
Level of Knowledge About Neonatal Danger Signs and Associated Factors Among Mothers Who Delivered at Home in Fogera District, South West, Ethiopia

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Abstract: Introduction: Due to little recognition of families about neonatal danger sign in many developing countries like Ethiopia, almost all of the neonates are not taken to health institutions early when they are sick and the majority of the newborn death occurred at their home. Therefore mother's health-seeking behavior in neonatal care extremely relies on their knowledge of neonatal danger signs: however, little is known about the mother's knowledge and associated factors on neonatal danger signs in Ethiopia. So, the main aim of this study was to assess the level of mother's knowledge about neonatal danger signs and its associated factors. Methods: A community-based cross-sectional study was carried out in 2018 from 845 mothers who delivered in the last six months and a multi-stage sampling was applied. Data were collected by nurses and midwives, and cleaned by EPI INFO software version 7. Data were analyzed using SPSS software version 21. Bivariable and multivariable logistic analyses were deployed to identify the associations. Results: In this study 542 (64.1%) with 95% CI (60.8-67.5) of mothers had good knowledge about newborn danger sign. Spousal involvement during ANC AOR= 1.77; 95% CI (1.28-2.46), assisted with traditional birth attendant AOR=1.39; 95% CI (1.00-1.93), had mass-media AOR= 1.53 95% CI (1.11-2.10), women who went to postnatal care /visited by health extension workers after delivery AOR= 1.35; 95% CI (1.00-1.81) were the independent predictors of mother's good knowledge of neonatal danger signs. Conclusions: In this study, greater than one-third of the respondents had no enough knowledge of WHO recognition newly born danger signs. Spousal involvement during ANC, delivery attendants, went for PNC/ visited by HEWS after delivery and availability of mass media were variables which are significantly associated with knowledge of good newborn danger signs. Routine counseling to pregnant mothers about the importance of PNC, ANC, and spousal involvement during PNC and ANC is essential. Refresher training to Health extension workers and counseling of traditional birth attendants to link pregnant mothers to Health institutions must be a great issue.

Keywords: Neonatal Danger Signs, Newborn, Associated Factors

1. Introduction

Of neonatal mortality occurred in their first 7 days of life at least 1 million newborn dies on them. Every year around 4 million babies die in the first four weeks of life: from this, approximately 75% first day of life. Surprisingly, almost all (99%) neonatal deaths arise in resource low and middle-income countries. Even though little development is seen in developing countries, around 67% of those burdens concentrated in sub-Saharan Africa and Asia, but the former

accounts the highest burden [1, 2].

Despite the global neonatal mortality rate weakened 40 percent from 33 deaths per 1,000 live births in the year 1990 to 20 in the year 2013, the proportion of under-five deaths that occur within the neonatal period has increased from 37 percent in 1990 to 44 percent in 2013, because declines in the neonatal mortality rate are slower than those in the death rate for elder children [3, 4].

The three most causes of neonatal morbidity globally are an infection, which includes (pneumonia, diarrhea, tetanus,

and sepsis) 36%, prematurity 28% and childbirth complications 23%). But most of the causes of death could be prevented with simple preventive and treatment measures [1].

Due to lack of/ little recognition of families about signs and symptoms of newborn illness, almost all of the neonates are not taken to health institutions early when they were sick due to low health-seeking behavior of the community and majority of the newborn death occurred at their home. [5]. But around three fourth of these neonatal deaths could be avoided with low cost, simple knowledge and easy interventions [6].

So far, different studies in different countries showed that, there were inconsistency level of maternal knowledge about neonatal danger signs and related factors, mothers who were mentioned three and more important neonatal danger signs were 13.9% in India [7], in Ghana 20.3% [8], in four regions of Ethiopia (29.9%) [9], and 18.2% in Gondar, Ethiopia [10]

In Ethiopia, neonatal mortality is still high even though the government of Ethiopia applies many interventional strategies including perinatal death surveillance and response assessment to alleviate this burden. The neonatal mortality rate was 29 deaths per 1,000 live births, and the postneonatal mortality rate was 19 deaths per 1,000 live births [11, 12].

