Causal Beliefs Affect Treatment Practices and Preferences for Neonatal Danger Signs in Northwest Ethiopia: A Qualitative Study

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Abstract. This study was conducted to explore the experiences of community members, particularly mothers, concerning their beliefs about the causes, treatment practices, and preferences for World Health Organization-defined neonatal danger signs in northwest Ethiopia. A phenomenological qualitative study was conducted in three districts of north Gondar Zone, Amhara region, Ethiopia, from March 10 to 28, 2016. Twelve focus group discussions were conducted involving 98 individuals. In-depth interviews were conducted with six health extension workers and 30 women who were either pregnant or who delivered in the past 6 months. Six subthemes emerged explaining the causes of neonatal danger signs. The causes varied from danger sign to danger sign and from person to person. Most of the perceived causes of danger signs in neonates do not align with the current biomedical science. Causal assumptions and perceived seriousness of danger signs influenced treatment practices and preferences. Four subthemes also emerged for treatment practices and preferences. In some cases, respondents indicated that non-biomedical sources of treatment were superior in outcome compared with biomedical treatment options. Unsatisfactory outcomes were mentioned as major reasons to opt for treatments from non-biomedical sources. Religious and cultural reasons were reported to be major impediments for treatment seeking for newborn danger signs. There is an urgent need to introduce or expand locally modified program interventions, such as community-based newborn care, to educate the community on the causes of neonatal danger signs and the need for prompt care seeking from qualified providers.

INTRODUCTION

The neonatal period marks the transition from fetal to neonatal life. Usually the transition is smooth. However, the process can be complicated leading to neonatal mortality.¹ Many newborns die in the first 4 weeks of life and most of them during the first week (World Health Organization [WHO], 2006). Around two-thirds of these neonatal deaths occur in just 10 countries.² The vast majority of the deaths happen in resource-limited settings,³ mainly due to preterm delivery, intrapartum complications, and infection.⁴

Despite reduction in neonatal mortality from 49 deaths per 1,000 live births in 2000 to 29 deaths per 1,000 live births in 2016, Ethiopia still has one of the highest neonatal mortalities in the world (United Nations International Children's Emergency Fund [UNICEF], 2015).

The death of a baby during pregnancy and child birth is devastating to the mother and the father. In outward ripple effect, the consequence touches siblings, the nation, and so on.^{5,6} For some communities, newborn death is inevitable.⁷ Inability to recognize the danger signs and the associated delays in care seeking contribute to avoidable neonatal deaths.^{8–10}

UNICEF and WHO (WHO, 2012) recognize the following symptoms as danger signs in neonates: 1) Not feeding since birth or stopped feeding, 2) convulsion, 3) respiratory rate of 60 or more (fast breathing), 4) severe chest indrawing (difficulty breathing), 5) temperature $\geq 37.5^{\circ}\text{C}$ (fever), 6) temperature $\leq 35.5^{\circ}\text{C}$ (hypothermia), 7) absence of movement even with stimulation (weakness and lethargy), 8) yellow soles (jaundice) and signs of local infection, and 9) reddened or pus-draining umbilicus, skin boils, or pus-draining eyes.

The Ethiopian Ministry of Health, through its flagship health extension program, prepared an illustrated booklet called the Family Health Card (FHC). The FHC contains recommended action points and key health messages on maternal, newborn, and child health. The booklet contains messages with illustrations on neonatal danger signs in different local languages. The FHC is distributed to households to help health extension workers (HEWs); female salaried, frontline health workers, educate and follow up the implementation of the recommended actions (ministry of health, 2016). The purpose of the FHC is to help families recognize danger signs and improve their treatment-seeking behavior in accordance with evidences that show correlation between treatment seeking and neonatal mortality.^{11–13}

In addition to recognition of danger signs, local interpretation of illnesses,^{14,15} knowledge of causes, perception of severity of illnesses, and the helpfulness of treatment also affect treatment-seeking behavior.^{15–19} Better information about the social processes, the timing and type of care-seeking actions, and treatments received before death are critical to identifying modifiable factors to prevent avoidable deaths.²⁰

Hence, understanding the community's beliefs and treatment practices and preferences surrounding neonatal danger signs is very important to design and implement context-sensitive programs to reduce neonatal morbidity and mortality. This study explores current beliefs, treatment practices, and preferences for neonatal danger signs in northwest Ethiopia.

