Original Article

Newborn Care: A Qualitative Study of Inter-Cultural Variations and Similarities Among Two Ethnic Groups in Northeastern Nigeria

RB Iganus, AM Mechanic, ZW Wudiri[1], ZE Hill[2], BA Omotara[1]

Departments of Sociology and Anthropology and [1]Community Medicine, University of Maiduguri, Nigeria, [2]Institute of Global Health, University College, London, UK

Abstract

Background: Neonatal mortality remains unacceptably high in most sub-Saharan and Asian communities, where cultural practices and poor antenatal care are common. Newborn care practices play a key role in preventing neonatal deaths. **Aims:** This study aimed to examine similarities and variations in newborn care between two major ethnic groups in northeast Nigeria. **Subjects And Methods:** Qualitative methods involving narratives, observations, focus group discussions, and in-depth interviews were used to collect data from recent mothers (ten per ethnic group) and grandmothers from the Babur/Bura and Kanuri ethnic groups in Borno State, Northeast Nigeria. A snowballing sampling technique was used to select the participants within four communities/villages (two for each ethnic group). **Results:** Babies were bathed within 30 to 45 minutes after delivery by mothers in both groups, except in case of ill health of the child and/or mother. Various substances were applied to the cord even though hygienic cord-cutting practice was reported. With the exception of early bathing, good thermal care practices were observed in both groups. Both groups applied emollients on the skin of the babies, but Bura preferred the use of shea butter to oils and lotion. Various substances were applied to other parts of the body of the baby, such as the fontanelle (Mahogany oil), anus (Neem oil and Mahogany oil), and circumcision wound (engine oil) more so among the Bura than the Kanuri. None of the substances were deemed to be harmful. **Conclusion:** Similarities and variations in newborn care exist between the two ethnic groups. There is a need for health education and promotion to encourage and facilitate positive behavioral change from old traditional practices to healthy newborn care practices among the Babur/Bura and Kanuri ethnic groups.

Keywords: *Bura Northeast Nigeria, cultural practices, kanuri, neonatal mortality, qualitative*

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Introduction

During the neonatal period, the first 28 days of life, babies are particularly vulnerable, with 24 million deaths occurring each year during this time, almost half of all child deaths.[1,2] Most of these deaths happen within the first eight days of life, with approximately one million deaths each year occurring on the first day. Neonatal mortality has remained unacceptably high, and sub-Saharan Africa has the highest mortality rate-27 deaths per 1,000 live births in 2019.[3] Nigeria has a very high neonatal mortality rate, 39 per 1,000 live births in 2018, a slight increase compared to the previous five years.[4] Health indices are usually the poorest in the northeast region of Nigeria, where only 26% of the deliveries take place in a Healthcare facility, and 31% of the women have postnatal checks by skilled health personnel within two days of delivery.[4]

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Address for correspondence: Prof. BA Omotara, Department of Community Medicine, University of Maiduguri, Nigeria.
E-mail: atunjeba@yahoo.com

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In addition to weak healthcare systems, community practices, driven by the prevailing cultural beliefs and norms may contribute to the high number of neonatal deaths in these countries.[5-7] Cultural practices relating to newborn care remain prominent in most sub-Saharan African and Southeast Asian communities,[8,9] and can expose newborns to the risk of infection, hypothermia, and inadequate feeding, due to unhygienic and harmful practices. For example, Olorunsaiye *et al*.[10] reported that two-thirds of mothers delivered at home under unhygienic conditions.

Based on the World Health Organization (WHO) and the United Nations Children Fund (UNICEF)[11] recommendations, after delivery, newborns should have delayed bathing, good thermal care, hygienic cord care, and early initiation of breastfeeding. To effectively promote these essential newborn care practices, there is a need to understand home-based neonatal care, especially in settings such as northeastern Nigeria, where most births are conducted at home, and neonatal mortality is high and increasing—the situation has worsened by armed conflicts and religious-based insurgency in the region. Therefore, the objective of this study was to understand the traditional and cultural newborn practices in two major ethnic groups of Borno state and explore ways by which these practices contribute to poor newborn health indices. The data for this study was conducted as part of a multi-site study on emollient use in newborns, and cross-site summary data has been presented elsewhere.[12-14] This paper describes in-depth findings on the differences and similarities in newborn practices in two major ethnic groups from Borno state.