Newborn danger sign highly recognized by mothers were hotness of the newborn 310 (74.9%) in Keny [13], 360 (57.1%) in Chenchu [14], 106 (53.8%) in Wldya [15], (83.6%) in [9]. To a lesser extent, women also aware of WHO recognized danger signs like poor sucking, breathing difficulty, unconsciousness, convulsion, hypothermia [9, 15-17].

Mothers also mention neonatal danger signs which are not included in WHO recognition including diarrhea, excessive crying, vomiting, coughing which are perceived by the mother as danger signs [15, 17].

Women's knowledge about newborn danger signs was rather low at 29.3% in four regions of Ethiopia [9], 15.5% in Kenya [13] and 54.2% in Southern Ethiopia [14], respondents were able to mention 3 or more neonatal danger signs and in Woldia, Ethiopia only 17.7% [15] respondents had good knowledge and could be identified six and more neonatal danger signs.

In rural Bangladesh, only 54.4% of the respondents were able to mention at least one neonatal danger signs and the most identifiable danger sign was hotness of the body (fever) 43.7% [18].

The most predicted variables associated with good knowledge of the neonatal danger sign were educational status the mothers and the husband [13-15, 17, 18] and having information about the neonatal danger sign, availability of mass media, ANC and PNC follow up [10, 13-15].

Since there is no adequate study conducted on Mother's Level of Knowledge on Neonatal Danger Signs and its associated factors in Ethiopia, especially in the Amhara

National Regional state, this study will be the most important to show the prevalence and its predictors that contribute for level of maternal knowledge about neonatal danger signs in Fogera district as well as in the region.

2. Methods

2.1. Study Setting, Period and Design

A community-based cross-sectional study was conducted in Fogera district from November first to November thirty 2018.

The study was conducted in Fogera district which is found in a South Gondar zone, Amhara National, Regional State in Northeast Ethiopia, and it is far from the capital city of Ethiopia (Addis Ababa) by 625 kilometers. The district is bounded on the south by Dera district, on the West by Lake Tana, on the North by the River Rib which separates it from the Libo Kemkem district, on the North East by Ebenat district, and on the East by Farta district. District Fogera have 44 kebeles (small administration), 9 Health centers and 44 health posts. The majority of the populations are farmers and Christian. And the report made by the district Health office disclosed that women of reproductive age constitute approximate 43, 227 (21%) of the population and an estimated 5685 deliveries take place annually.

2.2. Populations

The source populations and the study population: all reproductive-age women who gave birth within the last six months and all reproductive-age women who gave birth within six months in the randomly 9 selected Kebeles respectively.

2.3. Sampling

2.3.1. Sample Size Determination

The sample size was determined using the formula of single population proportion with the assumption of the prevalence of good level of knowledge in Chenchu District, Southern Ethiopia 50.3% [14], $Z_{\alpha/2} = 1.96$ with 95 confidence interval and 5% of marginal error and design effect 2 then, the final sample size was 845 including 10% none response rate.

2.3.2. Sampling Procedure

The multi-stage sampling procedure was employed to select the required 845 sample size. At least 20% (9 kebeles) were selected randomly from the total by using the lottery method. Then we did a survey to select mothers who delivered in the last six months in the selected kebeles. Finally, from all surveyed mothers, the proportional allocation was employed for 9 kebeles and at the end, we used simple random sampling techniques to select study participants. For a mother who was not present during the day of data collection, revisit was done in another time or day.

2.4. Study Variables

Outcome Variable.

Knowledge of the mother about Newborn danger sign.

2.5. Operational Definitions

Neonatal danger signs: Are symptoms that complicate the lives of the neonate and occur through the neonatal periods [15].

Maternal knowledge of neonatal danger signs: mothers who know at least three of neonatal danger signs were classified as having good knowledge and who were able to identify less than three were classified as having poor knowledge [13].

2.6. Data Collection Tools

A closed-ended structure questionnaire was developed after reviewing relevant literature to include all the possible variables that address the objective of this study. It developed in English and translated into the local language (Amharic), finally, retranslated into English. Data was collected by 4 Nurses and 5 Midwifery, Health Professionals using interview and supervised by 3 supervisors.

2.7. Data Quality Assurance

To ensure the quality of data, one-day training was given for data collectors on the overall procedure of the data collection process. The questionnaire was pre-tested before the actual data collection time on 42 participants (5% of the sample) outside the actual study area.

