

Newborn care practices in Pemba Island (Tanzania) and their implications for newborn health and survival

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Abstract

Newborn mortality accounts for about one-third of deaths in children under five. Neglecting this problem may undermine the fourth Millennium Development Goal of reducing child mortality by two-thirds by 2015. This study was conducted in Tanzania, where an estimated 32/1000 infants die within the first 28 days. Our objective was to describe newborn care practices and their potential impact on newborn health. We interviewed two purposive samples of mothers from Pemba Island, a predominantly Muslim community of Arab-African ethnicity, and one of Tanzania's poorest. The first sample of mothers ($n = 12$) provided descriptive data; the second ($n = 26$) reported actual practice.

We identified cultural beliefs and practices that promote early initiation of breastfeeding and bonding, including 'post-partum seclusion'. We also identified practices which are potentially harmful for newborn health, such as bathing newborns immediately after delivery, a practice motivated by concerns about 'ritual pollution', which may lead to newborn hypothermia and premature breast milk supplementation (e.g. with water and other fluids) which may expose newborns to pathogens. Some traditional practices to treat illness, such as exposing sick newborns to medicinal smoke from burning herbs, are also of concern. It is unclear whether the practice of massaging newborns with coconut oil is harmful or beneficial.

Interventions to reduce neonatal mortality need to identify and address the cultural rationales that underlie negative practices, as well as reinforce and protect the beliefs that support positive practices. The results suggest the need to improve use of health services through improving health worker communication skills and social management of patients, as well as by lowering healthcare costs.

Keywords: saving newborn lives, breastfeeding, Islam, medical anthropology, Swahili, Tanzania.

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Introduction

Every year, four million newborns die within the first 28 days of life (Lawn *et al.* 2005). Newborn mortality accounts for 38% of deaths in children under five (Martines *et al.* 2005). Inadequate attention to neonatal mortality may undermine global child survival efforts, including the fourth Millennium Development Goal of reducing child mortality by two-thirds (Winch *et al.* 2005).

This study, which was conducted on Pemba Island, Tanzania, examines family behaviours related to newborn care from the perspective of their potential to support or undermine newborn health.

Using ethnographic research techniques, our objectives were: (1) to identify and describe newborn care practices and the beliefs associated with them; (2) to assess the extent to which the culturally normative activities women described in pre-delivery interviews were actually carried out after their infants were born; and (3) to discuss the potential impact of the practices on newborn health.

Background

According to Lawn *et al.* (2005), the most common causes of newborn deaths, and their relative magnitude, are as follows: infections (e.g. sepsis, meningitis, diarrhoea and pneumonia) 39%; prematurity 28%; asphyxia 23%; tetanus 7%; and congenital abnormalities 7%. Huffman *et al.* (2001) noted that, with the exception of prematurity, asphyxia and congenital abnormalities, most neonatal deaths are caused by infectious diseases. Breastfeeding plays an essential role in preventing infectious disease in infants, and the examination of early breastfeeding practices needs to be part of a comprehensive evaluation of the factors that may be contributing to mortality in any given environment. A recent study from Ghana (Edmond *et al.* 2007) confirms the importance of specific breastfeeding practices in reducing neonatal mortality: when breastfeeding was initiated within a day of delivery there was a 2.6 reduction in the risk of death from infectious diseases (such as sepsis and meningitis) and, when breastfeeding was exclusive, a 5.7 decrease in the risk of mortality.

In addition to breastfeeding, other low cost interventions that prevent newborn mortality include tetanus toxoid vaccination during pregnancy, newborn thermal regulation, ensuring hygiene during delivery and avoiding umbilical cord infections (Martines *et al.* 2005).

Lawn *et al.* (2005) estimate that in developing countries one half of newborn deaths occur at home. Thus, as part of a larger strategy to reduce newborn deaths, it is important to understand what is happening within the home at the time of birth and the first weeks of infants' lives. Ethnography, which seeks to describe both practices and the cultural rationales (the beliefs) that underlie them, provides tools for developing this understanding. In this paper, we use the term 'beliefs' to refer to cultural knowledge about how to care for infants, including ideas about how to prevent and manage illness. This neutral usage, which makes no assumptions about the correctness or erroneous nature of people's ideas from the perspective of biomedicine, contrasts with a common assumption that beliefs 'constitute obstacles to appropriate behaviour' (Cf. Pelto & Pelto 1997 for a fuller discussion).

Materials and methods

Research setting

In Tanzania, an estimated 32/1000 infants die within the first 28 days (National Bureau of Statistics and ORC Macro 2005). This study was conducted on Pemba Island, one of the two major Zanzibar islands located off mainland Tanzania. Historically, the Zanzibar islands have received migrants from mainland Africa and the Indian Ocean rim, which has shaped their culture. Following the establishment of clove plantations by Omani settlers, Unguja (the larger of the two islands), became an Omani colony in the 19th century. Reflecting long historical ties with the Muslim world, more than 99% of Pembans are Muslim. Kiswahili, the main language spoken on the Zanzibar islands, is predominantly of African origin with many words borrowed from Arabic. Subsistence agriculture (mostly cloves, coconuts, groundnuts and cassava) and fishing constitute the economic activities (Goldman 1996).