Methods

Data were collected on community newborn care practices from two major ethnic groups (Babur/Bura and Kanuri) in Borno state, northeast Nigeria. The Babur/Bura are largely found in the southern part of the state, while the Kanuri are mostly in the north. Four communities (villages), two from each ethnic group, were purposively selected based on accessibility and representativeness. Bilatum and Mbulatawiwi communities were selected for Bura, while Magumeri and Ngamma communities were selected for the Kanuri. All the communities are rural and subsistent farming was the major occupation. Bilatum, Mbulatawiwi, and Ngama have dispensaries, while Magumeri has a health center. Data were collected between July and October 2011.

Community informants, word of mouth, and snowballing sampling techniques were used to recruit eligible participants from the four selected communities. Qualitative data were collected using newborn care narratives, bathing observations, in-depth interviews (IDIs), and focus group discussions (FGDs) with mothers and grandmothers/traditional birth attendants (TBA) to capture a wide variety of views and experiences relating to newborn care and to allow for triangulation. Narratives were conducted with 20 mothers (ten from each ethnic group) who delivered in the last three months, and eight (four from each group) were subsequently observed bathing their newborns. IDIs were conducted for eight mothers and six grandmothers in each ethnic group and two FGDs for mothers and grandmothers/TBAs for each ethnic group.

Data was collected by two trained research assistants (male and female) for each ethnic group, using a standard protocol designed for a multi-site study of which this study was part.[13] Male and female research assistants were used for the study because of the mixed population involved in the study; however, that portion of the study is not presented here. Both were trained together and jointly collected the data for the study. Interview guides, developed for the multi-site study, were translated and adapted for use on our site by pre-testing them among recent mothers from the two ethnic groups. All interviews were conducted in local languages (Babur/Bura and Kanuri), and each interview lasted between 30 to 90 minutes and was audio-recorded in addition to taking field notes. Bathing was recorded using a video recorder. The respondent's age, sex of child, parities, place of delivery, educational level, socioeconomic status, ethnicity, and religion reflect site variability.[12-14] Field notes and recordings were transcribed and translated into English expanded field notes using Microsoft word as described by Halcomb and Davidson.[15]

Data were analyzed using a code template developed in NVivo in accordance with the themes of the study. Themes and categories from the thematic analysis were arrived at during a general meeting by the investigators and interviewers to establish common codes for the analysis.[12-14]

Ethical approval was obtained from the ethics boards of the University of Maiduguri Teaching Hospital (ADM/TH/75/Vol.II) and from University College London. Informed consent forms were read to the participants just before the data collection to seek their approval, and written and verbal consent was obtained from all the participants before the commencement of data collection. Participants were interviewed in places comfortable for them, usually in their homes.

Patient and Public Involvement

Patients were not involved in the study.

Results

As shown in Table 1, the study was composed of 48 participants, excluding participants in the FGDs (24 for each ethnic group). The narrative group mothers were younger in the Kanuri, of which only 2/10 were literate, than the Bura ethnic group, of which 5/10 were literate. The age distributions of the IDI mothers were similar in both ethnic groups; none (0/8) were literate among the Kanuri against (3/8) among the Bura. The age range of IDI grandmothers indicates a slightly lower age for the Bura than for the Kanuri. Only 1/6 of the Bura participants in this category was literate, while none (0/6) of the Kanuri were literate. Each FGD consisted of 6–8 participants per session. Each group consisted of women of the same age group. While the groups in Bura mothers consisted of mixed literate and illiterate participants, those of the Kanuri consisted of illiterates.

Bathing, removal of vernix, stretching and massage of newborn

All narrative mothers in Bura and Kanuri communities had home delivery (delivery was done by either TBA or grandmother), and the babies were bathed within 30–45 minutes after the placenta was delivered, and the cord was cut using a new razor blade. However, the practice of early bathing was reported by the Bura respondents as not occurring if the mother had labored too long or had complications before delivery (FGD grandmother). In these cases, bathing is usually delayed even to the following day, depending on the health conditions of both the mother and the baby. Both Bura and Kanuri believed that if a newborn was not bathed immediately, the baby will develop body odor later in life, but they had divergent views about what causes body odor. For the Bura, their concern is that the birth fluids and the vernix cause odor, while the Kanuri showed more concern for the vernix and the blood, which must be washed off immediately to save the baby from 'future shame and disgrace'.