The supervisors were closely following the day-to-day data collection process and ensured the completeness and consistency of the questionnaire that administered each day. The supervisors were randomly verified on 10% of the completed questionnaire for inter-interviewer consistency. The collected data were reviewed and checked for completeness before data entry and all were complete.

2.8. Data Processing and Analysis

Data cleanup and cross-checking were done before analysis and all were coded, entered and cleaned using EPI INFO windows –version 7 statistical software; and analyzed using SPSS version 21. Both descriptive and analytical, statistical procedures were utilized.

To reduce the excessive number of variables and resulting instability, only Variables in binary screening found at a p-value less than 0.2 were further considered into multiple logistic regressions to avoid confounding.

Logistic regression analysis was performed to describe explanatory variables. Odds ratio (OR) with 95% confidence interval (CI) was applied to assess the strength of association between independent and outcome predictors e. For all statistically significant tests p-value < 0.05 was used as a cutoff point.

2.9. Ethical Clearance

Ethical clearance was obtained from the Institutional Ethical Review Committee of Debre Tabor University, permission letter from each district health office bureau and informed consent from each respondent. Personal identifies were excluded during and after data collection and all the data were kept confidentially.

3. Results

3.1. Socio-demographic Characteristics

In this study, a total of 845 mothers were included with a response rate of 100%. All most half 413 (48.9%) of the age distributions of the respondents were found between the 30-39 years. Greater than half 461 (54.6%) the respondents were developing their first pregnancy below the age of 20 and only 332 (39.3%) of the respondents were had mass media. Half of the respondents 416 (49.2%) were unable to read and write (Table 1).

Table 1. Socio-demographic characteristic of the respondents in Fogera district, Amhara National Regional State, Ethiopia 2018 (N=845).

Variables	Number	Percent
Age of the mother at first pregnancy		
<20	461	54.6
20-35	384	45.4
Age of the mother during data collection		
≤19	45	5.3
20-29	288	34.1
30-39	413	48.9
≥40	99	11.7
Marital status of the mother		
Married	772	94.1
Non-married	34	4
Separated	22	2.6
Divorced	17	2
Educational status of the mother		
Unable to read and write	416	49.2
Able to read and write	290	34.3
1-8 grade	92	10.9
High school and above	47	5.6
Occupation of mother		
Housewife	88	10.4
Farmer	675	70.9
Daily Worker	59	7.0
Government employed	23	2.7
Economic status of the family		
Poor	215	25.4
Medium	448	53.0
Rich /better	182	21.5
Availability of radio/ television		
No	513	60.7
Yes	332	39.3

3.2. Maternal Health Services

Of the total respondents, approximately three fourth 628 (74.3%) of the respondents were going to antenatal care follow up. Greater than two-thirds 586 (69.3%) of the mothers delivery attendants were their families, three fourth 642 (76%) of the households were didn't visited by health

extension workers during their pregnancy time (Table 2).

Table 2. Maternal health service of the respondents in Fogera District Amhara National Regional State, Ethiopia 2018 (n=845).

Variable	Number	Percent
ANC follow up at least two times		
No	217	25.7
Yes	628	74.3
Delivery attendant		
Family	586	69.3
TBA	259	30.7
HEWS visit your home during pregnancy		
No	642	76
Yes	203	24
Did you go for PNC/ visited by HEWS after delivery		
No	401	47.5
Yes	444	52.5

3.3. New Born Care Practice

All most all 812 (96.1%) used new cord-cutting instruments, to keep the babies warm most 786 (93.0%) were immediately drying and covered. Immediately bathing was a norm for this society with half 428 (50.7%) of the newborn babies bathed before 24 hours. Around half 491 (58.1%) were initiated within the first hour of delivery. Even though spousal involvement is the most important factor for maternal and neonatal health, only 312 (23.2%) of their husbands went with them for maternity services (Table 3).

Table 3. Newborn care practice among mother who delivered in fogera district Amhara National Regional State, Ethiopia 2018 (n=845).