Table 1. Repertoire of common care-giving practices for Pemban newborns identified from informal discussions with key informants

Description	Description of care-giving practice
Practices around the time of delivery	(1) give birth at home; (2) give birth in hospital; (3) vaccinate baby; (4) boil razor used to cut cord; (5) tie cord with string or thread; (6) bury placenta; (7) wrap baby; (8) call baby to prayer (<i>adhana</i>)
Practices in the early post-partum period	(1) wash baby with water; (2) wash baby with soap; (3) apply oil on baby's skin; (4) apply olive oil on baby's skin; (5) apply oil on baby's fontanel; (6) massage baby after warming hands; (7) massage baby with coconut oil; (8) carry baby to 'pass the doorway' 7 days after birth
Practices for preventing and managing illness	(1) apply soot on baby's feet, palms and face; (2) apply kohl on baby's forehead or eyes; (3) do not wash baby; (4) massage baby with oil that does not have a strong smell; (5) wash baby with soap that does not have a strong smell; (6) wash baby with Swahili medicine; (7) mix oil with Swahili medicine and apply on baby's skin; (8) shave part of the baby's hair and apply medicine to the shaven area; (9) make the baby inhale medicinal smoke from burning dried Swahili medicine
Liquids and foods to give to newborns	(1) breast milk; (2) water (plain or mixed with glucose); (3) cow's milk; (4) dill water*; (5) powdered milk†; (6) <i>shubil</i> ‡; (7) dates and honey; (8) biscuits; (9) <i>tonga</i> , <i>vichukio</i> and <i>kachiri</i> §; (10) thin porridge made of corn flour.

*This water is commercially made; it is bought in small bottles and is packaged as industrially made medicinal syrups, directions on the package indicate that relieve colics. In Pemba it is used when the newborn is perceived to be having stomach problems, when he cries, or to relieve gas.

†Including infant formula. ‡A bitter herbal mixture made from aloe. §Oral traditional medicines for newborns.

Study design

We used an ethnographic approach to collect and analyse study data. This approach allowed us to obtain in-depth information from respondents and to describe their feelings, insights and experiences as closely as possible. We carried out the study in three phases – the results of the last two are reported in this paper. The first phase consisted of key informant interviews to obtain a general picture of beliefs and practices and to generate lists (specific practices, medications, liquids and foods) to use in interviewing mother-respondents. In Phase 2, mothers of newborns living in a peri-urban community were interviewed, using an open-ended interview protocol based on the information from the lists. In Phase 3, we extended the study to a rural community to ascertain whether the views of peri-urban mothers were similar and to find out the extent to which the mothers engaged in practices that they described prior to the birth of their infant.

Both communities were selected because they were easily accessible from the main towns in their respective district. In the peri-urban sample, we identified mothers who had recently delivered and were still in

'ujusi'. The term refers to the post-partum period when the mother is 'secluded' away from the rest of the society. Post-partum seclusion generally lasts for 40 days or for as long as the mother experiences post-partum bleeding. In Pemba, as in other Muslim societies (Winch *et al.* 2005), post-partum seclusion is the emic (insider) definition of the newborn period. When the period of seclusion is over, infants are no longer considered to be 'newborn'.

Mothers in urban areas were interviewed once. In the rural area, a series of three interviews was scheduled of which two were conducted during pregnancy. The criterion for eligibility was the intention to stay in the area during post-partum seclusion. Respondents were interviewed from December 2004 to February 2005. For the rural sample we report the results of the third interview, which pertains to actual post-partum caregiving practices.

Data collection procedures

The list of practices, generated through the key informant interviews (phase I) are shown in Table 1. For the interviews with the mother-respondents we prepared index cards containing brief descriptions of the

practices in Kiswahili. We used the cards as follows: we started by shuffling the index cards, and showing them, one by one, to a respondent. For non-literate respondents we read the content of the card to her and checked that she understood what was intended. One advantage of using the cards was that, if a mother was unable to respond or seemed hesitant, we could easily skip that item and later come back to it. This made the interviewing process flexible and allowed us to adjust to the mother's pace. For each item, we asked the respondent: 'in your own opinion, why do people around here do the following [concept written on the card]?' For example, 'in your own opinion, why do people around here [massage the baby with coconut oil]?'

The nutrition items were represented as pictures drawn on index cards by a local artist, and pre-tested for relevance with key informants. Short, written descriptions were included above each picture. In the interviews, we asked: 'in your own opinion, why do people around here give the following [concept written on the card]?' For example, 'in your own opinion, why do people around here give babies porridge made of corn flour?'

To assess the extent to which a specific practice was carried out, for each of the behaviours described, we asked mothers in the rural sample 'since your baby was born, have you done the following [item written on the index card]?' For example: 'since your baby was born, have you done the following [called the baby to prayer]?'

All interviews were conducted in Kiswahili. With the peri-urban sample, the first author (a fluent Kiswahili speaker) was assisted by one native Swahili speaker and, with the rural sample, by three native Swahili interviewers.

Ethical approval

Approval was obtained from the research ethics committees of the Pemba Public Health Laboratory (which offered technical assistance throughout the study), from the Zanzibar Ministry of Health, and from Cornell University. Informed consent was sought from all respondents prior to participation.

Data analysis

All interviews were tape-recorded and transcribed in Kiswahili. Each Kiswahili transcript was reviewed in consultation with the interviewers and additional items and discrepancies noted. To ensure accurate translation of the transcript into English, the first author consulted two dictionaries (Akida *et al.* 1981) and discussed locally specific terms with the interviewers and with other knowledgeable informants.

We used text retrieval software to code the transcripts (QSR 2002). We began with broad descriptive coding (e.g. 'traditional medicine'), followed by more refined coding as the text analysis progressed (e.g. 'traditional herbal medicine relieves stomach pains'). For each theme, the context of the statement and respondent's characteristics were noted in order to build a fuller description. In the results' section, we present findings in terms of 'themes'.