METHODS

Design and setting. This study used a phenomenological qualitative study design to explore the current experiences of community members, particularly mothers, concerning their beliefs about the causes, treatment practices, and preferences for the WHO-defined neonatal danger signs. The study was conducted between March 10 and 28, 2016, in three

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districts of north Gondar Zone, namely, Debark, Dabat, and Wogera. The woredas are located in the Amhara Regional State in Ethiopia. The highest peak in the country, Mount Ras Dashen, is found in Dabat woreda. The zone is where the Semien Mountains stretch across the land. The areas are known for their difficult topography and terrain, making distribution of the most basic infrastructure difficult.

According to the Ethiopian Central Statistical Agency (CSA), in 2014, the zone's projected population based on the 2007 national population and housing census was 3,441,885, of which 1,741,549 were males (CSA, 2014). According to the zonal health department, the zone had nine government hospitals, 126 health centers, and 563 health posts in 2016. There are also many private clinics, most of them located in urban areas.

Study participants and sampling. Pregnant women, women who gave birth in the past 6 months, married women, married men, HEWs, and religious leaders participated in the study. Focus group discussions (FGDs) were conducted among purposively selected married women, men, and religious leaders. Those who speak Amharic, who were not sick at the time of the FGD, and who were willing to participate in the study were selected by the HEWs. The HEWs were used to select the FGD participants because of their knowledge of the study areas.

In-depth interviews (IDIs) were also conducted among women who were pregnant or who delivered in the past 6 months, regardless of the outcome. Snowball sampling method was used to identify women in the community for the IDIs. In-depth interviews were also held with HEWs.

Reaching the point of saturation is usually taken as enough instead of predetermining sample size for qualitative studies (Baker SE, 2012). However, most studies suggest 5–50 interviews as adequate (Dworkin SL, 2012). In this study, a total of 12 FGDs were conducted; six FGDs among married women (two FGDs per district), three FGDs among married men (one per district), and three FGDs with religious leaders (one per district). A total of 30 IDIs were conducted (10 IDIs per district) among pregnant women and women who delivered in the past 6 months. A total of six IDIs were conducted with HEWs (two per district). Both the FGDs and the IDIs were conducted until the discussions and interviews stopped to give new information.

Procedure. The FGDs were held at health posts for married women; schools and kebeles for married men; and within the premises of churches for religious leaders. A semi-structured questionnaire was used to guide the FGDs. The IDIs with pregnant women and women who delivered in past 6 months were held at their respective houses. The IDIs with HEWs were held at health posts. A semi-structured interview guide was used for the IDIs. The FGDs and the IDIs were conducted by the principal investigator and a public health PhD fellow who were not residents in the study area. The interviews and the FGDs were held in Amharic, the most widely spoken language in the country and the language of the Amhara people where the study was conducted.

Data processing and analysis. The FGDs and the IDIs were audiotaped. The audios were transcribed verbatim and checked for accuracy by the principal investigator. The transcription was translated to English by a person who was proficient in both languages: Amharic and English.

Thematic content analysis was used to identify and analyze themes in the data.²¹ The transcriptions were studied repeatedly to identify and list important and recurrent themes.

An inductive approach was used for data analysis. The coding and summarizing of the data into categories and themes were done manually.

Validation. The purpose of the research was explained to all study participants. The IDIs were conducted in settings that allowed privacy. A detailed field note was kept during the data collection process. Respondents were selected from three districts, allowing for environmental triangulation. The FGDs and IDIs were made with different population groups. Two of the study participants reviewed the transcripts and did the coding independently.

Ethical considerations. The study was reviewed and approved by the ethical review board of the University of Gondar. Permission was obtained from local administrations in the study area. All participants received explanation of the Amharic version of the consent form. All study participants were informed of the potential benefits, harms, confidentiality, and the possibility of withdrawing from the study even without giving reasons.

RESULT

Demographic characteristics of study participants. In total, 98 people participated in 12 FGDs. The number of participants in each focus group ranged from 7 to 12 individuals. Participants ranged from 18 to 47 years of age, with a median age of 25 years. Most study participants were followers of Orthodox Christianity. All of the participants were married and the majority, 91 of them, were farmers. In total, 30 individuals, with an age range of 16–43 years and a median age of 27 years, participated in the IDIs.

