

# Knowledge of neonatal danger signs and associated factors among mothers who gave birth during the last four months while attending immunization services in Harar town public health facilities, Ethiopia.

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## Research note

**Keywords:** Neonatal danger sign, Mothers' knowledge, Immunization

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## Abstract

**Objective:** The purpose of this study was to assess knowledge about neonatal danger signs and associated factors among mothers who gave birth in the last 4 months attending immunization services. **Result:** The study recruited 432 mothers to participate. A knowledge score of neonatal danger signs was found [32.9% (95% CI: 28.9%, 37%)]. Mothers educated to secondary level were 4.9 times more likely to know about neonatal danger signs [(AOR=4.9, 95% CI: (1.15, 21)]. Similarly, mothers whose husband educated to college and above [AOR=4.95, 95% CI: (1.15, 21)], and being multipara mother [(AOR=2.59, 95% CI: (1.05, 6.6))], were factors significantly associated with good knowledge of mothers about neonatal danger signs. **Keywords:** Neonatal danger sign, Mothers' knowledge, Immunization

## Introduction

Parenthood of a new life is a responsibility for protection and crucial to the health and safety of the little, immune suppressed newborn. Although the symptoms of illness in a newborn baby are difficult to recognize, mothers always need to monitor their newborns for any signs of illness in the neonatal period. The majority of parents lack awareness about how a sick baby reacts as compared to a healthy baby. Thus, they lack experience in recognizing what is normal signs and what is unhealthy and atypical [1]. Neonatal danger signs that arose in the first month of life are multiple and can be a manifestation of almost any fatal diseases [2]. The integrated Management of Newborn and Childhood Illness (IMNCI), which is developed by the World Health Organization (WHO) introduces around ten general danger signs which define the illness of a neonate.

The critical period in newborn survival is often during the first week of life. During this period most neonatal deaths occur at home and without any contact with the formal health professional. Thus, unable to seek care and related problems are managed if mothers are aware of newborn danger signs through routine counseling by health professionals. Eventually, this will help them to develop the experience of early recognition. Hence, it is found necessary to assess mothers' knowledge and associated factors that hinder and promote awareness of neonatal danger signs.

## Methods

The quantitative institutional-based cross-sectional study design was applied to study a total of 433 mothers. The respondents were contacted at the baby immunization ward in different health facilities. Mothers with health problems like deafness and caregivers (Maid servant) who immunize their employer's baby were excluded from the study to enhance the quality of data.

The required sample size was determined using a double population proportion formula by assuming a 95% level of confidence, a 5% margin of error, 80% power and the ratio of exposed to unexposed equivalent to 1. The highest number of samples was taken from the scenario at which mothers exposed to primary education to that of not taking formal education (18% vs. 8%) which yields 394. Thus, adding a 10% non-response rate, the total number of participants becomes 433 mothers. A total of six public health facilities (four health centers and two hospitals) were included in the study. Hence, a systematic sampling technique was used from their registration frame to get a total of 433 participants after proportionally allocate to size for each health facility.

A structured, questionnaire developed by the principal investigator was applied in this study. The questionnaire was first prepared in the English language and translated to local languages for the ease of the interview. It was also pretested on 5% of the population out of the study area. Finally, the mothers were interviewed face-to-face using the checked and pretested questionnaires.

### Operational definition

#### Knowledge

A mother who mentions three of the ten WHO recognized danger signs of a neonate without prior prompt, plus three or more danger signs with a prior prompt is categorized as good knowledge. But, mothers capable of mentioning two or fewer key danger signs of neonate with and without prior prompt are classified as having poor knowledge [10].

The collected data were entered into epi data and exported to SPSS version 20 for analysis. All variables with p-value  $\leq 0.2$ , on bivariate logistic regression analysis, were taken into the multivariate model to control the possible confounders. The odds ratio (OR) was used as a measure of strength and the level of statistical significance was declared at p-value  $< 0.05$ .

Finally, before the data collection process started, ethical clearance was secured from Haramaya University Institutional Health Research Ethics Review Committee (IHRERC). Official letter was disseminated from Haramaya University College of health and medical sciences to each selected health facilities.

## Results

### Socio-demographic characteristics

A total of 432 mothers of babies aged up to 4 months were included in the study. The median age of the mothers was 25 years with a range of 15-45 years (Table S1).