Results

There were 12 respondents in the peri-urban sample and 26 in the rural sample (Table 2). The mean age was 31 (23–40) in the peri-urban sample and 29 (18–40) in the rural sample. All the women were Muslim, and of Swahili ethnicity. The peri-urban sample was interviewed 26 ± 7.8 after delivery. The third, post-partum interview with women in the rural sample was 5.5 ± 3.7 days. Families tended to be large; on average, rural women had five children and peri-urban women had four. The peri-urban sample had a higher socio-economic status; e.g. 83% had been to secondary school vs. none in the rural sample.

The results of the interviews with mothers can be summarized under four main themes: (1) assistance with childbirth; (2) preventing and managing illness in the newborn; (3) post-partum seclusion; and (4) breastfeeding initiation and infant consumption of other liquids and solids. These are described below, together with relevant background and context information.

Theme 1: assistance with childbirth

Mothers perceived childbirth as a dangerous event. As one 40-year-old peri-urban mother observed:

Table 2. Demographic characteristics of the two samples

Characteristics		Peri-urban mothers (<i>n</i> = 12)	Rural mothers (<i>n</i> = 26)
Mean age of mothers in years (range)		30 (23–41)	30 (18–40)
Mean number of children (range)		4 (1–8)	5 (0–9)
% women who had 1 or more children die		NA	31% (8)
Delivery with the help of skilled attendants at the hospital		NA	47% (14)
Mean newborn age at time of interview in days		26 ± 8	6 ± 4
Level of education	% no schooling	8% (1)	50% (13)
	% primary school	8% (1)	50% (13)
	% secondary school	84% (10)	0% (0)
Type of marriage	% monogamous	83% (10)	57% (17)
	% polygamous	17% (2)	35% (9)
Location of post-partum seclusion	Her natal home	92% (11)	23% (6)
	Her own home	8% (1)	77% (20)

If the mother is pregnant, our hearts are worried, we do not know how she is going to give birth, will she die?

Most mothers felt that it was safer to deliver at the hospital rather than at home; their stated motivations for hospital delivery included the belief that home delivery practices were unsafe and that complications often occurred. The same 40-year-old peri-urban mother quoted above described the disadvantages of home delivery as follows:

When a baby is born at home, sometimes people use things like razors that have not been boiled, or if there is a problem which the traditional birth attendant does not understand, the mother can lose a lot of blood [at home] there is no way to help her, at the hospital, if you lose a lot of blood, the doctors can help you by giving you blood. But at home [. . .] is your mother going to give you blood?

Despite its perceived advantage with respect to safety, respondents were often reluctant to deliver at the hospital. Less than half of the 26 women in the rural sample delivered at the hospital. Mothers felt that the cost of the supplies they were required to purchase was prohibitive. For example, if a mother was to have a c-section, she needed to purchase gauze, disinfectant, gloves and other basic items, for an equivalent cost of 25 US dollars. Mothers would also need to line up blood donors, in the event they lost a lot of blood during the operation and needed transfusion. Nurses would ask mothers to bring at least 80 US dollars. Typically nurses did not explain to women

that the extra money was required to cover unforeseen expenses. Consequently, the mothers interpreted the request for additional money as extortion from the nurses.

Problems with transportation to the hospital, lack of running water and electricity, crowded wards and negative psychological encounters with hospital personnel added to mothers' reluctance to utilize health services. With respect to negative experiences, one 27-year-old peri-urban respondent noted:

[Mothers] are afraid, they think that doctors at the hospital are harsh; they snarl and show their teeth, the way dogs show their teeth to their enemies.

Theme 2: protecting the newborn from harm and managing illness

Mothers perceived newborns as being vulnerable because of various forms of danger, which included bad human intent, evil spirits and disease. Concerns about vulnerability were central in the mothers' discussions. As a peri-urban respondent noted:

We the Swahili, we say that when a baby is young, his blood is still young, it has not settled, it needs to be saved from danger.

Families therefore engaged in various actions to prevent the vulnerable newborn from harm or to manage illness. The actions fall into several distinct categories: (a) preventive actions, whose rationale is

couched in biomedical terms; (b) actions meant to prevent diseases of 'traditional Swahili origin'; and (c) 'curative actions' for 'traditional' problems.

(a) *Actions couched in biomedical terms*

In Pemba, it is common to buy razor blades from the local shops, boil them for sterilization, and use the sterilized blades to cut the umbilical cord during delivery. Eight of the 12 peri-urban respondents noted that boiling prevents tetanus. With regard to actual practice, 10 of the 12 rural mothers who delivered at home reported the use of a razor to cut the umbilical cord; the other two reported the use of scissors. The mothers did not know whether this equipment was sterilized. Two of the mothers reported that charcoal was applied to the newborn's stump.

All 12 peri-urban respondents noted that vaccination protects the newborn from diseases such as measles, tetanus and polio. For the developing nations, the World Health Organization's Expanded Programme on Immunization recommends BCG to prevent tuberculosis and the first Oral Polio Vaccine during the neonatal period (Cutts 1998). However, by the time we visited the mothers (26 ± 7.8 days postpartum for the peri-urban sample and 5.5 ± 3.7 days for the rural sample), none of the newborns had received any immunization.

Wrapping babies improves thermal insulation, and prevents them from excessive heat loss. Ten of the 12 peri-urban mothers accurately noted that wrapping is important for warmth. Pemban mothers usually use a new '*khanga*' (a brightly coloured, thin, rectangular East Africa cloth), to wrap the baby. Mothers believe that an old cloth would bring bad luck to the newborn. The use of *khangas* appears widespread, and all mothers in the rural sample used the cloth to wrap their newborns.