Table 1: Sociodemographic characteristics of respondents

Category	*n* (Age group in year)	
	Bura	Kanuri
Narrative Mothers	10 (30-45)	10 (20-29)
IDI Mothers	8 (20-53)	8 (20-53)
IDI Grandmothers	6 (57-75)	6 (65-75)
FGD Mothers	2 (20-53)	2 (20-53)
FGD Grandmothers/TBA	2 (56-75)	2 (56-75)

"The birth fluids (Yimir-ya) and the blood (Mamshi) smell bad; they must be washed away to prevent body odor later in life." (34- year-old educated Bura mother)

"*The baby was born with whitish particles and some blood on his body; there is no way a baby could be born a hundred percent clean, so this practice must be done to remove all the dirt from the skin of the baby. Otherwise, it will penetrate into the skin and cause problems in the future." (27-year-old illiterate Kanuri mother*)

Other reasons given for early bathing included 'to make the baby presentable to well-wishers, making the baby feel good, clean, and fresh and to prevent the skin from cracking.'

Even though the vernix is generally described as whitish dirt by Bura and Kanuri, what constitutes the vernix is viewed differently. The Bura see the vernix as an accumulation of dirt from what the mother eats during pregnancy and believe that some mothers have natural womb cleansers, while some do not. Those who do not have the natural womb cleanser are those who give birth to a baby without vernix.

"*I delivered my baby with whitish dirt (didnir-kuta) on her body, and the dirt was more on the head, around the neck, and the joints compared to other parts of the body. The whole body looks as if he was rubbed with blended groundnut, and there is no way one can wash off the birth fluids completely without removing the dirt, so we used groundnut oil and cotton wool and removed the dirt gently before bathing him." "Uhuum! Some women are lucky, their womb has a natural cleanser, so they deliver clean babies without this whitish dirt (didnir-kuta). Some of us do not have womb natural cleanser; that is why the baby came out dirty." (34-year-old educated Bura mother)*

The Kanuri hold a different view about the vernix; even though it is not publicly discussed, it is generally believed that the mother was sexually active throughout the pregnancy, and so the vernix is a deposition of sperm that must be removed immediately before people see it. Therefore, bathing newborns immediately prevents the mother from being seen as promiscuous. The vernix is typically removed by sprinkling groundnut oil all over the baby's body and allowing it to soften the vernix for at least 10–15 minutes. A clean rag or cotton wool is used to remove the vernix before bathing the baby.

Bathing newborns and removing the vernix is a common practice among the Bura and the Kanuri, and the study revealed that the Bura and the Kanuri bathe newborns with warm water, soap, and a soft sponge twice daily, irrespective of the weather. The bathing method varies

between the two ethnic groups, with the Bura placing the baby on the caregiver's lap with the caregiver's legs stretched over a plastic bath that contains and collects the water as it falls. They start by washing the head first before other parts of the body. The main reason for placing babies on the lap is to have control over the slippery body of the newborn, especially with the use of water and soap.

"We place babies on the lap when bathing because newborns are difficult to handle. You cannot control the baby with only one hand, and the baby can easily slip off from your hand and get injured, but if you place the baby on your lap, the baby will not fall." (35-year-old educated Bura mother)

The Kanuri generally place the baby direct into the plastic bath and support the baby with one hand, then use one hand to scrub and wash the baby.

"I just put the water into the bath and seat the baby inside, supporting her with one hand and then using the other hand to scrub her with soap and sponge. It is easier, but only experienced mothers can do it because we have heard of mothers whose babies slipped out of their hands when bathing them." (26-year-old illiterate Kanuri mother)

The massage was commonplace. Most of the Kanuri mothers reported that massage is usually done during bathing of the baby with a soft sponge or with their hands when the baby wakes up from sleep by stretching.

"I used to massage my baby when I back her (carrying the baby on my back) for a long period or when she slept for a long time. When I put her down, I would hold her hands up, and she would stretch her legs, then I would massage her body all over.' (23-year-old illiterate Kanuri mother)

Some Kanuri mothers reported that new skin is too delicate, so it cannot withstand hard massage; because of this, the massage is done gently.