Beliefs about the causes of neonatal danger signs. There was widespread belief that a single cause could result in different danger signs. Exposure to wind or *Girifta* was believed to cause red and swollen eyes, fast breathing or *Wigat*, and difficulty breathing. Exposure to rays from the sun or *Mitch*, especially at midday called *Ketir*, was believed to cause fever and convulsion. Similarly, there was a widespread belief that a single danger sign could have multiple causes. Difficulty breathing was believed to be caused by *Girifta* and wrong handling of newborns while hugging, washing, or moving called *Towata*. Similarly, stopping feeding was commonly attributed to uvulitis called *Anker* or tonsillitis called *Qimo*. Red and swollen eyes were attributed to *Mitch* and prematurity. Absence of movement even when stimulated was attributed to weaknesses due to long labor and improper presentation during labor. Convulsion was attributed to possession by evil spirit, excess bleeding from umbilical cord, *Girifta*, and exposure to cold. Omphalitis was believed to be caused by pulled cords and cords that are cut short (Table 1).

Generally, beliefs about the causes of neonatal danger signs varied among study participants. These beliefs can be categorized into six subthemes: 1) beliefs about symptoms associated with the danger signs, 2) beliefs related to exposure to environmental conditions, 3) beliefs related to human errors, 4) beliefs on disease-causing organisms and deficiencies, 5) beliefs on spiritual causes, and 6) unknown causes.

Beliefs about symptoms associated with danger signs. Respondents' beliefs about the causes depended on the symptoms associated with the danger signs. Fever and inability to feed in newborns were widely thought to be caused

TABLE 1

Summary of causal beliefs for neonatal danger signs, northwest Ethiopia, April 2017

Newborn danger signs	Causal belief
Not feeding since birth or stopped feeding	Uvulitis/ <i>Anker</i> and tonsillitis/ <i>Qimo</i>
Convulsion	Exposure to rays of the sun/ <i>Mitch</i> , possession by evil spirit, excess bleeding from the cord, and exposure to cold
Respiratory rate of 60 or more (fast breathing)	Exposure to wind/ <i>Girifta</i> and exposure to sun/ <i>Mitch</i>
Severe chest indrawing (difficulty breathing)	Exposure to wind/ <i>Girifta</i> and wrong handling of newborns/ <i>Towata</i>
Temperature $\geq 37.5^{\circ}\text{C}$ (fever)	Exposure to rays of the sun/ <i>Mitch</i>
Temperature $\leq 35.5^{\circ}\text{C}$ (hypothermia)	Washing newborn with cold water and uvulitis/ <i>Anker</i> , tonsillitis/ <i>Qimo</i>
Absence of movement even with stimulation (weakness and lethargy)	Long labor and improper presentation during labor
Yellow soles and signs of local infection (jaundice)	Unknown cause, infection of newborn in the womb, and mother not eating the type of food she wanted during pregnancy
Reddened or pus-draining umbilicus	Pulled cords, cords that are cut short, and infection of the cord
Reddened or pus-draining eyes	Exposure to wind/ <i>Girifta</i> and prematurity

by uvulitis, described as descended uvula or *Anker*, and tonsillitis or *Qimo*.

...If the newborn stops breastfeeding, it is because of Anker (descended uvula) that drops in to the throat. (Women FGD participant)

We know it is Qimo when it (the newborn) stops breastfeeding. (IDI participant)

Women differentiate *Anker* from *Qimo* by inspecting the oral cavity. They use *Enzirt*, a traditional spinning stick, the size of a sipping straw, as a spatula for inspection of the oral cavity. Inspection of the fontanels was also reported as an additional parameter to differentiate *Anker* from *Qimo*. Such diagnosis was universally reported by respondents as the most widely used method to differentiate the two abnormalities.

Qimo is when it is swollen both on the left and right side, you can see the swelling in the mouth or feel it on the neck with your hands. When you look inside you can see yellowish pus both on the left and the right side. (FGD participants)

Bulging of the fontanels was mentioned as the other sign associated with *Qimo*.

The head (the fontanel) fills up, when it (the illness) is Qimo. (FGD participant)

...when the baby has its Anker dropped, it can be seen filling up the throat from the top. (Women FGD participant)

Only very few women thought that convulsions in newborns can follow after excess bleeding from the cord during birth.