Newborn massage, used for both preventive and therapeutic purposes, was contextualized by mothers in biomedical terms. Seven respondents noted that massaging babies with coconut oil helps their limbs and joints 'to develop'. This 'development' was described as 'joints not being stiff'; 'joints become relaxed' and 'joints become stronger'. As one 27-year-old respondent described the motivation:

A baby is massaged so that he develops; the baby's [joints] have not yet developed, each time the baby is massaged, his limbs become stronger.

Coconut oil massage appears common, and all mothers in the rural sample reported having engaged in this behaviour.

All mothers in the rural sample reported bathing the newborn twice a day: once in the morning, and once in the evening. Mothers typically heat the bath water in a cooking pot and cool it down with cold water. They wash the newborn with soap and water and then wipe him. After applying oil onto their palms, mothers warm them over an open fire, and quickly massage the newborn all over.

(b) *Preventive actions meant to prevent outcomes that are of 'traditional Swahili origin'*

Mothers explained that some of their care-giving actions could prevent unwanted outcomes that can be characterized as 'traditional' because they were of 'Swahili origin'. Six of the 12 peri-urban women described the symbolic importance of ritually disposing the placenta through burial. This traditional practice is reinforced by religious beliefs, which dictate that, because dogs are unclean animals, it is imperative to bury the placenta in such a way that it is not eaten by these animals. As one mother noted:

It is not good to throw the placenta away carelessly, anything can harm the baby. You see, when it lies there, carelessly, children may play with it if it is near the house, if it is elsewhere, like on the side of the road, a dog can dig it out of the ground and make it dirty. It is not good.

Mothers noted the practice of giving the newborn a taste of dates or honey to indicate that 'life is sweet'. These items are given to the newborn immediately after the call to prayer, before breastfeeding is initiated. In practice, the use of pre-lacteal feeds appears to be rare, as none of the rural mothers reported having given their infants any of these items.

The practice of applying kohl on the newborn's face appears to be pervasive, as 92% of the rural mothers reported having applied kohl on their newborn's face. Ten of the 12 peri-urban respondents justified this behaviour in terms of newborn vulnerability: kohl is

intended to protect them from people's evil intentions. Examples of wickedness include looking at the newborn with envy or singing praises about the newborn, while secretly wishing him bad luck. As one 40-year-old peri-urban respondent explained:

When the baby is born, when he is still young, kohl is applied to disguise his face, you disguise his face so that, if other people come inside your house during seclusion, they do not know what the baby's face looks like.

Shortly after delivery, some families consult a Traditional Birth Attendant (TBA) from whom they purchase traditional medicine, commonly referred to as '*dawa za Waswahili*' or '*dawa za kienyeji*'. Some traditional medicines are mixed with water and used to bathe the newborn; others are mixed with oil and applied on the newborn's skin. One 32-year-old peri-urban respondent explained the beliefs associated with adding traditional medicine to the newborn's bath water as follows:

We believe that when a baby is washed with Swahili medicine, he is less likely to get diseases such as kijicho [the evil eye] and harm from people with evil intentions . . .

Applying oil mixed with traditional medicine to the newborn's skin was also perceived as a form of prevention against 'evil'. As one 27-year-old respondent noted:

We say that the young baby is appealing to evil spirits (mashetani) and to the supernatural (majini) [. . .] when oil mixed with traditional medicine is applied on the baby's skin, those [evil spirits] encounter the bad smell of the oil, then it is not easy for them to harm the baby.

Only 12% of the rural mothers had used these medicines. Those who did not mentioned lack of money to compensate the traditional healer.

(c) '*Curative*' actions

When infants have 'stomach problems' a common prescription is to give them 'dill water'. This water is commercially made, bought in small bottles and packaged as industrially made medicinal syrups, and directions on the package indicate that it is destined to

relieve colic. In Pemba, it is used when the newborn is perceived to be having stomach problems, when he cries, or to relieve gas. An alternative prescription is to give the infant '*shubili*', a bitter herbal mixture made from aloe.

Childhood diseases that do not respond to 'hospital medicine' are commonly known as '*homa za babu*' (grandfather's fevers). These diseases are generally ascribed to non-biomedical causes and require traditional treatments. Prescriptions for their management are commonly referred to as '*dawa za babu*' (grandfather's medicines).

If a newborn has fever, the recommended action is to burn Swahili medicine (dry leaves obtained from healing herbs) and to direct a light medicinal smoke towards the sick newborn. Mothers had varying explanations about this practice, including 'keeping evil spirits away', 'treating fevers in the newborn' or 'just a tradition'.

Another prescription for fever is to apply soot – or to a lesser extent garlic – on the baby's face, palms and under his feet. In exploratory interviews, key informants described this practice as one that 'scares evil spirits away'. Mothers were less knowledgeable than key informants; seven of the 12 peri-urban mothers did not know why it was carried out.

A third prescription for illnesses of 'Swahili origin' is to shave one part of the baby's hair and to apply medication on this part of the head. As soon as the hair grows on this part, one should shave the part that was not previously cut and apply medication. This practice is known as '*kupasua umbu*'.

In contrast to key informants, such as traditional healers, whom we found to be very knowledgeable about '*dawa za babu*', mothers did not know why these practices were carried out. Six of the 12 peri-urban respondents could not supply a motivation for the practice; four noted that 'when you try different medicines and these don't work, you shave part of the baby's hair and apply medicine on it', the rest simply reported that it was 'just one of our traditions'.