### Knowledge of neonatal danger signs

Out of the 432 recruited mothers, 302(69.9%) mothers were aware of the following number of mentioned neonatal dangers sign, one, 60(13.9%), two, 100(23.1%) and 142(32.9%) three & above. Mothers who satisfied the WHO criteria for good knowledge was found 142 (32.9% with 95% CI: 28.9%, 37%). Among the prompted neonatal danger signs cord bleeding, redness followed by pus, and fever mentioned by 95.8%, while Hypothermia, convulsion, and vomiting are the least mentioned neonatal danger signs accounted for 45.8%, 63.4%, and 68.3% respectively ( Figure 1).

### Maternal health service utilization and obstetric conditions

Out of 432 mothers, 393(90.9%) had antenatal care follow up (ANC) during the latest pregnancy. Counseling related to neonatal danger signs were the least of all area of counseling covered with 34.2%. Similarly, out of 432 mothers less than half, 133 (30.8%) had postnatal care visits (PNC) and only 70 (52.6) mothers got counseled about neonatal danger signs (Table S 2).

The median parity of mothers was two (2), ranging from 1- 8 live births with multipara mothers 226 (52.3%) accounted for the highest number in the parous status of the respondents. Related to the place of delivery the majority of mothers 352 (81.5%) delivered their current baby in a hospital for labor and delivery (Figure S 1).

### Source of information

Regarding the source of information 253 (83.8%) mothers from those who were aware of neonatal danger signs had been informed from different sources. Among this subset, 81 (31%) had received information from health professionals. (Figure 2).

### Mother's newborn care knowledge and practice

The majority, 280 (64.8%) mothers knew cord care. Regarding cord care practice, 218 (78.2%) but nothing on the cord, 42 (14.6%) butter, and 18 (6.4%) other remedies. Concerning the mother's neonatal care practice, about 306 (70.8%) reported as the exact time of breastfeeding initiation is within 1 hour, while less than half 153 (35.4%) mothers claimed as the exact time of baby bath is within 24 hours. delivery and 320 (74.1%) mothers were reported as they use an insecticide-treated net for their newborn baby.

### Factors Associated With knowledge of neonatal danger signs

The multi-variable analysis result showed that educated mothers to the level of college and above as well as secondary level were more likely to recognize neonatal danger signs (Table 1).

Table -1: Factors associated with knowledge of neonatal danger signs among mothers who gave birth the last four month attending immunization in Harar town public health facilities, Eastern Ethiopia, February 2017.

dependent variables	Frequency (%)	Knowledge of neonatal danger signs		COR (95% CI)	AOR (95% CI)
		Good	Poor		
Maternal level of education					
College and above	95 (27.3)	53	42	3.99 (1.86, 8.6)**	5.4 (1.3, 22.7)*
Secondary level	83 (23.9)	38	45	2.7 (1.22, 5.83)*	4.9 (1.15, 21.1)
No formal education	50 (14.4)	12	38	1.00	1.00
Time of breast feeding initiation					
<1 hour	306 (70.8)	113	193	1.87(1.17, 3)**	3.23 (1.11-9.7)
>1 hour	126 (29.2)	30	96	1.00	1.00
Husband/partner level of education					
College and above	88 (20.6)	44	44	3.4 (1.72, 6.75)**	4.95 (1.15, 21.32)**
Secondary level	106 (24.8)	43	63	2.34 (1.2, 4.53)*	4.7 (1.15, 19.23)
No formal education	75 (17.5)	17	58	1.00	1.00
Parity					
Primi para	188(43.5)	46	142	1.00	1.00
Multi para	226 (52.3)	85	141	1.9 (1.2, 2.9)**	2.59 (1.05, 6.58)*
ANC neonatal danger sign counseling					
Yes	121 (34.2)	76	45	4.87(3.04, 7.8)**	4.34 (1.61, 11.7)
No	233 (68.8)	60	173	1.00	1.00
ANC visit within 6 days					
Yes	145 (33.6)	74	71	3.29 (2.16, 5.02)**	3.32 (1.26, 8.67)
No	287 (66.4)	69	218	1.00	1.00
Source of information					
Yes	253 (83.8)	127	126	2.29 (1.19, 4.4)*	6.04 (1.63, 22.4)**
No	49 (16.2)	15	34	1.00	1.00
Mode of delivery					
Spontaneous vaginal delivery (SVD)	248 (57.4)	51	197	1.00	1.00
Caesarian section	148 (34.2)	80	68	4.5 (2.9, 7)**	3.86(1.46, 10.25)
First source of information					
Family	52(19.9)	12	40		
Health professional	81(31)	47	34	4.6 (2.1, 10.6)**	5.45(1.27, 23.3)*
Media	68 (26.1)	35	33	3.5 (1.6, 7.9)*	5.08(1.16, 22.36)*