"No, whatever we want to do, we do it gently. You know the skin is tender and does not require hard touching as I have told you before." (33-year-old illiterate Kanuri mother)

Another Kanuri mother was reported as saying: *"I massage my baby with charcoal morning and evening. I particularly massage the stomach very well as that would help to reduce 'surokerita' stomachache." (26-year-old illiterate Kanuri mother)*

Among the Bura, the massage is done with a cloth soaked in hot water, which is normally hotter than that used for bathing, and, like the Kanuri, the Bura respondents reported that the baby's skin was delicate, and the massage needed to be soft.

"*I massage the baby's head first, chest and other parts of his body with warm water, which is hotter than the one I use for bathing him." (34-year-old illiterate Bura mother)*

Reasons for the massage are 'to make the baby active' and 'take away fear,' meaning to make the baby bold/fearless, to prevent stomachache (Bura) and to make the baby active (Kanuri).

Skin care

There is a marked difference in the substances used for skincare between the two ethnic groups. Whereas the majority of Bura mothers prefer to use shea-butter, a thick creamy substance, Kanuri mothers prefer to use oil. The Kanuri use mostly transparent oils, which are lighter as they believe it keeps the baby's skin smooth, soft, healthy, and warm. On the other hand, the Bura use mostly shea butter and Vaseline as they also believe that thicker substance stays longer on the baby's skin to protect against dryness, cracking, and cold, softening and smoothening the skin.

"I rub shea butter (Mai-Fuma) on my baby because it protects the skin from cracking, making the skin soft and smooth." (33-year-old illiterate Bura mother)

However, Bura mothers do not use shea butter on babies with 'loose skin'.

"We use shea butter to soften and prevent the skin from cracking, but we do not use it on every baby because some babies have tight and strong skin while others have loose skin. For those with loose skin, we do not rub shea-butter on them." (34-year-old educated Bura mother)

Although shea butter was considered the best emollient for newborns, two Bura mothers applied baby lotion. Shea butter is used for only 40 days after delivery due to its unfriendly odor. Bura mothers reported changing from shea butter to Vaseline after 40 days of intensive use of shea butter for newborn skincare.

Whereas the Bura use only one emollient at a time, the Kanuri use a variety of oils for skincare, sometimes mixed together and have a preference for shop-bought lotions and baby oils.

"The baby lotion mixed with baby oil keeps the baby warm and healthy." (27-year-old illiterate Kanuri mother)

Seasonal variation in the use of oils for skincare was reported among both ethnic groups. During the hot season, Kanuri mothers use little quantity of oil on the baby's

skin than during raining or cold season. This is in line with what the Bura do, as they apply oils to the legs and hands of the newborn more often during harmattan (cold and dusty weather) than during the hot season.

"*The quantity of oil applied on the skin depends on the prevailing weather." (22-year- old educated Kanuri mother)*

"We apply oil on the hands and legs of the baby more frequently during the harmattan than during hot seasons because after dressing the baby, the legs and hands are usually exposed to cold more easily than other parts of the body. Even if you cover the baby with a wrapper, the baby can easily push it off. So if you touch the legs and hands, especially during harmattan, you will feel it cool, and to protect the baby from cold and dryness, we do apply oil from time to time." (35-year-old educated Bura mother)

Thermal care

The study found that there was not much variation in thermal care practices among the Bura and the Kanuri mothers and both groups were knowledgeable of the importance of thermal care and the risks associated with inadequate thermal care. Both groups reported using new wrappers (clothes) to receive newborns and wrapped them immediately, even before the placenta was delivered and the cord cut.

"*Before I delivered my baby, I bought a new wrapper specifically for the baby to be received in and wrapped immediately because newborns are not to be exposed to cold while waiting for the placenta to be delivered." (35-year-old educated Bura mother).*

Kanuri mothers also reported using new wrappers to receive newborns during delivery.

"The TBA used the new wrapper I bought to receive the baby so that the baby could be covered immediately because of the cold." (23-year-old illiterate Kanuri mother")

Both the Bura and the Kanuri use warm water to bathe newborns immediately after delivery as one of the strategies of providing good thermal care.