With respect to the use of traditional medicine, by the time of the interview, three of the rural mothers had made their infants inhale medicinal smoke. None had applied soot or garlic on the newborn's palms or

soles, or shaved parts of the newborn's hair to apply traditional medication.

Theme 3: post-partum seclusion

In Pemba, a new mother is considered unclean, a source of ritual pollution. For as long as she experiences post-partum bleeding, she must be secluded from the rest of the community; she cannot sleep in the same bed with her husband; and she must abstain from sex, and she cannot prepare meals for her husband. As one peri-urban respondent described ritual uncleanness:

We, the Waswahili, the Muslims, we believe that, when one has those things that come out after giving birth, one does not walk around, unless you need to take the baby to the hospital or you are told that you need to go to the hospital yourself. You are not even allowed to pray, until those things stop coming out of you, then you purify yourself and then you can begin praying.

Typically, seclusion lasts for about 40 days. Ideally, the mother should be secluded in her parents' home. Returning to one's natal home for the seclusion period is primarily practised for the first birth, and thereafter, women remain their own home for this period, and their mothers come to help them.

The mother has a special diet during seclusion. This includes: foods believed to hasten the end of post-partum bleeding (e.g. tea with ginger, fenugreek and oranges); foods believed to increase milk supply (e.g. octopus, squid, wrasse fish, roasted cassava and chicken); and foods that provide strength (e.g. rice and *ugali* – a thick gruel made of corn meal). The mother should avoid eel, *mandazi* (East African doughnuts), meat, beans and bananas as these are believed to increase post-partum pains.

To mark the end of seclusion, the mother takes a cleansing bath in water mixed with herbal medicine. After this ritual, she is now allowed to go outside of the home. She resumes her duties, including returning to the fields to work, fetching water and cooking. Now, she spends less time with the newborn. Family, friends or neighbours become the primary caretakers. She sleeps in the same bed as her husband, and resumes routine religious activities.

Theme 4: breastfeeding initiation and infant consumption of other foods and liquids

Soon after delivery and before breastfeeding is initiated, someone recites '*adhana*' (the Muhammadan call to prayer) in the newborn's right ear. Ten of the 12 peri-urban mothers described *adhana* as a religious requirement. The other two believed that the call to prayer was 'just a tradition'. With respect to actual practice, 92% of the rural mothers had had their newborns 'called to prayer'. Fathers recited the call to prayer most often (50%), followed by grandmothers (21%), grandfathers (13%) and, to a lesser extent, the mother herself (8%).

In the rural sample of 26 women, 14 mothers (54%) reported initiating breastfeeding immediately after delivery, 11 (42%) initiated breastfeeding within the first day post-partum, only one mother (4%) began breastfeeding the next day after delivery.

Both rural and peri-urban mothers believed that breast milk is the ideal food for the newborn. As one 26-year-old peri-urban mother noted:

[A baby is breastfed] so that he gets strength, and this is his food, he is breastfed so that he becomes healthy, he gets full [the respondent laughs].

Despite the early initiation, and the perception that breast milk was vital for infant health, the mothers watched for signs that the infant was not satisfied and needed additional substances, and only nine of the rural infants were exclusively breastfed by the end of their first week of life. Signs indicating that the newborn was not satisfied included crying, 'seeming disturbed' or 'licking his fingers'. Rationales for giving newborns fluids and solids are provided in Table 3.

Respondents prescribed biscuits (softened with tea, water or milk to make it easier for the newborn to eat), thin gruels, powder milk and cow's milk for the newborn who was not satisfied with his mother's milk. There was some ambivalence among some of the mothers about giving newborns substances other than breast milk. As one 32-year-old peri-urban mother said, with respect to water:

The newborn is given water to drink because he is thirsty. But you shouldn't give the baby water when he is still very

Table 3. Rationale for giving newborns fluids and solids other than breast milk

Item	Mothers' statements about why to give (or not give) an item	Peri-urban mothers*	Rural mothers
Dill water	'Because of stomach problems'		3
	'It helps'/ 'It builds the body'		3
	'So that babies get good health/it is healthy'		3
	'This helps in digesting food'		1
	'Because it is medication'		2
	'A baby is not an adult, so he should not be given just anything'		1
	'To make small problems go away'		1
	'It soothes the baby'		1
	'We do not give those things to our babies'		1
	'I don't know/my friend, I have never heard of this'		11
Water (plain or with glucose)	'This is a good thing, because the baby sees that it is something to eat/it is a drink'	1	2
	'Because he is thirsty'/ 'breast milk has a lot of sugar so the baby feels thirsty and he needs water'	8	3
	'So that he becomes healthy'	1	6
	'To build the body/water is important for the body'	1	2
	'It reduces the chance of getting minor illnesses'		1
	'When the baby is crying, once you give this to him, he feels better/when the baby is crying, and you do not have any tea or milk'		2
	'I don't know/perhaps you can help me out/what do you think?/I don't know that my friend, tell us why this is done'		9
Powdered milk	'This makes the baby healthy'	4	4
	'When the mother's milk is not enough'	4	None
	'It is good/it helps the baby's body develop/it builds the body'	2	3
	'This is given when the mother works'	1	0
	'This is given so that the baby can get used to the bottle/so that you can breastfeed the baby less'	2	0
	'This is given when there is no cow's milk'	1	0
	'This is food for the baby'	None	5
Cow's milk	I don't know	None	5
	'It gives the baby strength'/ 'it builds the body'/ 'it is healthy'	3	9
	'It is given when the mother's milk is not enough'	3	None
	'It helps a lot/it is good for the baby'	2	2
	'It is given when the baby is hungry or thirsty'/ 'when the baby is crying'/ 'when the baby wants it'/ 'babies find it tasty'	2	2
	'It is food for the baby'	None	1
	'People like cow's milk a lot'	None	1
Shubili	I don't know	None	3
	'Maybe it's because swellings or sores but I am not sure'	Question not asked	1
	'When he has stomach aches/because it is medication, it makes diseases go away/because of problems with their bodies/aches and pains/it cures illness in the body/because they are sick'		20
Dates	I don't know		4
	'They build the body'/ 'they are healthy'/ 'they help'/ 'they provide blood'	Question not asked	8
Honey	'So that the baby can know the sweet taste (of dates)'		1
	'It builds the baby's body'/ 'it is healthy'	Question not asked	4
	'So that babies begin to talk early'		1
	'It is used as medication'		1
	'So that the baby can know the sweet taste (of honey)'/ 'Islamic law advises us to give babies honey immediately after they are born, if we have any'		2
	'I am afraid of giving this to my babies'		1

