Medical and Systemic Barriers to Implementing Kangaroo Mother Care at Nyakahanga Hospital, Karagwe Tanzania

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Citation

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Abstract

Tanzania is one of many nations attempting to decrease the neonatal mortality rate (NMR). Kangaroo Mother Care (KMC) is one method recommended by the World Health Organization to reduce NMR, particularly in low birth weight infants (LBWI). [1] This paper examines implementation of KMC and potential barriers to successfully using this method at Nyakahanga Designated District Hospital (NDDH) in rural Tanzania as part of a broader study of maternal and neonatal mortality at this facility. Retrospective medical record analyses of single births (N=14,858) from 2009-2013 at Nyakahanga DDH shows a perinatal mortality rate (PMR) of 56, while the national average is only 21.[2] The number of LBWI is also elevated (11%) compared to only 8.4% nationally. The high PMR and proportion of LBWI demonstrate the importance of implementing KMC with high-risk infants as one strategy to promote survival and growth of LBWI. The barriers are assessed through personal observations and an analysis of four cases in which KMC was utilized during June 2014. This investigation found that although the hospital and staff want to implement KMC, barriers include lack of education, lack of staff to train mothers, misinformation about and lack of resources to provide adequate infant nutrition, and lack of supplies. The KMC initiative at Nyakahanga DDH is indicative of the hospital's continued interest in reducing NMR but also highlights the increasing need for resource provision, clinical training, and educated staff in order to successfully implement the technique.

INTRODUCTION

In 2000, The United Nations Millennium Declaration was adopted paving the way for the beginning of a concerted effort to improve well-being across the globe.[3] Healthy beginnings were an important part of this initiative, so many nations turned their efforts to improving maternal and neonatal health. Countries in Sub-Saharan Africa were actively engaged in this ongoing effort since the maternal health indicators and neonatal survival has been lower here compared to countries in Europe and the North America. One of these sub-Saharan countries, Tanzania had one of the ten highest neonatal mortality rates (NMR) in the world in 1990. By 2010, this country had made significant progress in reducing neonatal mortality through a number of initiatives. [4, 5, 6].

The death rate of newborns continues to be magnified by the deaths of low birth weight infants (LBWI)(defined as those weighing less than 2500 grams). At least half the neonatal deaths each year in Tanzania are low birth weight infants (LBWI)[5]. Three main causes of neonatal death, accounting for 88 percent of neonatal deaths in the developing world are infection, intra-partum-related conditions, and preterm birth[6] . Within Tanzania, inadequate antenatal care, home delivery without skilled birth attendants, and failure to seek timely care in emergency cases are related causes of neonatal death. Generally, all of the top three causes of neonatal death are preventable and treatable if healthcare is sought in an appropriate amount of time. In addition, deaths may be preventable when due to complications of LBWI[6]. The current rate of LBWI births in Tanzania is 8.4% [7].

One low cost and easily implemented method to improving health outcomes in LBWI is Kangaroo Mother Care (KMC), a program that involves skin-to-skin contact between mother and infant and exclusive breastfeeding while hospitalized, continuing the regimen at home once discharged.[8] KMC can be utilized to further decrease the NMR in LBWI. Other easily-implemented treatments such as warmth, feeding hygiene, and early treatment of infection could significantly reduce these NMR numbers.[8][9] Of these solutions, KMC addresses neonatal temperature fluctuations, prevalence and frequency of breastfeeding, and hygiene when implemented

in a healthcare facility with trained staff.[8][10][11] In addition, one study found that compared to traditional care, mothers who performed KMC produced breast milk for longer.[12] Several studies have shown that implementing KMC in a resource-poor environment is not only possible, but extremely beneficial to neonatal outcomes with the added benefits of enhancing maternal-neonate bonding and lengthening lactation.[13][14][15][12] KMC has been shown to decrease NMR in large LBWI, those weighing between 1,800 grams and 2,499 grams [9][8][16][11]. One study found that although KMC was beneficial for all neonatal outcomes, its effect was even more pronounced with utilized with LBWI.[15]