## Discussion

In this study, the knowledge of neonatal danger signs was found to be 32.9% (95% CI: 28.9%, 37%), 37%). It was found satisfactory on educated mothers and those who got ANC counseling about neonatal danger signs at their current ANC follow up visit. The knowledge of neonatal danger signs in this study was lower than the study done in India (2006), which was 39% [11], in Nigeria (2009) which was 78.3% [12], in Egypt (2008) which was 69% [13] and in Tigray region Ayder referral hospital (2011), 64% [14]. Even

though, the most frequently mentioned danger sign was fever, in all four studies, which is congruent with this study. The knowledge gap may be due to socioeconomic differences lead to owning an advanced health care delivery system. According to this study, mothers who were educated to a secondary level and college and above were more likely to know about neonatal danger signs compared to those who didn't take formal education. This was nearly consistent with the study conducted in Gondar, (2012) that mothers with the same level of education were more prone to know  $\geq 3$  neonatal danger signs with and without prior prompt [17]. This might be because of education increases the tendency to get service and read materials related to their baby.

The study revealed that mothers who were counseled about neonatal danger signs during their current ANC follow up and those who had PNC visits during the first six days postpartum were more likely to have good knowledge about neonatal danger signs. Thus, it is in line with the study conducted in Fiche town Oromia region in 2012 [18], and in Gondar, 2012 [17]. The reason might be, increased maternal ANC and PNC utilization promote the likelihood of counseling and knowledge acquisition. In our study, we tried to test new variables; among them, a mode of delivery was found to be significantly associated. Mothers who delivered through cesarean section were found more knowledgeable about neonatal danger signs compared to those who delivered by spontaneous vaginal delivery (SVD). This might be the longer they stay at a health facility in the postnatal period, the more to get counseled about neonatal danger signs.

Mothers who had a source of information about were six times more to know the danger signs compared to those who didn't have. In line with that, mothers who got information from health professionals and media were more knowledgeable about neonatal danger signs. The finding is similar with the study conducted in India by 2012, where poor knowledge was due to other sources than health professional [20] and with the study conducted in Gondar (2012), by which mothers got their first information about neonatal danger sign from health professionals and media have significantly resulted good knowledge [17].

Mothers who knew the exact breastfeeding initiation, as less than one hour (78%) in our study were found more knowledgeable compared to those who reported as later than one hour. This is consistent with the study in Nepal, Chitwan district (2011) even though the number of mothers who reported as less than one hour differs (78% vs. 52%) [21], the similarity might, due to more emphasis is given by the government upon counseling breastfeeding habit of mothers, which increases bonding and identifying the possible newborn illness.

## Limitation

- Because this study used a cross-sectional study design, it is descriptive and cannot demonstrate a specific relationship between cause and effect.
- The inclusion of mothers up to four-month post-partum may result in some recall bias given that infant health concerns and danger signs are common during the first month of life.

## List Of Abbreviations And Acronyms

ANC	Antenatal care
AOR	Adjusted odd ratio
BCG	Bacillus Chalmette Guerin
CI	Confidence interval
HEWs	Health Extension Workers
HC	Health center
HU-IHRERC	Haramaya university institutional health research ethics review committee
IMNCI	Integrated management of newborn and childhood illness
OR	Odds ratio

PI	Principal Investigator
PNC	Postnatal care
SNNP	Southern nation nationalities and peoples of Ethiopia
SPSS	Statistical package for social science
SVD	Spontaneous vaginal delivery
UNICEF	United nation Children's Emergency Fund
WHO	World health organization

## Declarations

### Ethical approval and consent to participate

Before starting the data collection process, ethical clearance was secured by Haramaya University Institutional Health Research Ethics Review Committee (IHRERC, Tel: +251256661899, P.O.Box 235, Harar), to each selected health facilities. Informed, written and signed consent was obtained from each head of every facility involved in the study and participant mothers after the purpose and benefits of the study are explained. Participants were informed about the minimal risk that it had participating in the study, their volunteerism and the right to stop the interview at any time they want. Parental consent was also obtained for participants under sixteen. Confidentiality of the study participant's information was also ensured. Eventually, mothers who had poor knowledge were informed about the ten (10) key danger signs prompted in the questionnaire immediately after the interview is finished.