"We know that the womb is warm; that is why we use warm water to bathe newborns to maintain the temperature for some time and then expose them gradually to the outer environment." (35-year-old educated Bura mother)

We also found out that in preparation for delivery, the Bura and the Kanuri mothers pay attention to preparing thermal care materials such as warm clothing and emollients, particularly the Bura mothers, that were believed to prevent the baby from catching a cold.

"B*efore I delivered my baby, I tried as much as I could to buy cold protectives, including a baby blanket, towel, shea–butter, and clay pot (ha'ahi) for heating charcoal." (34-year-old educated Bura mother)*

"I always make sure I rub my baby with shea-butter and dress him with cold protective clothes before covering him with his blanket; that is why I put on a cap, socks and overalls on him, because, if he catches a cold, he will have catarrh (jang) and fever (diz'dizku)." (35-year-old illiterate Bura mother)

"Once I bathe my baby, I will rub him with shea-butter (mal-fumma), put on his dress, and covered him with a towel to protect my baby from the cold." (31-year-old educated Bura mother)

Bura and Kanuri mothers keep their room warm by heating charcoal at least for the first eight days and do not allow newborns to be taken outside. The Bura believe that the massage with the hot cloth described above also helps keep the baby warm.

"We keep the baby in a safe place within the room in a mosquito net and heat charcoal in a clay pot (kosko) to keep the baby warm." (33-year-old illiterate Kanuri mother)

Both groups recognized that premature babies need to be kept especially warm through warm clothes and reduced bathing.

'*We always dress them with a heavy cloth and keep them in a very warm room or under a very thick mosquito net." (58-year-old illiterate Kanuri grandmother)*

'If a baby is born small .... he/she will not be bathed like normal babies." (FGD; 60-year-old illiterate Bura grandmother)

Application of substance for cord care

Care of the cord was considered important and different between the Bura and the Kanuri groups.

Three different substances are used on the cord by Bura mothers: shea butter, ground piece of a clay pot, and chimney powder. Application is usually done by mothers except in one case, where the grandmother was mentioned. Shea butter was most commonly used by ten of the Bura narrative to prevent stomachache. This was typically applied after bathing the baby and after the hot cloth massage. The hot cloth is used to press the cord gently, and then shea butter is applied with a chicken feather or matchstick. The application was believed to help heal the wound and remove dirt:

"*Why I apply shea butter and chimney powder on the cord is to heal the wound and close the hole in the cord fast." (35-year-old educated Bura mother)*

"I applied shea butter mixed with chimney powder and ground piece of a clay pot to remove the dirt from the cord." (31-year-old illiterate Bura mother)

Among the Kanuri, the application of toothpaste on the cord was done by 90% of the narrative mothers. This was done after bathing the baby in the morning and evening. A few mothers applied Vaseline to the cord.

"I applied Maclean (toothpaste) on the cord because it heals, and it does not let the place get dry." (26-year-old illiterate Kanuri mother)

"My friend told me to use Maclean, but my mother said no, I should use Vaseline because she used Vaseline on all of her seven children, and it was good." (27- year-old illiterate Kanuri mother)

Application of substance to the fontanelle

Two types of emollients were applied to the fontanelle by Bura mothers. Mahogany oil was used most often and was dripped on the fontanelle directly from the container. It was not rubbed but allowed to flow over the fontanelle freely.

"*I apply Mahogany oil on my baby's fontanelle (Burbur) so that he can feel comfortable." (35-year-old narrative educated Bura mother)*

"I apply mahogany oil on my baby's fontanelle because it makes the baby breath comfortably without difficulty." (31-year-old illiterate Bura mother)

"Mahogany oil is applied on the fontanelle of the baby because it is medicinally good. It prevents evil spirits and cold from entering the baby." (39-year-old educated Bura mother)

Application is two times daily after the baby has been bathed morning and evening. However, oil can be applied on the fontanelle anytime it is noticed that the fontanelle is dry.

The Kanuri paid less attention to the fontanelle, with only a few mothers reporting applying baby oil on their baby's fontanelle and only if mothers noticed that the fontanelle was 'blinking,' which was thought to be a sign that the baby was either thirsty or sick. This shows that the Kanuri pay lesser attention to the fontanelle than the Bura.

Application of substance to the anus

Six of the ten Bura narrative mothers applied substances to the anus, four applied mahogany oil, and two (2) mothers applied neem oil. Typically, mothers use their fingers or cotton wool to insert the oil into the anus.