The current project takes place at a rural hospital, Nyakahanga Designated District Hospital (NDDH) in northwestern Tanzania. Research by one of the co-authors indicates that the perinatal mortality rate (PMR) averages 56 at this hospital compared to a national average of 21 for neonatal mortality rate[7][17]. This is of special concern since perinatal mortality only encompasses the first few days of life, whereas neonatal mortality includes the first twenty-eight days of life. The difference between perinatal death at NDDH and the Tanzanian NMR has resulted in a number of hospital initiatives seeking to address neonatal mortality. It is especially important to address the preventable causes of neonatal death. In many cases, perinatal mortality and NMR at NDDH may be indicative of delayed presentation to healthcare facilities for delivery after attempting home delivery. In addition, eleven percent[l1] of deliveries at NDDH are considered LBWI. Therefore, it is important to have a system in place that can address the unique health needs of LBWI[2]. Yet, there are few support services available to monitor and respond to fetal or neonatal distress. After delivery, neonates are kept in the delivery area under a warming light until claimed by the mother. Skilled attendants who are present are trained in maternal care, not in neonatal care, and are focused on the mothers in labor in the adjacent Obstetrics area. A normal day includes 10-12 births, straining the already understaffed Obstetrics Ward.[2] Implementing KMC at NDDH could enhance LBWI survival and lower neonatal mortality helping to meet new targets set by the Millennium Sustainable Development Goals [18] and the Tanzanian national government.

RESEARCH SITE AND BACKGROUND

This project was completed over a four week period in June 2014 at NDDH in northwestern Tanzania. This health service provider serves a broad area of northwestern Tanzania (Karagwe and Kyerwa districts, 650,000 persons). The area is dependent on subsistence agriculture, intersected by unpaved roads, and much of it remains without electricity. NDDH receives clients from throughout the area as direct admissions or referrals from other clinics, dispensaries, or two smaller hospitals. One of the authors (LAW) had ongoing projects with this hospital (NDDH) examining maternal and neonatal health indicators over the past 12 years. In 2014, Hospital administration and the District Medical Officer requested an assessment of NDDH's ability to implement a successful KMC program. The area served has approximately 40,000 births each year with over half occurring outside a clinic or hospital setting. Nyakahanga Designated District Hospital currently performs just under 4000 deliveries each year.[2] Many of these deliveries are referrals for high-risk complicated deliveries.

Prior to this visit, NDDH had acquired three incubators through their relationships with various NGO partners. During this study, two of those incubators were operational. The incubators were of German construction, used and appeared quite old. They were housed in a former closet within the Pediatrics Ward, sequestered from children on the ward. The premature infant room, as it came to be known, also housed a functional sink, a single wire-frame bed with a mattress, and a cabinet for storing linens, although the hospital could only spare a single blanket for the room. Mothers and families of the infants were expected to provide everything else—linens for swaddling and warmth, oil for the infants' skin, containers to store expressed breast milk (EBM), and the mother or a family member to be present and care for the infant, in addition to any needs that the adult caregiver may have. Although this seemed a burden for many families, it is the standard of care for many understaffed hospitals in Tanzania and NDDH and driven by lack of funding for supplies and care-givers.

The entire Pediatrics Ward was staffed by two nurses during the day and one at night. In addition, Clinical Officers and Medical Officers contributed to the care of patients but were only available intermittently and during rounds. Of this staff, none could be spared to exclusively attend to the premature infant room due to understaffing and the cyclic malaria outbreak overburdening the Pediatrics Ward. The nurses on staff were aware of KMC since it had been mentioned in their training. However, none know how to perform KMC, nor were they aware of the benefits of KMC,

especially when compared to incubator-only care or traditional methods. Other skilled staff members (Nurse's Aids, technicians) were less informed about KMC. Some believed that touch would be detrimental to infant health and the constant incubation was the only[l1] resort. Essentially, the knowledge base was nonexistent. Skilled staff needed education not only about how to perform KMC, but also about common misconceptions of LBWI care and the benefits of KMC, especially the benefits to this most vulnerable infant population.

The hospital's premature infant room was the subject of this case study. All information gathered was supplemented by discussions with clinical staff. Information was gathered without identifiers and based on medical records and implementation observations. Neither patients nor families were interviewed. Five premature, LBWI occupied the room during the examination period of June 2014. The following pertains to the experience of introducing and implementing KMC during this time period.

NYAKAHANGA DESIGNATED DISTRICT HOSPITAL AND KMC

Observations

During the observation period, four infants were born prematurely and subsequently brought to the premature infant room for incubation. An additional neonate had been born on the night before the team arrived. At no time were there more than two premature infants utilizing the incubators, therefore incubator allocation did not become an issue. The mothers of the LBWI shared the single mattress provided and often shared blankets. After the initial KMC education took place, four of the five mothers used KMC for at least 3 hours each day. However, the mother of infant 2 did not use KMC, even upon encouragement from researchers and hospital staff. The mother of infant 1 utilized KMC more than any other, providing skin-to-skin contact for at least 7 hours each day. It should be noted that although this investigation does not contain a large enough sample to draw conclusions, infant 2 had the worst outcomes and infant 1 lived the longest and was the only infant to gain weight during the observation period. In addition to the KMC, mothers rubbed infants with oil every other day in order to maintain infant hydration and skin moisture. Mothers also expressed breast milk into cups and used clean, needleless syringes for feeding.