Table 3. *Continued*

Item	Mothers' statements about why to give (or not give) an item	Peri-urban mothers*	Rural mothers
Biscuits	'These are given to the baby when he is hungry'	8	2
	'These should not be given to a newborn'	3	None
	'When the mother has no milk'	2	None
	'This is food for the baby'	2	None
	'So that babies can get strength in their bodies'/it builds their bodies'/babies become healthy'	None	6
	'So that babies get proteins'/biscuits are nutritious'	None	2
	'When babies cry a lot'	None	1
	I don't know	None	5
Oral traditional medicines	'When the baby is ill'/as a cure for stomach aches and pains'/when it is difficult to go to the hospital for treatment'	Question not asked	12
Thin porridge	'The baby is not yet able to digest heavy foods'	7	1
	'To prevent hunger'/when the baby is not satisfied'	2	1
	'This is food for the baby'	1	1
	'The baby is given thin porridge so that he begins to get used to other foods'	1	
	'Porridge builds the baby's body/provides strength/makes the baby healthy/it helps'	None	8
	'Some babies like to drink porridge'	None	1
	I don't know	None	5

*A mother can give more than one response; therefore, responses do not add up to 12 for the peri-urban mothers or 26 for the rural mothers.

young, you should only give the baby water when he needs it. When the baby breastfeeds, he is satisfied, he has already got enough water, so there is no need to give him water.

A 40-year-old peri-urban mother expressed uncertainty about giving newborns powdered milk as follows:

Powdered milk is given according to the parents' wishes [...] it is not a must [...] some people do not like powder milk, but others find that their own milk is not enough for the baby.

A 27-year-old rural mother explained her doubt about cow's milk as follows:

Babies are given cow's milk so that they get food, but the doctors tell us not to give the baby cow's milk because it has got a lot of fat in it.

Respondents believed that a new pregnancy could contaminate breast milk and harm the lactating newborn. For this reason, breastfeeding should cease as soon as a mother finds out she is pregnant again. During breastfeeding, sexual abstinence is prescribed as a means of preserving breast milk from being

contaminated by semen, thus protecting the infant's health.

Discussion

Most research on global neonatal mortality has focused on South Asia (see e.g. Darmstadt & Saha 2002; Fikree *et al.* 2005; Winch *et al.* 2005). Sadly, sub-Saharan Africa, where the rates of neonatal mortality are highest, has often been neglected. If the current trends continue, the Millennium Development Goal of reducing child mortality by two-thirds by the year 2015 is likely to fail in this region of the world (Lawn & Kerber 2006).

Respondents in our study knew that we respected their knowledge and valued their opinions. We hope that this encouraged them to share their perspectives openly, and to express their views without censoring what they told us. The results revealed areas in which there is strong concordance between common community beliefs and practices and biomedical recommendations. It also revealed areas in which there is discordance.

According to the World Health Organization, the following actions are critical for reducing newborn mortality: (a) ensuring professional assistance with childbirth; (b) promoting cleanliness during delivery; (c) protecting the newborn from hypothermia; (d) preventing and managing illnesses; and (e) initiating early and exclusive breastfeeding (WHO 1996; Osrin *et al.* 2002). Based on our research, we highlight two additional practices that may have implications for newborn care: (f) post-partum seclusion; and (g) newborn massage.

In the following section, we examine the positive and negative features of newborn and maternal care giving in Pemba in relation to biomedical recommendations and understandings.

(a) Professional assistance with childbirth

Only 46% of the rural women delivered at a healthcare facility. Various factors may have discouraged hospital deliveries, including problems with travel; fear of being humiliated by health care personnel; and, in such a poor population, the excessive user fees required to purchase basic medical supplies. Similar problems have been reported in other resource-poor settings (see e.g. Shakya & McMurray 2001). In the long term, encouraging women to deliver with the help of skilled attendants should be a high priority in efforts to reduce child mortality (Martines *et al.* 2005). Increasing healthcare utilization among the poor would require improving health workers' client skills and eliminating unnecessary user fees. Given the difficulty of training and retaining facility-based healthcare workers in rural environments, an alternative approach is to train community-based health workers to provide home-based care during and after delivery (Martines *et al.* 2005). Bang *et al.* (1999) have demonstrated the feasibility, effectiveness and affordability of home-based neonatal care in India. This approach may also be applicable in other resource poor environments, such as in sub-Saharan Africa.