There was widespread belief that absence of movement in newborns even when stimulated could be caused by long labor that depletes newborn's energy, rendering them weak and without active movement.

...if the baby isn't moving, it could be the result of long labor, the baby weakens if the mother is in labor for long time. (FGD participant)

Abnormal presentation of the newborn during labor was associated with the absence of movement even with stimulation by very few respondents.

...if the mother is in labor for more than 12 hours, if it (the newborn) comes with its feet and legs first, it will be weak. (FGD participant)

Belief related to exposure to environmental conditions. Almost all FGD and IDI participants attributed fast breathing and difficulty breathing to exposure to wind and sunlight. People believed that sudden exposure of newborns to wind or *Girifta* or the sun or *Mitch* could cause these symptoms.

...we believe that fast breathing and difficulty breathing is caused by exposure to the sun or the wind. (FGD participant)

This belief was so rampant in the community including religious leaders.

...when they (the newborns) come out of the womb, if they are not quickly covered and are exposed to wind, they could die. (Orthodox priest who participated in FGD)

...they wrap the baby in clean towel or else it could die from exposure to wind, remarked another priest participating in an FGD.

Some women believed that fever in neonates could be caused by exposure to sunlight. Few believed that fever could be caused when the newborn's washed cloth is sun-dried and then is worn by the newborn.

...if the mother doesn't have the newborn properly covered up and is exposed to wind, it could get a body fever and would be taken to a health center...

Beliefs related to human error. Inability to apply procedures correctly was believed to cause danger signs. Omphalitis was widely believed to be caused by pulling or cutting cords short, especially during home deliveries.

...it (omphalitis) is caused when the cord is pulled too much. Specially, if a woman gives birth at home, traditional birth attendants cut the cord. Some of them make it too long, the others too short, if it's too short, it retains pus, swells up and bleeds. (Women FGD participant)

Only few mentioned that washing the newborn with cold water causes hypothermia because of the small size of the baby.

Beliefs about disease-causing organisms and deficiencies. Few participants mentioned that omphalitis could be caused by infection with germs when birth attendants use unhygienic instruments to cut the cord.

...if it (the cord) is cut by a blunt or stained instrument, it could retain pus. (FGD participant)

...If the instrument used to tie the umbilical cord isn't boiled, it could cause infection. (IDI participant)

Despite the inability to discern specific infection types, very few women mentioned that yellow skin and soles in newborns could be caused by maternal infection during pregnancy.

...if the baby has yellow palms or feet, it is a danger sign. The cause could be infection of the newborn when it was in its mother's womb. (Woman FGD participant)

Few women mentioned that discoloration of the skin in newborns, including yellow skin and soles, was associated with the mother not eating food she craved during pregnancy.

If the mother is not getting enough food or different varieties of food, or if she doesn't get what she craved during pregnancy, that could turn the baby yellow. (Woman FGD participant)

Beliefs about spiritual causes. Participants of the study unanimously mentioned that there used to be attribution of certain newborn danger signs to spiritual causes. However, with the advent of the health extension program and the associated improvements in knowledge, the community was abandoning attributing causes to spiritual interventions. Previously, convulsion in newborns was attributed to evil spirit. People also sought spiritual treatments from *Awaki bet* or "wise person's house" to get rid of the *qole* or the evil from the newborn.

...now, the community is well aware. There are no old worshipping practices at Awaki bet. But in the old days people believed in the qole. (Woman FGD participant)

However, the belief was not totally obsolete now. Still, there were few people who believed that convulsion in newborns was the result of demonic possession.

...it's the devil that causes the newborn to shiver. There's no other cause. (Female IDI participant)

Only one woman FGD participant attributed inability to feed to God's punishment.

...if the newborn can't breastfeed, it is because of the will of God.

Unknown causes. Most study participants reported that they never experienced or heard about yellow discoloration of the skin or soles in newborns. Hence, they could not tell the cause of jaundice in newborns.

We don't know this (neonatal jaundice). However, we would just take it to the hospital... (Woman FGD participant)

Treatment practices and preferences. The study respondents reported various treatment practices in the study areas for newborn danger signs. Treatment preferences varied from person to person and danger sign to danger sign. Generally, treatment practices and preferences can be categorized into four subthemes: 1) preferences for modern treatment, 2) preferences for traditional treatment, 3) preference for no treatment, and 4) preference for spiritual treatment.