Variable	Number	Percent
Clean cloth for a new baby		
No	454	53.7
Yes	391	46.3
Clean cord tie		
No	306	36.2
Yes	539	63.8
Cord cutting instrument		
Old	33	3.9
New	812	96.1
Thermal care		
Drying and covering immediately	786	93.0
Not drying and covering immediately	59	7.0
Bathing		
< 24 hours	428	50.7
≥24 hours	417	49.3
Breastfeeding in the first time		
<1 hour	491	58.1
≥1hours	354	41.9
Water to wash the newborn		
Cold	174	20.6
Hot	671	79.4
Apply on umbilicus		
Nothing	672	79.8
Butter	94	11.1
Others	77	9.1
Place the newborn		
Earth	322	38.1
Beside the mother	267	31.6
Give to another person	256	30.3
Knowledge of the mother about CBNBC		
Poor	435	63.1
Good	410	36.9

Variable	Number	Percent
Spousal accompany during ANC/PNC		
No	533	76.8
Yes	312	23.2
Distance from the health facility		
> 60 minutes	512	60.6
≤60 minutes	333	39.4

Others =mud, muck, and honey

3.4. Mother's Knowledge About Neonatal Danger Signs

The most neonatal danger sign mentioned by the mothers was fever 700 (82.8%) and the least danger sign recognized by them was coldness 261 (30.9%) and redness/discharge at a cord 267 (31.6%) (Table 4).

Table 4. Mothers knowledge on neonatal danger signs in Fogera district, Southwest, Ethiopia, 2018 (n=845).

Variable	Number (No/Yes)	Percent (No/Yes)
Convulsion	469/376	55.5/44.5
Fever	145/700	17.2/82.8
Poor feeding/suckling	537/308	63.6/36.4
Difficult/fast breathing	529/316	62.6/37.4
Baby feels cold	584/261	69.1/30.9
Baby too small/born too early	409/436	48.4/51.6
Redness/discharge at a cord	578/267	68.4/31.6
Eyes red/swollen/discharge	306/539	36.2/63.8
Yellow palms/soles/eyes	515/330	60.9/39.1
Lethargy	525/293	65.3/34.7
Unconscious	432/413	51.1/48.9

3.5. Factors Associated with Neonatal Danger Sign

In bivariable analyses, age of the mother during data collection, educational status of the mother, family income, marital status, antenatal care follow up, went for PNC/ visited by HEWS after delivery, availability of mass media, Knowledge of the mother to newly born care practice, Spousal involvement during ANC/any other health intervention and delivery attendant were associated with knowledge of neonatal danger sign.

Spousal involvement during ANC/any other health intervention, delivery attendant, went to the PNC/ visited by HEWS after delivery and availability of mass media were the only significant associated factors with knowledge of newly born danger sign in multivariable Logistic regression analyses.

Spousal involvement during ANC/any other health intervention 1.77 times more likely had good knowledge of neonatal danger sign than mothers whose spousal didn't involve during ANC/any other health intervention AOR= 1.77; 95% CI (1.28-2.46), mothers who delivered with the assistance of traditional birth attendant 1.39 times had good newborn danger sign compared with women whose delivery attendant was family members AOR=1.39; 95% CI (1.00-1.93), the odds of had good knowledge among households who had mass media were 1.53 times compared households had no mass media in their home AOR= 1.53 95% CI (1.11-2.10), women who went to postnatal care /visited by health extension workers after delivery was 1.35 time more likely

had good knowledge of neonatal danger sign than those mothers who didn't go to health institution for postnatal care/ didn't visit by health extension workers AOR= 1.35; 95% CI (1.00-1.81) (Table 5).

Table 5. Factors associated with Newborn danger sign by multiple logistic regression analysis, fogera district, Amhara, Ethiopia 2018 (n=845).