"I used to insert mahogany oil into my baby's anus twice a day to prevent dryness, itching, and evil spirits from attacking my baby. It also cures stomach pain and makes my baby defecate easily." (35-year-old educated Bura mother)

"I put neem oil in the anus of my baby two times a day to prevent itching and make my baby defecate without difficulty." (32-year-old illiterate Bura mother)

The reasons for the use of these oils were to prevent itching, make the baby defecate easily, and prevent evil spirits from attacking the baby. In fact, it is generally believed by Bura mothers that there are two points where evil spirits attack babies, the fontanelle and the anus. The anus is also given less attention by the Kanuri, although a few applied Vaseline to prevent itching.

"*I generally apply Vaseline to avoid irritation of urine." (23-year-old illiterate Kanuri mother)*

"I apply Vaseline to the anus and the genital to avoid itching." (27-year-old illiterate Kanuri)

Application of substance to circumcision

In rural communities, circumcision is usually conducted by a local surgeon (*Wanngam or Ndir Thla Kachiya*) on the 8th day of delivery. The Bura and the Kanuri mothers who have male children were reported to use engine oil only on circumcision wounds. The application usually starts the second day after circumcision with a feather, allowing the oil to drop on the wound without rubbing. For the first five days, engine oil is applied every hour, then reduced to three times and once a day until the wound heals.

"I put engine oil so that the wound will heal fast, prevent flies from touching the wound, prevent dryness and cracking…. Engine oil is the best for me as I have never used any other oil before on circumcision." (43-year-old educated Bura mother)

"*I applied engine oil on the circumcision wound to hasten the healing and to keep flies off the wound." (35-year-old educated Bura mother)*

Some mothers had tried other oils and found that engine oil heals faster.

"The reason why I applied engine oil as instructed by the wannzami (traditional surgeon) is that I had once used groundnut oil, but it took a longer time to heal." (21-year-old illiterate Kanuri mother)

As well as quickening the healing process, reducing cracking and pain, and keeping flies away, application was also thought to stop the bandage sticking to the wound:

"*With the help of engine oil, the bandage will not stick and hold the wound." (26-year-old illiterate Kanuri mother)*

Discussion

Early bathing increases the risk of hypothermia, which is associated with the risk of neonatal morbidity and mortality. WHO recommends delayed bathing of the newborn until after 24 hours or at least 6 hours after birth.[11] The finding that all the mothers from both ethnic groups bathed their babies within 30 to 45 minutes after birth is consistent with that from southwestern Nigeria among mothers in home and facility deliveries.[13,16] However, bathing was delayed for several hours among the Bura if the mother had prolonged labor until both mother and baby were well enough. Hill *et al*.[17] and Saaka and Iddrisu[18] reported 93% of early bathing of newborns in rural Ghana within 6 hours after delivery. Bee *et al*.[19] conducted a systematic review of newborn care practices in Sub-Saharan Africa and reported varying proportions of early newborn bathing in Ethiopia, Mali, Senegal, Malawi, Ghana, and Uganda, with levels as high as 75% in Ethiopia and two West African countries and as low as 25% in Malawi. In Asia, early bathing of newborns was reported in India,[6] Bangladesh,[9] and Nepal.[20,21] Alem *et al*.[22] found that level of education, place of birth, and ethnicity were associated with delayed bathing among rural women in the northern part of Ghana. Reasons given for not observing delayed newborn bathing as recommended by the WHO and UNICEF were related to a belief that the vernix and the birth fluids cause lifetime body odor if left uncleaned. Among the Bura, bathing is done immediately, because it is generally believed that if the birth fluids and the vernix stay long on the baby, it will penetrate into the baby's skin and cause body odor later in life. We found similarities among the Kanuri, who share the same belief that if the vernix stays long on the baby, it will cause body odor later in life. Thus, the birth fluids and the vernix must be washed off immediately to save the baby from *future 'shame and disgrace'*. A similar situation was reported among Senegalese mothers as they believed that the birth fluid has a lifetime smell.[21] The same reasons related to body odor caused by birth fluids and blood were reported by other cultures for initiating early bath.[6,9,13,16-21,23] Hindus consider the vernix unholy.[6] Other reasons for an early bath include for the baby to look clean and presentable for well-wishers, for the baby to feel good, and to prevent the skin from cracking. Our finding reveals that the Kanuri culture attaches more importance to the removal of the vernix as its presence was strongly associated with the mothers' promiscuity during pregnancy. Therefore, to save the mother from that stigma, the vernix had to be removed immediately after birth by sprinkling oil on the baby's body to soften the vernix, after which it is gently rubbed off with a clean cloth before bathing the baby. The Bura mothers perceived the vernix as an accumulation of dirt in the birth canal that could be cleansed in women who were endowed with the special ability to do so in the womb, and since most are not, the vernix remains a problem to be dealt with immediately after birth. This practice stems out of a lack of understanding of the importance and function of the vernix as the protective layer/film that protects the skin of the fetus from infection.