Preference for modern treatment. Many respondents believed in the need for modern treatment of most of the neonatal danger signs. The health post was the commonest first place people take sick newborns for modern treatment.

If we are sure the newborn is sick, we take it to health extension workers at the health post for treatment. (FGD participant)

If it (the newborn) has difficulty to breath, if the umbilical cord becomes red, swollen or starts bleeding, if it stops breastfeeding, we take it to the health post and if they can't treat the illness, they refer it to the health center. (Woman IDI participant)

However, for fever and inability to feed, for which the cause was widely believed to be *Anker* and *Qimo*, all participants unanimously agreed that modern medicine provided only temporary solution with high chances of reoccurrence of the symptoms after treatment. Hence, almost all people preferred traditional treatments for *Anker* and *Qimo*.

...people take their newborns to the health post and they give them shots, but they don't get better. (Woman FGD participant)

All respondents unanimously agreed that if they happen to notice yellow skin and soles in newborns, they would try to take the newborn for treatment. Lack of knowledge about the causes of jaundice was the reason mentioned by some respondents for not seeking treatment options.

I haven't heard or seen this (jaundice) in my life, But if I see, I take the newborn to health extension workers or take it to the hospital. (IDI participant)

Coldness of the newborn's body (hypothermia) was generally taken as a serious illness and synonymous to death.

if it (the newborn) becomes cold, it means death. (Woman IDI participant)

Most agreed in the need to seek treatment right away from health facilities for hypothermia. Few women mentioned that coldness in newborns must be treated by modern techniques as the newborn needs to be put in a heater.

We take it to the doctor and they put it (the newborn) in heater room to recover. (Woman FGD participant)

If it (newborn) is cold, it should be taken quickly to the health post. (Woman IDI participant)

Similarly, absence of movement even with stimulation was believed to be very serious, requiring urgent modern treatment.

If it (the newborn) doesn't move when it's touched, this is a serious danger sign. It has to be taken to a health center. (Woman IDI participant)

In connection with the common belief that absence of movement follows long labor, some women mentioned the need for facility delivery.

At home, the labor could take longer and it (the newborn) would be weak. At the health center, they (health professionals) would help her, give her injections to assist labor and she would give birth to a normal healthy baby. (Woman FGD participant)

Preference for traditional treatment. Respondents reported different traditional treatment practices for different neonatal danger signs. Treatments were given in the form of drinkable herbal extract, inhalation of steam of what were believed to be medicinal plants, topical application of herbs, body massaging, water dunking, and surgical removal of body parts or hand drainage of abscesses.

Inhalation, drinking, and massaging with *Aregsisa* or *Areksisa* plant was believed to treat red, swollen, and pus discharging eyes; difficulty breathing or *Wigat*; and fast breathing. The modality of administration of the treatment (steaming or topical application of the leaf) depended on the judgment of the traditional healer.

...if the newborn starts breathing rapidly, there is a leaf called "Areksisa," we massage the newborn with it. The leaf "Areksisa" is also squeezed and the drops are rubbed where there is the feeling, usually the chest area. (Woman FGD participant)

Few women reported that dunking newborns in cold water in the morning helps treat fast breathing.

...dunking the newborn in water in the morning is what is still practiced for the treatment of fast breathing and Wigat. (Woman FGD participant)

Despite common knowledge among participants that fever and inability to feed were treatable using modern medicine, the reoccurrence of the danger signs after modern treatment was reported to be major reason for people to resort to traditional treatment. There was a near universal belief among respondents that uvulectomy and hand drainage of tonsillar abscesses were the best available traditional treatment options for *Anker* and *Qimo*, respectively. These traditional treatment practices were believed to be superior in outcome and prognosis compared with modern treatment.

...my neighbor's newborn stopped breastfeeding. The husband took it to the health center. Though they (health workers) gave the newborn syrups and a shot, it (the newborn) still didn't get better. But, after the father took the newborn and the uvula was removed, the baby started breastfeeding... (Women FGD participant)

If it swells on the sides of the neck (Qimo), people would send their hands in and break the abscess. (FGD participant)

The practice of having the uvula cut off was so deep in the culture of the community that even some HEWs included in the study reported that their newborns' uvula was cut off.