(b) Cleanliness and hygiene considerations during delivery

According to the World Health Organization, the risk of umbilical cord infections (such as tetanus)

increases when unclean materials are used to cut the cord, and substances applied to the stump (WHO 1996). Our mothers were generally aware of the importance of using sterilized equipment during delivery. They knew that unsterilized equipment was a major risk factor for child illness. Because we relied on verbal accounts, we do not know the extent to which hygiene is observed in practice. The use of charcoal on the umbilical cord, described as a cultural practice in the interviews but not reported as actual practice by the mothers, is clearly contravened by biomedical knowledge.

(c) Preventing hypothermia

To prevent neonatal hypothermia, newborns should be wiped with a dry cloth immediately after delivery to lessen evaporation, and the newborn should be covered with warm clothing (WHO 1996). In general, mothers should avoid bathing the neonate before the umbilical cord falls off. Physical skin-to-skin contact between the mother and infant also promotes infant thermoregulation. In Pemba, the practice of bathing newborns immediately after birth, rather than simply wiping them off with a warm towel, increases the risk of hypothermia. Washing was only delayed when infants were born at the hospital, in part because hospital personnel discouraged immediate bathing, and in part because hospitals lacked water. Fikree *et al.* (2005) have observed that religious beliefs may be associated with bathing the baby immediately after delivery. They note that the 'vernix may be perceived as culturally dirty and bathing as ritually cleansing'. According to these authors, countering beliefs about ritual impurity could be a challenge for discouraging the practice.

On the other hand, it is encouraging to note that Pemban mothers were concerned about keeping newborns warm and protecting them from the cold. Typically, newborns were wrapped with a clean (preferably new) traditional cloth immediately after delivery. This appears compatible with recommended practice. None of our informants mentioned skin-to-skin contact, and we do not think this is practised as both baby and mother are clothed, although they share a bed.

(d) Preventing and managing illness in the newborn

According to Peltó & Peltó (1997), in most parts of the developing world, there is now widespread acceptance of many aspects of biomedicine, which is used in conjunction with traditional healing practices. In this research, we found that, regardless of cultural beliefs, Pembans are willing to use elements of Western medical practice without giving up traditional explanations of illness. As illustrated with 'homa za babu' (illnesses that do not respond to western medicine), it is not uncommon for Pembans to utilize both traditional and biomedical remedies, sometimes sequentially, sometimes simultaneously.

Many of our research participants had adopted biomedical understandings of vaccination. However, at the time of the interview none of the families had immunized their newborns. This was true of infants born at home and of those born in the hospital. During the newborn period, the World Health Organization's Expanded Immunization Programme suggests vaccination with BCG and with the first dose of the Oral Polio Vaccine (Cutts 1998). If the mother is positive for Hepatitis B, vaccination should be offered to the infant within the first 12 h of birth.

With respect to managing illness, some families resorted to traditional treatments, such as exposing ill newborns to smoke or giving orally introduced medications. Even if they are harmless, the oral medications contravene exclusive breastfeeding (see below), and exposing newborns to smoke could put infants at risk of respiratory distress.

(e) Breastfeeding initiation and exclusive breastfeeding

We found that some of the local beliefs and practices fit well with recommended breastfeeding practices. Others do not conform as well. On the positive side, women do not reject colostrum as a substance to feed babies, and are therefore oriented to early initiation of breastfeeding. Our mothers did not report the use of prelacteal feeds, suggesting that this practice is uncommon. With the exception of one mother, all rural mothers in this study reported having initiated

breastfeeding within a day of delivery. These are encouraging findings with respect to early breastfeeding initiation. For the most part, mothers do not perceive breastfeeding as an activity that should be carried out on a rigid schedule and are therefore oriented to feeding on demand. Thus, the public health recommendations to initiate breastfeeding within 2 h of birth and to breastfeed 'on demand' fit well with local cultural understandings of infant feeding.

The practice of reciting '*adhana*' (the Muhammadan call to prayer) in the newborn's ear soon after delivery and before breastfeeding is initiated has been observed in other traditional Muslim societies (see e.g. Fikree *et al.* 2005). The practice of '*adhana*' may not delay the initiation of breastfeeding by much time, and we therefore do not think it is of particular concern.

Mothers in our study stressed that breast milk is 'a natural food' for the newborn. They viewed breastfeeding as 'normal' behaviour, and as a way to promote good health and nutrition for the newborn. The finding that breastfeeding is highly valued, and apparently universally practiced, is clearly in accordance with current global health recommendations.

The absence of breastfeeding exclusivity, however, is a serious problem. Newborns were given water and other fluids soon after they are born. The belief that 'babies are thirsty', and need additional fluids appears to be embedded in the culture. Similar findings were reported in another study of infant nutrition in Pemba (Tschida 2004). Almroth & Bidinger (1990) note that infant need for fluids in addition to breast milk has not been scientifically substantiated. According to these authors, breast milk contains water that should be adequate to meet infant requirements. Second, because breast milk is low in solutes, an exclusively breastfed infant does not need water to help in evacuating excess substances, even where temperatures are high. Third, although colostrum contains less water than mature breast milk, newborns do not require any supplement because they are born with extra water. By filling up the infant's stomach with a substance of little or no nutritional value, water may 'reduce' the infant's appetite for breast milk and lead to malnutrition.

As with other supplements, unclean water may also contain pathogens which, in turn, lead to infant illness.

While we are not aware of studies which have assessed water quality in Pemba Island, a study in nearby Zanzibar indicates high levels of fecal contamination, particularly due to inadequate disposal of human excreta (Mohammed 2002). Fecal-oral contamination has been associated with an increased risk of waterborne diseases, especially diarrhea, a major cause of death in infants (Esrey *et al.* 1988).