Beginning after the first week of observation, premature infants were checked every morning, logging heartrate, respiratory rate, weight, and comments on general appearance. The mothers logged feedings, noting time given, amount consumed (milliliters), and type of nutrition (EBM, cow's milk, or in one case, dextrose solution). Figure 1 shows metrics for three of the five infants. There are not metrics available for two of the five infants as one was born before the observation period began and expired on day two of observation and the other only survived one night in the premature infant room. Of the data collected, trends suggest that KMC improves lactation time for the mother and survival time for the infant. However, none of the mothers were able to express sufficient breast milk to meet infant needs, and all stopped lactating before the conclusion of the observation period. After EBM was no longer available, cow's milk was substituted by family members. Figure 2 illustrates the outcomes for three of the five infants following ingestion of cow's milk. There seems to be a relationship between ingestion of cow's milk and death for the infants. However, no concrete conclusions can be drawn given the small sample size and the short observation period. In addition, there were many unknowns, such as gestational age of the infants and parity of the mothers, both of which would be useful in drawing conclusions about the infant outcomes in question.

Implementation barriers

One of the first barriers to implementing KMC at Nyakahanga Designated District Hospital was the language barrier. None of the researchers spoke Kiswahili fluently or the local language Kinyambo and none of the mothers of the infants spoke English. This barrier necessitated using skilled staff members as translators for the first introduction of KMC procedure and recommendations. Following the inception of KMC, gesticulation, basic Kiswahili sentences, the first mother's knowledge and experiences, and occasional staff translation were some of the methods used to communicate KMC procedure and recommendations to mothers of premature infants and LBWI.

A second barrier was the lack of adequate substitute neonatal nutrition in the absence of EBM[l1] . While this is in part an educational issue regarding expressing sufficient breast milk, the lack of affordable formula contributed to the problem. In the absence of EBM (once the mother stopped lactating), the traditional and affordable substitute used locally was cow's milk. For a premature infant or LBWI, cow's milk can be and was catastrophic. Of the five infants observed, four

received cow's milk—all expired within two days of receiving it. Baby one had shown steady and slow weight gain until cow's milk was introduced. The fifth infant received cow's milk on the last day of observation and lived to the conclusion of our presence on the ward. However, it is unlikely that the infant survived given what is known in the literature and the outcomes of the four other infants.[5][11]

Finally, cultural beliefs posed an obstacle to KMC implementation. Although likely due to lack of education about neonatal and LBWI care, mothers were hesitant to remove their infants from the incubators. It was unclear due to the language barrier as to why they were reluctant. In addition, the mothers were hesitant to touch their infants, especially the mothers whose infants were extremely small. Perhaps with proper education administered in Kiswahili for both the skilled hospital staff and the mothers, both of these hesitancies would resolve. The latter reluctance to touch the infants has been observed in NICUs across the developing world as well—in these cases, mothers perceive their infants as fragile or breakable and do not want to do them harm.[8] Perhaps mothers at NDDH also perceive their premature infants as too fragile. If this is the case, education is again an answer.

A second cultural barrier is the hesitancy of community members to trust foreigners, especially non-African foreigners to implement any program. Although the goal of implementing KMC is to improve outcomes for LBWI, tradition promotes suspicion in the face of foreigners. In order to implement KMC in this context, an ongoing program would need to be implemented in such a way that native Tanzanians headed the effort and educated the skilled staff.

RECOMMENDATIONS

The skilled healthcare workers at Nyakahanga Designated District Hospital are capable of implementing KMC and have requested it. However, in order to successfully implement KMC, several things are needed: hospital-wide education, increased recording of patient data, better training regarding manual expression of breast milk, and increased access to appropriate nutritional substitutes for EBM. The first is the largest barrier to implementation. Proper KMC education would be provided in Kiswahili to all skilled hospital staff, and there should be at least one staff member responsible for the care of premature infants each shift. The education needed spans which infants should be given priority for incubation and targeted KMC training including what KMC is, how to perform KMC, and the benefits of KMC, especially compared to incubator-only care. In order to introduce KMC in a way that would be acceptable to all staff members, the upper-level staff should be trained first and later used as educational resources to train the other skilled healthcare workers. Nurses should not have the sole responsibility of training new mothers in the KMC method given the nursing shortages at NDDH. It is essential that education also include what constitutes proper nutrition for premature and LBWI.[15] Given the disastrous effect of cow's milk substitution, it is crucial that premature and LBWI caregivers understand that in the absence of EBM, dextrose (short-term) or a breast milk donor (long-term) are necessary. Obtaining a breast pump and education on its proper use could help mothers sustain lactation, but it is imperative that nutrition training take place, as a pump would only be available while at HDDH and avoidance of cow's milk should continue upon discharge. It would positively affect infant outcomes if the hospital or families had access to breast pumps, proper breast milk storage, and formula for use in the absence of EBM.