I had the uvula of my children cut off while they were newborns. (IDI HEWs)

I have seen a health extension worker visiting a traditional healer to get her baby's Anker cut off. (Woman FGD participant)

Another less conservative traditional treatment option for fever and inability to feed caused by *Anker* was to put a leaf called *Sikel* on the newborn's head. *Sikel* in Amharic means "take up." The extract from *Sikel* is applied on the head or the leaf is rubbed against the vault of the head so that the uvula that descended into the throat ascends to its normal anatomy. This treatment is given as a first-line treatment usually in the early neonatal period before surgical removal of the uvula. This treatment was reported to be widely practiced in the study area.

Sikel is applied on to the newborn until the baby is stronger, until the body gets bigger or gets older than 7 days. (Woman FGD participant)

Previously, application of and/or massaging with Vaseline® or butter was reported to be used for the treatment of omphalitis and *Wigat* in the study area. However, the practice has decreased over time in favor of modern treatment.

The butter, the Vaseline, all of that used to happen before. (Community leaders, FGD)

Preference for no treatment. Both women and religious leaders included in the study unanimously indicated that if the mother or the newborn is sick in the first 10 days, treatment seeking outside of home was uncommon. The major reason was fear of attack by malevolent spirit and exposure to the sun, wind, or evil spirit should the mother and the baby go unaccompanied to the health facility before baptism.

If she (the mother) is not yet 10 days after birth, she has a lot of obstacles, she or the newborn could be exposed to wind, sun or evil spirit. But someone else can take the baby. (Orthodox Priest, FGD participant)

Particularly, mothers were not allowed "to cross a river" before Christianization of the baby on the 40th day for the boy baby or 80th day for the girl baby. It was believed that evil spirit lurking around rivers could attack a lonely mother. Hence, if

the mother detects danger sign(s) in the newborn, especially during market days, when neighbors and family members were not usually around, the newborn could be left untreated and face a tragic death without any treatment.

If a mother were to give birth and has her newborn ill, the neighbor would be the one to take the baby to the hospital, the mother won't leave, the neighbor would take an umbrella and bring the baby to health facility. (IDI health extension worker)

A HEW also mentioned that a recent initiative called community-based newborn care (CBNC), introduced in the community, includes home visit in the immediate postnatal period by a HEW to identify and treat illnesses in newborns.

...these days, we do home visits when there are births in the community. We carry Amoxicillin and Gentamicin with us to treat sick newborns. (IDI with a health extension worker)

Preference for spiritual treatment. Even though very few people believed in spiritual causes for danger signs, such as convulsion and inability to feed, no one reported the importance of imploring for divine interventions. The use of "holy water" or *Tsebel*, for healing by divine intervention, is not allowed for sick newborns. This is because *Tsebel* cannot be used before baptism in Orthodox faith in Ethiopia. However, some participants reported the use of "miniature holy scripture parchment" called *kitab*, tied around newborns' necks like a necklace, to fend off or clean evil spirit causing danger signs in newborns.

Holy water cannot be used before it is baptized (boy in 40 days, girl in 80 days). However, some people put a holy book "Kitab" and tie it around its neck. (IDI participant)

Orthodox priests who participated in FGDs said that even if both the mother and the newborn cannot use holy

water before baptism, the faith allows the house to be sprinkled with holy water to force out the evil causing the illness.

If it (the newborn) is not baptized it can't be sprayed with Tsebel. However, the house is sprayed with holy water instead but not the baby or the mother. (Orthodox priest, FGD)

Even though no women FGD and IDI participant reported the practice of visiting sorcerers for neonatal illnesses, the FGD with priests showed that the practice of taking sick newborns to a sorcerer was a living reality.

Still some of them (parents, particularly mothers) go to sorcerers. They don't call priests to spray their house with holy water. (Orthodox Priest, FGD)

Theoretical framework that affects treatment practices and preferences. In summary, the treatment practices and preferences of the community for newborn danger signs were influenced by a variety of factors (Figure 1).