Thin porridge, powdered milk, fresh cow's milk and biscuits were also given to newborns. Motivations for very early supplementation included beliefs that the mother's milk is insufficient; that the 'baby is hungry', or that the foods promoted the newborn's health. Similar findings were reported for Pemba in another study (Tschida 2004). Beliefs that breastfed newborns require solid supplementation are clearly contravened by best practice recommendations; as there is evidence that breast milk alone provides adequate nutrition for the infant up to 6 months of age (Kramer & Kakuma 2004).

(f) Post-partum seclusion

Post-partum seclusion has been reported in other parts of the world, e.g. among the Zulu of South Africa (Ngubane 1977) or among the Merchang in rural Malaysia (Laderman 1987). Various authors have argued that seclusion is a negative practice for newborns as well as mothers. For example, Fikree *et al.* (2005) note that seclusion discourages mothers from visiting health care facilities during the newborn period. Other authors, including Saucier (1972) and Ngubane (1977), conceptualize the practice as a form of discrimination against women, which has its roots in popular beliefs about the danger of women's reproductive blood.

We do not know the extent to which seclusion in Pemba delays health care seeking or whether providers are brought to the home when newborns are ill. However, we also observe positive features of post-partum seclusion. First, during this period of isolation, the mother is not supposed to work or do anything that is physically exhausting. This allows her to rest, regain much needed strength, and establish a special bond with her newborn baby. Second, with respect to newborn nutrition, seclusion provides an ideal situa-

tion for bonding and for initiating and sustaining breastfeeding: isolated from the larger society, the mother and newborn remain close proximity, the mother has uninterrupted time with the newborn, and is not distracted by other household tasks. Third, when the newborn is secluded, he has limited contact with the outside world, and may be less exposed to communicable diseases. Thus, for both the mother and the child, post-partum seclusion could have beneficial consequences even if the cultural rationale is essentially discriminatory in that it stems from a negative conceptualization of women's reproductive functions.

(g) Massaging the newborn with coconut oil

As summarized by Mullany *et al.* (2005) the application of certain oils to the newborn's skin may be beneficial – possibly because of greater fat intake through the newborn's immature and permeable skin, physical stimulation while applying the oil and/or improved thermoregulation. However, because of the fragility of the newborn's skin, products such as mustard oil or olive oil may disrupt the epidermis, enhance the entry of pathogens through the skin, and thus increase the risk of infection. These risks may be heightened for low birthweight and premature infants. We found that it is common to massage the newborn with coconut oil in Pemba. Further research is needed to elucidate the effects of coconut oil on newborn skin.

Implications for programmes

This study illustrates the richness and diversity of newborn care-giving practices among the Swahili of Pemba Island. The cultural information elicited provides evidence that some aspects of belief and practice on the island are in line with current biomedical recommendations and probably play an important role in promoting newborn well-being and survival. Others are less positive from the perspective of biomedical understanding of best practice behaviours. The sub-optimal practices include: (a) home deliveries without adequate skilled assistance; (b) bathing the newborn soon after delivery; (c) resorting to traditional treatments such as 'exposing the newborn to smoke' for curing illnesses attributed to magic or charms; and (d)

supplementing breast milk with water and other substances, even during the first weeks post-partum. Ethnographic data from the community provide guidance concerning specific features to consider in designing interventions to address these practices.

In the long term, encouraging women to deliver with the help of skilled attendants should be a high priority in programs designed to reduce newborn mortality. Key investments should include training health-care workers to improve their communication with mothers or training community-based health workers, and reducing the financial costs borne by mothers.

The use of charcoal on the umbilical cord does not appear to be widespread in Pemba at present. Nonetheless, it is important in health education activities to continue to emphasize its danger as the practice is still part of cultural lore.

As suggested above, the practice of wrapping the newborn is likely to be beneficial, and it should continue to be encouraged in interventions designed to improve newborn care. On the other hand, the practice of bathing the newborn needs to be discouraged. If, as Fikree *et al.* suggest, this practice reflects larger cultural concerns about ritual pollution, finding acceptable modifications will require imagination and sensitivity.

The value that Pemba culture places on breast milk and breastfeeding provides a good foundation on which to build an intervention to improve early infant feeding practices. A major aspect of the challenge will be to change people's perceptions concerning newborn hunger and thirst. From the interviews with mothers there are signs that some ideas that support exclusive breastfeeding have already entered the community. The ambivalence expressed by a few of the mothers is an indication that new understandings are beginning to emerge. However, at present these appear to be embryonic, and this is an area that should be a central focus of intervention efforts.

Reliance on traditional oral medicines as a strategy to deal with newborn illness may undermine breastfeeding exclusivity. Without further clinical research it is impossible to know whether the infants who receive these treatments are actually ill. More importantly, without modifications in the healthcare delivery system to give families of newborns access to cultur-

ally acceptable care during this vulnerable period, it will be difficult to establish alternative means of managing worrisome signs and behaviours during a period in which families are especially concerned about their newborn's vulnerability.

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Key messages

- Neglecting newborn mortality may undermine global child survival efforts.
- The high rates of home deaths suggest the importance of examining family behaviours in order to design effective programmes to reduce neonatal mortality.
- Families engage in various activities to protect the newborn from harm and to manage ill health. While some of these practices may be beneficial, others may increase the risk of newborn illness and death.
- In Pemba Island, Tanzania, unintentional harmful behaviours may include: bathing newborns immediately after delivery, traditional treatments, and premature breast milk supplementation. Excessive user fees and negative psychological encounters discourage public healthcare utilization for childbirth.
- Efforts to reduce newborn mortality should include promoting behaviour change, improving health workers' communication skills and lowering the cost of healthcare borne by mothers.

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