The massage was carried out gently in both groups, but it seems to be done more gently among the Kanuri than among the Bura. Stretching and massaging are synonymous in the two groups as no distinction was made between the two. Massage is reportedly given to the mother and the newborn in Nepal;[24] and only to the newborn in India using mustard oil to relax the muscles and smoothen the joints of the baby.[25] Yilmaz and Conk[26] found a statistically significant increase in weight and height of massaged children than those not massaged, after two weeks and 14 weeks of massage.

In newborn care practices, skincare is one of the areas mothers pay attention to because it is linked with warmth. Choice of emollients for skincare varies among cultural groups as mothers prefer substances that can protect the skin. The Bura/Babur use shea butter which is thick in texture because they believe that thick substances stay longer on the body and do not allow air to penetrate the baby's body. However, the Kanuri prefer transparent oils as they believe that it is the best in terms of skincare. Studies among different cultural groups, particularly in Africa, have documented the use of shea butter and oils.[13,16-19,23] In Ekiti, Nigeria, social pressure was associated with the choice of substance used as mothers used shop-bought emollients (Branded), whereas brand was not important in Tanzania.[14] A cross-sectional survey of emollient-use among hospitalized newborns in Nigeria[27] revealed that 71% of admitted newborns had skin oiling within 24 hours. Some of the widely used substances include shea butter, palm oil, cashew oil, sesame oil, groundnut oil, coconut oil, kernel oil, and cow butter.

Home delivery and the use of unsterilized instruments for cutting the cord can expose newborns to infections. Neonatal tetanus, which is usually caused using contaminated instruments or the application of substances to the umbilical cord stump, is highly influenced by cultural newborn care practices.[28,29] Because of the vulnerable nature of newborns to infection, the WHO and UNICEF recommended that both mother and baby be checked at least twice within the first eight days of life to facilitate early detection of infection for effective treatment. It is also recommended that no substance should be applied to the cord except 7.1% chlorhexidine.[11,30]

Overall, it is interesting to note that the Bura mothers used local or traditional substances for the cord, as also reported by Sharma and Pandya,[7] while only a few Kanuri mothers used more branded substances. Bee *et al*.[19] reported highly variable cord care practices where over 90% of the babies had something applied to their cord in Ghana and Mali, but lower levels were found in Ethiopia, Mozambique, and Tanzania. In northern Ghana,[18] only one out of the 404 mothers did not apply any substance to the cord, while 87.9% applied methylated spirit in southwestern Nigeria.[16] Substances applied included oil/shea butter, methylated spirit, and a combination of methylated spirit,[18] and cow urine.[31] We found evidence of the use of a clean instrument in the cutting of the cord as all mothers listed new razor blades among items bought preparatory to delivery. This is corroborated by Hug *et al*.[1] that Nigeria was among the four countries that practiced clean cord care; nine out of ten home deliveries were accompanied by cord-cutting with a clean instrument. Other studies from the same area as ours confirmed the use of clean instruments in cord care practices.[32,33]