DISCUSSION

In this study, respondents demonstrated variations in beliefs about the causes of neonatal danger signs. The findings showed a single cause attributed to many danger signs, multiple outcomes, and a single outcome attributed to multiple causes. Similarly, multiple treatment preferences and practices were mentioned for particular danger signs. Hence, the beliefs in neonatal danger signs in the community were characterized by multiple causes, multiple outcomes, and multiple treatment preferences and practices. In addition, most of the causes of the reported neonatal danger signs did not align with biomedical science.

In this study, treatment preferences of respondents for neonatal danger signs depended on causation assumptions, unsatisfactory biomedical treatment outcomes, lack of

FIGURE 1. Theoretical framework for treatment practices and preferences for newborn danger signs, northwest Ethiopia, April 2017.

knowledge of causes, fear of malevolent spirit, and perceived seriousness of the danger signs. A study in India showed that for almost all neonatal danger signs/symptoms, supernatural causes were suspected and the remedy was sought from traditional faith healers.²² Another study in Nepal also indicated community belief associating jaundice with food restrictions. Food consumed during or after pregnancy was assumed to be both the cause and the remedy for jaundice.²³ In both studies, treatment practices and preferences were influenced by causal assumptions. In this study, causation assumptions also affected respondents' treatment preferences. Non-biomedical sources of treatment were mostly preferred for neonatal danger signs believed to be caused by exposure to environmental conditions, human errors, and spiritual causes. When the cause was not well known as in the case of jaundice, treatment preferences were skewed to biomedical sources.

In some areas, caretakers relied on traditional medicine for various reasons.²⁴⁻²⁶ In this study, unsatisfactory biomedical treatment outcomes for fever and inability to feed were the commonest reasons given by respondents for opting to traditional treatment options. A study in India also showed similar preferences for traditional treatment of specific newborn danger signs. According to this study, care seeking for chest indrawing, fast breathing, and bulged fontanelles, which were considered to be untreatable by modern medicines, was influenced by "local beliefs."²⁷ The fact that some HEWs visited traditional healers for uvulitis further reinforces existing beliefs in traditional treatment options.

According to the Health Belief Model, perceived severity of illness is one of the driving forces for health-seeking behavior (Hayden J, 2013). In this study, respondents reported preference for biomedical treatment of hypothermia and absence of movement even with stimulation because of the perception of seriousness of the danger signs. In line with our study, another study in Ethiopia also showed that care-seeking for childhood illnesses by caretakers depended on the perception of severity or worsening of illness.²⁸

Despite differences in treatment preferences and practices, many respondents still believed in the need for biomedical treatment of neonatal danger signs. However, the belief in biomedical treatment was overshadowed by the restriction of mothers and the newborns at home for 10 days postpartum. This makes modern treatment inaccessible during the most critical time where more than 75% of the neonatal deaths occur.² An unpublished study (C. N. Kayemba, unpublished data) in Nigeria also showed the negative effect of postpartum home restriction of mothers on treatment-seeking behavior.

New initiatives such as CBNC are emerging that help identify and treat newborn illnesses at home by HEWs. In difficult terrains and mountains, like this study area, home visits by community health workers helps circumvent the spiritual and cultural barriers that caused home restriction of mothers and newborns.

Strengths and limitations. The diversity of the participants and the sample size are the strengths of the study. The beliefs of mothers, married men, and religious leaders were assessed allowing for triangulation. All IDIs and FGDs were conducted in the native language of the respondents to avoid communication barriers that could have negatively affected the results of the study.

One of the limitations of the study was that many respondents reported what they practiced and heard or saw others practice. What was unclear is how many of the primary respondents actually practiced what they reported. This study may also have a problem of recall bias as some of the study participants might forget to report correct practices. Another limitation could be the possibility of courtesy bias that might occur because of respondents giving answers they think the researchers want to hear. However, to reduce courtesy bias, the professional background of the data collectors was not disclosed to the study participants during the data collection process.

CONCLUSION

The causal assumptions for neonatal danger signs were diverse. Most of the perceived causes did not align with biomedical science. However, the type and nature of the perceived causes affected treatment practices and preferences. Religious and cultural restrictions were major impediments for biomedical treatment seeking. Time spent in non-biomedical sources of treatment cause delays that lead to undesired eventualities. Hence, there is an urgent need to introduce and expand a locally modified program intervention, such as CBNC, postnatal home visit of the mother and the newborn, and education of communities about causes of danger signs and the need for prompt care seeking from qualified providers.

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