014. 41(3): p. 199 -203.
- [8] Callaghan-Koru, J., et al., Newborn care practices at home and in health facilities in 4 regions of Ethiopia. *BMC Pediatrics* 2013.
- [9] Nigatu, S. G., A. G. Worku, and A. F. Dadi, Level of mother's knowledge about neonatal danger signs and associated factors in North West of Ethiopia: a community based study. *BMC Research Notes* 2015. 8: p. 309.
- [10] Yadav, S. P., et al., Knowledge, attitude and practices on the care of the newborn in postnatal mothers delivering at a tertiary care centre in Nepal. *Sri Lanka Journal of Child Health*, 2016. 45(3): p. 189-192.
- [11] Ekwochi, U., et al., Knowledge of danger signs in newborns and health seeking practices of mothers and care givers in Enugu state, South-East Nigeria. *Italian Journal of Pediatrics*, 2015. 41: p. 18.
- [12] Kibaru, G. E. and M. A. Otara, Knowledge of neonatal danger signs among mothers attending well baby clinic in Nakuru Central District, Kenya: cross sectional descriptive study. *BMC Res Notes*, 2016. 9: p. 481.
- [13] Assefa, F. M., *Assessment of Knowledge and Health Care Seeking Behavior about Neonatal Danger Signs among Mothers Visiting Immunization Unit Inselected Governmental Health Centers, Addis Ababa, Ethiopia*. Msc Thesis, Addis Ababa University, Addis Ababa. 2014.
- [14] Eshetu, Y., *Assessment of Level of Knowledge and Practice of Essential Newborn Care and Its Determinants among Recently Delivered Women in Ficthe Town, North Shewa Zone, Oromia Region, Ethiopia*. 2015.
- [15] Feyisso, M., et al., Assessment of Knowledge of mother on danger signs of Neonatal and postnatal illness and health seeking behaviour among pregnant and postpartum mother in Gedeo Zone, 2014/15. *International Journal of Current Research*, 2016. 8(01): p. 25466-25471.
- [16] Chench District Health Office Annual Report. 2016.
- [17] Lancet, Young Infants Clinical Signs Study Group. Clinical signs that predict severe illness in children under age 2 months, a multicentre study 371(9607) 2008: p. 135-142.
- [18] WHO, Handbook, in *Integrated Management of Childhood Illnesses (IMCI)*. WHO and UNICEF: Geneva and New York. 2005.
- [19] WHO, *Caring for the newborn at home. A training course for community health workers; community health workers manual*. Geneva. 2012.
- [20] Kibaru, E. G. and A. M. Otara, Knowledge of neonatal danger signs among mothers attending well baby clinic in Nakuru Central District, Kenya: cross sectional descriptive study. *BMC Res Notes*. 9(1): p. 481.
- [21] Gathoni, A., *Mother's Knowledge, Attitude and Practice Regarding Neonatal Illness and Assessment of Neonates at Kenyatta National Hospital*, Msc Thesis, University of Nairobi, Nairobi. 2013.
- [22] Mamta, K., *A study to assess the knowledge, practices and attitude of Prim gravid mothers on newborn care at JJR maternity Centre Bangalore, Karnataka March*. 2013.
- [23] Rasha, M., O. Essa, and M. Heba, Factors associated with maternal knowledge of newborn care among postnatal mothers attending a rural and an urban hospital in Egypt *Bulletin of High Institute of Public Health* 2010. 40: p. 2.
- [24] Senarath, U., et al., Factors associated with maternal knowledge of newborn care among hospital-delivered mothers in Sri Lanka. *Trans R soc Trop Med Hyg* 2011. 53(4): p. 121-122.
- [25] Aliyie, A. H., *Effect of planned teaching on Essential Newborn Care practice and Identification of Neonatal Danger Signs among mothers in Chewaka resettlement* 2014.