### Consent for publication

"Not applicable"

### Availability of data and materials

The datasets during and/or analyzed during the current study available from the corresponding author on reasonable request

### Competing interests

"The authors declare that they have no competing interests"

### Funding

Not applicable

### Authors' contributions

FT proposed, designed the study. NA supervised, advised and helped analysis to the author. GA developed the first version of the data collection tool. NE assisted interpretation of the result and preparation of the draft of the manuscript. MB assisted on proposal development and the final write up of the data collection tool. MG performed the statistical analysis of the study. SG wrote the first draft plus the final write up of the research paper. Eventually, it has been done to read the last version of this manuscript by all contributors for possible modifications they want to make. The manuscript is then amended and gets approved by every author before it is being sent to publication.

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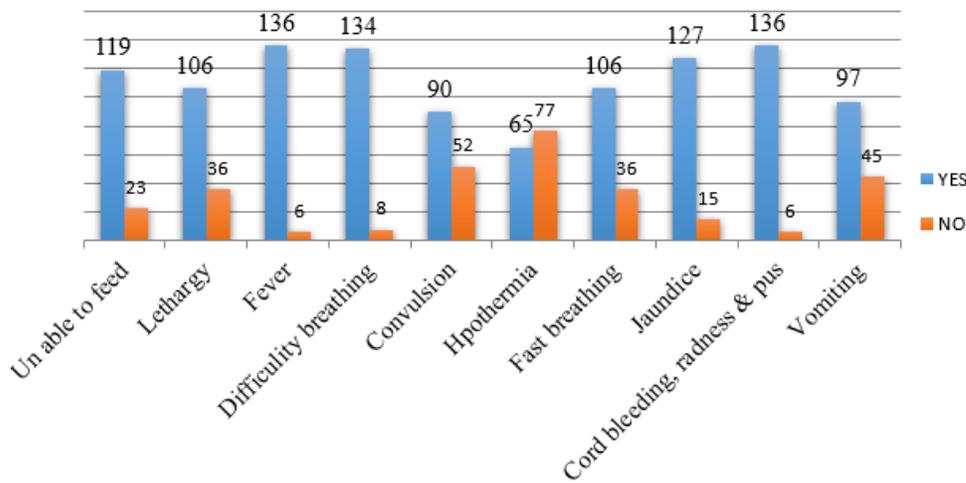
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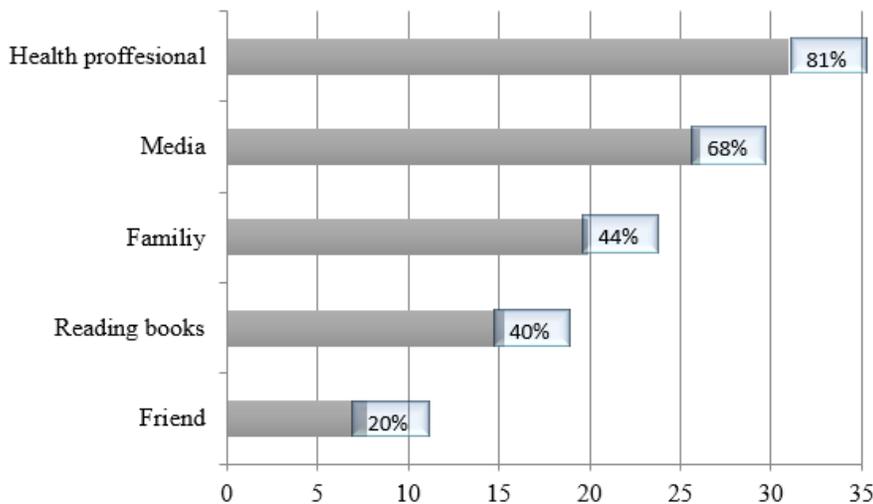
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## Figures



**Figure 1**

Knowledge of prompted neonatal danger signs among mothers who gave birth the last four months attending immunization in Harar town public health facilities, Eastern Ethiopia, February 2017.



**Figure 2**

First source of information about neonatal danger signs for mothers who gave birth the last four month attending baby immunization in Harar town public health facilities, Eastern Ethiopia, February 2017(n=253).

## Supplementary Files

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