Variables	Knowledge of newborn danger sign		COR (95%CI)	AOR (95%CI)
	Poor	Good		
The current age of Mather				
≤19	13	32	1	1
20-29	108	180	0.68 (0.34-1.26)	0.62 (0.27-1.43)
30-39	160	253	0.64 (0.33-1.26)	0.49 (0.28-0.86)
≥40	22	77	1.42 (0.67—3.17)	0.50 (0.29-0.85)
Marital status of the mother				
Married	271	501	2.64 (0.99-7.02)	2.44 (0.84-7.10)
Non-married	15	19	1.81 (0.56-5.89)	1.83 (0.52-6.48)
Separated	7	15	3.06 (0.82-11.44)	1.80 (0.44-7.32)
Divorced	10	7	1	1
Educational status of the mother				
Unable to read and write	159	257	1	1
Able to read and write	106	184	1.1 (0.79-1.47)	1.15 (0.83-1.61)
Primary	26	66	1.57 (0.96-2.57)	1.44 (0.85-2.44)
High school and above	12	35	1.8 (0.91-3.58)	1.80 (0.83-3.89)
Economic status of the household				
Poor	86	129	1	1
Medium	154	294	1.27 (0.91—1.78)	1.25 (0.87-1.87)
Rich	63	119	1.28 (0.84—1.20)	1.10 (0.7-1.70)
Availability of mass media				
No	207	306	1	1
Yes	96	236	1.66 (1.24-2.24)*	1.53 (1.11 (2.10)*
ANC follow up				
No	87	130	1	1
Yes	216	412	1.94 (1.43—2.63)	1.12 (0.81-1.49)
Did you go for PNC/ visited by HEWS after delivery				
No	156	245	1	1
Yes	147	297	1.29 (0.97—1.71)	1.35 (1.00-1.81)*
Spousal involvement during ANC/any other health intervention				
No	220	313	1	1
Yes	83	229	1.94 (1.43-2.63)*	1.77 (1.28-2.46)*
Knowledge of the mother to newborn care practice				
Poor	170	265	1	1
Good	133	277	1.34 (1.01-1.77)*	1.10 (0.81-1.49)
Delivery attendant				
Family	224	362	1	1
TBA	79	180	1.41 (1.03-1.93)*	1.39 (1.00-1.93)*

*Significant at p<0.05

4. Discussion

Dropped child illness and death requires abrupt caregiver's recognition of suggestive known danger signs to take immediate actions. But the findings of this study showed that the level of good maternal knowledge about neonatal danger sign in the District was 542 (64.1%) with 95% CI (60.8-67.5). The prevalence of mother's good level of knowledge about neonatal danger signs (who mentions at least 3 of the WHO recognition danger signs) in the district was higher than the studies conducted in Rural Uganda 58.2% and 14.8% that mentioned at least one and two WHO recognition danger signs respectively [19], in South-East Nigeria 30.3% and 0.3% who mentioned at least three and eight danger signs respectively [17], in Kenya 15.5%% [13], in 4 regions of Ethiopia (29.3%) [9], and in North West of Ethiopia (18.2%) [10].

The low prevalence in Uganda might be due to that: even

though community initiatives, community health workers and women's saving groups helped in enhancing illness recognition, decision-making, and care-seeking of newborn complications, women and caretakers Newborn illness understanding was very low and they delayed to seek care [20] and the low prevalence of good knowledge among mothers in Kenya and in South-East Nigeria was due to poor quality of antenatal follow up and low passage of information to pregnant.

mothers and their relatives on birth preparedness, complication readiness, about importance of immunization and its schedule including neonatal danger signs during their antenatal follow up by health care providers and this discrepancy might be due to sampling size difference, gap of the time and their socio-cultural variation [21, 22] and also the low prevalence in four regions of Ethiopia and in North West of Ethiopia might be sample size difference, time gap and the commitment difference of health extension workers

in each region

Improved community practices and use of services is important to respond to newborn danger signs and it enhances child survival (36). But the widespread newborn danger sign for which there was highly recognized among mothers in this study was hotness of the body (fever) 82.8% and also it was similar to other studies in Kenya 74.9% [13], in four regions of Ethiopia 83.6% [9], and in Woldia 53.8% [15], but the others must be recognizable newborn danger signs were very low. In Nigeria, the recognition of WHO recommended neonatal danger signs were very low rather diarrhea, cough, and excessive crying were the most apparent and experienced non WHO accepted neonatal danger signs among respondents [17].