Thermal care is one of the most important aspects of newborn care practices that ensures the healthy growth of a baby. However, both physical and social environments are determinants for such healthy growth. Inadequate thermal care places newborns at a high risk of slow growth rate in newborns.[34] Hug *et al*.[1] combined immediate drying or wrapping and delayed bathing to create an indicator of thermal care in their study. Thermal care starts immediately as the baby is received and wrapped by the birth attendant among both the Bura and the Kanuri. In addition, babies are kept warm by heating the room with a charcoal oven, especially by the Bura mothers who also use thick emollient to prevent the baby from catching a cold. Mothers from both ethnic groups understand the importance of good thermal care in order to maintain the warmth in the womb from which the baby was delivered. The use of warm water and massaging are also considered thermal care by the mothers. More interestingly, thermal care is particularly considered very important for small/preterm babies in the two cultures. As indicated in the manuscript, mothers from both ethnic groups do not practice delayed bathing because of their negative beliefs concerning the vernix and birth fluids but tried to compensate by immediately wrapping the baby with cloth in addition to dressing the baby in warm clothing which was part of the items bought preparatory to the birth of the baby. Delayed bathing was reported among Tanzanian mothers (75%) and Ethiopian mothers (60%), which is in line with good thermal care but seems to be a new practice.[15] Although Hug *et al*.[1] reported no significant difference in neonatal mortality between infants who had delayed bathing and those who did not, a higher mortality rate was recorded for those infants who were bathed within six hours of birth than those whose bathing was delayed. The lack of significance was attributed to the lack of power in the data. Culturally driven thermal care practices that fall short of WHO recommendations have also been reported in many other African and Asian communities.[1,8,35]

The results of our study revealed that both the Bura and the Kanuri mothers apply different substances to other parts of the baby's body, which have cultural implications. The other parts of the baby's body where substances are applied include the fontanelle, anus, and circumcision wound in male children. Bura mothers predominantly use mahogany oil (5/10) and neem seed oil (4/10) for the fontanelle, and Vaseline (1/10) on a regular basis, usually after the morning and evening baths and also when the fontanelle is dry. Only three of the ten (3/10) Kanuri mothers applied Olive oil (2/10) and baby oil (1/10) to the fontanelle of their babies. The application routine is the same as that of the Bura and so were the reasons for the application, which were to help the baby breathe well, to prevent the head from cracking, and to prevent an evil spirit attack. Mothers also associated fast blinking fontanelle with illness and signs of dehydration. Even though fewer Kanuri mothers applied a substance to the fontanelle, they paid more attention to the blinking of the fontanelle than their Bura counterparts did. Six Bura and only one Kanuri mothers applied engine oil to male circumcision wounds until they healed. This does not, however, indicate that the application of a substance to circumcision wound is more common among the Bura than the Kanuri because in the Kanuri culture, circumcision is usually done when the male child attains the age when he could feel the pain of circumcision before it is done. This is usually after seven years. The reason for the application from both sides was to facilitate quick healing of the circumcision wound as well as to keep flies away. Female circumcision was not included in the study.

Mahogany and neem oils were applied to the baby's anus by four and two Bura mothers, respectively, while four Kanuri mothers used Vaseline. The reason for the use is the same for both ethnic groups, to prevent irritation, while to ease defecation was added by the Bura mothers.

Conclusion

Our study shows that there are similarities and variations in newborn care practices among the Bura and the Kanuri ethnic groups of Borno State, Nigeria. Bathing of a newborn immediately within 30–45 minutes after

delivery is associated with strong cultural beliefs and practices among the two ethnic groups, which can only be changed by culturally sensitive community-based health education on standard newborn practices. Both ethnic groups practice good thermal care. Despite early bathing, the use of emollients, apart from its benefit for skincare, also doubles for thermal care. Cord care practice is suboptimal even though cutting of the cord was done under hygienic conditions. The application of substances to other parts of the body was observed slightly more among the Bura than the Kanuri and cannot be said to be harmful. Providing good incentives and encouraging mothers to access antenatal care and deliver in a healthcare facility where appropriate health education would be given to them should be given top priority by the local health authorities and development partners. This is particularly and urgently needed in rural communities in order to bring about the needed change in newborn care practices. Our study has added to the body of knowledge on cultural practices of newborn care in northeast Nigeria and the gaps to be filled in order to achieve the WHO goal of reducing neonatal mortality in less developed nations of sub-Saharan Africa and Asia.

Authors contribution

The study was conceived by ZH. BAO, RBI, and MAM were responsible for planning and execution of the study. ZH, BAO, and RBI ensured quality assurance. BAO, RBI, and ZWW drafted the manuscript which was critically reviewed by all authors.

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Conflicts of interest

There are no conflicts of interest.

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