In addition to education, more data are needed about the premature infants and LBWI in order to properly assess not only their health, but also the success of any efforts to improve their health, such as the current effort to introduce KMC as common practice[9] . Currently, while the infants are logged at birth into records at the Obstetrics Ward, no information on the neonate is carried over to the Pediatrics Ward. A system in which the neonate gets a unique medical chart upon birth would be required. The chart would need to include information such as estimated gestational age, delivery records, weight, sex, any pertinent conditions for the neonate or mother, APAGAR scores, and charts that could be used to track weight, age, feeds, heartrate, respiratory rate, mother's KMC use, including skin-to-skin contact duration and frequency, and any other health information that could be obtained during a stay in the premature infant room. Implementing these changes would require additional personnel resources. Personnel resources would not be the only strain on employees. A properly implemented system of KMC would require systemic assessment in a regimented and frequent manner, not only for proper technique and success of KMC interventions, but also for quality across educators and providers.[20[[1][18] Such a system would require even more personnel within the administration and skilled healthcare staff.

CONCLUSIONS

Given the request to implement KMC, and given the interest in its use among the skilled healthcare workers even in the absence of education about KMC, it is likely that KMC can be implemented successfully. However, even with a supportive administration and staff, a tailored education program administered in Swahili is needed, and an expansion of staff would likely be required. In addition, the nutritional and hygiene needs of LBWI would need to be addressed, especially the avoidance of cow's milk. Although four of the five infants observed expired in this case during the study period, with proper education and access to EBM substitutes, Nyakahanga Designated District Hospital could successfully implement KMC and save or prolong the lives of many premature and LBWI delivered at the hospital. In addition, the education about KMC could be spread to the community through contact with more distant villages during the mobile clinic excursions, spreading the benefits beyond the walls of the hospital and into the Karagwe community.

APPENDIX

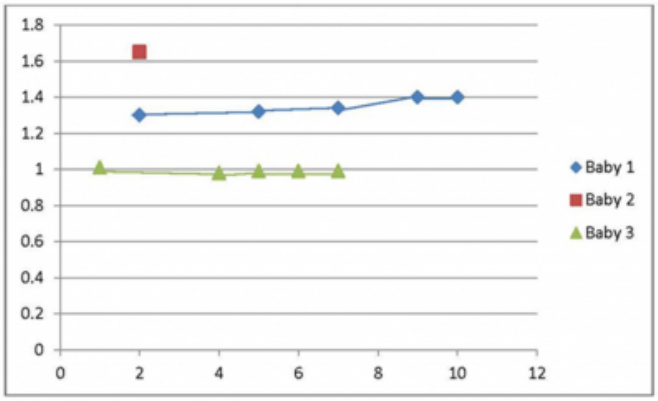
Figure 1

Shows the birth weight in kilograms, days of survival, and if mother used KMC the majority of infant days of life. Note: Infant 3 was still alive at the conclusion of data gathering.

Infant	Birth weight (kg)	Survival (days)	KMC compliance
1	1.3	15	X
2	1.65	5	
3	1.01	7+	X

Figure 2

Illustrates the clinical course of three infants in the LBWI unit at Nyakahanga Designated District Hospital following the introduction of cow's milk feeds in the absence of EBM. Note: Infant 3 was still alive at the conclusion of data gathering.



ETHICAL CONSIDERATIONS:

This study was reviewed for ethical use of human subjects and approved by Nyakahanga Designated District Hospital Medical Officer in Charge and Hospital Management, Karagwe District Medical Officer, the National Institute for Medical Research (NIMR) of Tanzania, and Commission on Science and Technology of Tanzania (COSTECH) as part of research permit # 2013-242-NA-2013-62 to author LAW, and 2014 permit renewal to SW and LAW. It was also reviewed and approved by the IRB boards of Wilkes University and The Commonwealth Medical College.

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