This study designated that exposure to mass media was statistically significantly with women's knowledge about neonatal danger signs AOR= 1.53; 95% CI (1.11-2.10 and it was similar to a study conducted in Chencha District, Southern Ethiopia AOR=1.58; 95% CI (1.05-2.37) [14], The reason for this might be women who exposed to mass media knows more about maternal and child health issues because the government of Ethiopia gives special attention to mothers and children in different media programs [12]

Spousal involvement during ANC/any other health intervention 1.77 times more likely had good knowledge of neonatal danger sign than mothers whose spousal didn't involve during ANC/any other health intervention AOR= 1.77; 95% CI (1.28-2.46 and another study in Bangladesh shared this idea that recently delivered women know at least one neonatal danger sign was significantly associated with husband involved in the mother's facility visit (AOR: 1.3, 95% CI 1.1–1.5) [23].

The reason may be: involvement of male partners increases open discussion and develop a common understanding with their wives about maternal and child health issues and enhancing awareness in utilizing health services.

Educational status was critical predictable significant variable with maternal level of information about neonatal danger signs [10, 13, 15, 22]: those mothers who attend diploma and above were 3.4 times more likely to had good knowledge of neonatal danger sign than mothers who couldn't able to read and write [10, 15], women educational status secondary and above were 1.2 times (AOR=1.21, CI 0.049, 0.677) more likely to had good knowledge of neonatal danger sign than mothers who couldn't have formal education [22]. But educational status was had no significant effect on this study. The possible reason may be due to the fact that knowing neonatal danger signs at the household level or at the community level is simple, non-complex, cheap to implement, do not contradict with community's value and didn't need special knowledge and specially trained staffs to give information about neonatal danger signs and the information can be defused through health extension workers, women saving groups and any individual who had the information [20, 24, 25]. The study also established that mothers who went to postnatal care /visited by health extension workers after delivery creates a good opportunity for them to had adequate

knowledge towards neonatal danger sign and it was 1.35 times more likely mentions at least three neonatal danger signs as compared to their opposites AOR= 1.35; 95% CI (1.00-1.81). This also supported by [10, 22, 26]. The reason why is that, when mothers went to the Health Institution for PNC follow up / visited by health extension workers after delivery, they have a chance to counseled or gained enough information for complications of the newborn in the next.

Even though the government of Ethiopia design different strategies to increase utilization of institutional delivery [27], in 2016 EDHS report only 26% of mothers delivered at health institution by skill birth attendants and 42% assisted by traditional birth attendants.

In this study mothers who delivered with the assistance of traditional birth attendant were 1.39 times had good newborn danger sign AOR=1.39; 95% CI (1.00-1.93) compared with women whose delivery attendant was family members. Why is it even though skill birth attendants are the only recommended delivery attendant currently, traditional birth attendants also a backbone of the developing countries to decrease women and children morbidity and mortality, because traditional birth assistants are trusted by the community, they are advisors of the community, they link to Health institutions and them have some knowledge about essential newborn care practice compared to family attendants [28-30].

5. Conclusions and Recommendations

In this study, greater than one-third of the respondents had no enough knowledge of WHO recognitions newborn danger signs. The highest recognized newborn danger sign in the community was hotness of the body. So that the finding of this study also discovered that most newborn danger signs were not reaching the communities.

Spousal involvement during ANC/any other health intervention, delivery attendants, went for PNC/ visited by HEWS after delivery and availability of mass media were the only significantly associated factors with knowledge of good newborn danger signs.

Routine counseling to all mothers about the importance of PNC, ANC, listening of mass-media and spousal involvement during PNC and ANC is essential. Refresher training to Health extension workers and counseling of traditional birth attendants is important to link pregnant and PNC mothers to Health institutions.

Abbreviations

ANC	Ante-Natal Care
AOR	Adjusted Odds Ratio
CI	Confidence Interval
HEWS	Health Extension Workers
OR	Odds Ratio
PNC	Post-Natal Care
WHO	World Health Organization
CBNBC	Community Based Newborn Care

Declarations

Ethical Approval and Consent to Participate

Ethical clearance was obtained from the Institutional Ethical Review Committee of Debre Tabor University and permission letter from each District Health office Bureau. Informed consent from each respondent was obtained.

Consent for Publication

Not applicable for this section

Availability of Data and Materials

All the data sets are available on the hand of the corresponding author.

Competing Interests

We declare that there is no competing interest with anyone else.

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Authors' Contributions

All stated authors DTA, MTE, ADG and were involved in this study from the inception to design, acquisition, analysis, and interpretation of data and drafting of the manuscript.

All the authors read and approved the final manuscript.

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