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KANGAROO MOTHER CARE: A QUALITATIVE STUDY ON THE PRACTICE AND EXPERIENCES OF MOTHERS OF PRETERM NEONATES IN A TERTIARY TEACHING HOSPITAL IN EASTERN UGANDA

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Abstract

Introduction: Globally, neonatal deaths continues to be a challenge especially to to attainment of sustainable development goal 3. About 4 million neonatal deaths per year, with 99% of the deaths occurring in low and middle resource countries, 75% of these occurring in the first week of life. Prematurity remains an indirect leading cause of mortality and morbidity. Uganda's progress on the improvement of perinatal morbidity and mortality has largely stagnated at 27 deaths per 1,000 live births from the year 2006. One of the cost-effective readily available interventions that would curtail perinatal mortality is kangaroo mother care(KMC)- a low tech four decades old intervention. However challenges about its implementation persist on in Uganda despite

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[£]-equal contribution.

Authors' Contributions
MN and RN conceptualized the idea. RN and JN supervised protocol writing and data collection. MN, RN, EKK, LV.N S, and JN carried out the analysis, interpreted the result, participated in drafting the manuscript, revised the manuscript, and approved the final manuscript for submission. All authors read and approved the final manuscript.

Suggested area of research
A follow up study on this topic that would explore the role of health systems building blocks would be key.

Strenght
To the best of our knowledge, this is the first study to examine facilitaors and barriers of KMC in any tertiary centre in eastern Uganda.

Limitations
Due to lack of resting rooms we had to identify them from within the NICU.
We did not interview and assess the extent and influence of the leadership of MRRTH on these facilitators and barriers.

Ethical approval
Ethical approval for this study was obtained from Mbale Regional Referral Hospital research and ethics committee with REC application number (**MRRH-REC OUT 007/2020**).

Consent
We ensured that informed written consent was obtained from all participants before collecting data. Confidentiality, anonymity, and the right of the participants to to withdrawal at any time during the course of the study was respected.

Conflict of interest
The authors declare no conflict of interest.

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intensified implementation and roll-out startegies in 2010. This study, the first of its kind to the best of our knowledge in eastern Uganda sought to find the facilitators and barriers of KMC.

Materials and methods: This was a qualitative study using in-depth interviews(IDI) carried out at a tertiary university teaching hospital. Twenty IDIs were carried out among mothers/caretakers using the phenomena theory. After each IDI, each transcript was analyzed by two researchers working independently using NVIVO software version 11 plus (QSR International, Burlington, Massachusetts) and themes and subthemes developed.

Results: Majority of mothers/caretakers, were adolescents and young adults and primiparous at 55%. The major facilitators to KMC were supportive staff that facilitated positive attitude, ability to substitute provider and family support.

The major barriers were lack of family support, lack of male involvement, maternal stress and poor health and multiple gender roles, infrastructural challenges, and misconceptions associated with preterm births such as early sexual intercourse and lack of herbal medicine use.

Conclusion: More facility leadership involvement and engagement of mothers during antenatal, community and promotion of male involvement in sexual and reproductive health matters will improve uptake of KMC. This can be spearheadded by sexual and reproductive health, and neonatal and child health care service providers.

Keywords

Kangaroo Mother Care; eastern Uganda; preterm neonates; Mbale regional referral and teaching hospital

Background

Globally, neonatal deaths continues to be a burden. Global figures project 4 million neonatal deaths per year, with 99% of the deaths occurring in low and middle resource countries[1]. Moreover,75% of these deaths occur in the first week of life[1–3] and 44% in the first 6hrs after birth[3]. Research shows that there are 30-fold increase in death during the neonatal period compared to the postneonatal periods[1, 4]. Even in the first week, there are sharp contrast with the first 24 hrs contributing 25-45% of the deaths. Moreover, whereas low birthweight contribute about 14% of all births,60-80% of the neonatal mortality rate is registered in the low birthweight with the issues of only 50% of the newborns being weighed and majprity of whom gestation age is unknown, not withstanding[5]. Globally, preterm births as an indirect cause of deaths, is the leading cause of perinatal and neonatal mortality and morbidity[4, 6].

Although Uganda has registered tremendeous progress in averting neonatal mortality ratio(NMR) and thus seen a decline from 33 in 2001 to 27 deaths per 1,000 live births in 2006, no change was appreciated between 2006 and 2016[7]. This curtails efforts to achieve sustainable development goal 3 and specifically target 3.2 that aims to achieve a reduction in neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births by 2030 in all countries[8]. One of the major causes of high NMR in Uganda is preterm births[3], with some of the identified

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risk factors being teenage pregnancy, failure to attend antenatal care adequately, shorter interpregnancy interval among others[3, 7]. The fact that some risk factors such as high teenage pregnancy rate[9, 10] have persisted, it is imperative that efforts to save neonates using the cost effective measures are sought-one that will as much as possible make mothers especially teenage mothers get relieved from at times the torrid experiences as was reported in studies in eastern Uganda[9, 11].

One of the evidence based interventions that has tremendeously impacted on the survival of the preterm and low birth weight neonates is kangaroo mother care(KMC). Kangaroo mother care (KMC) is defined as care of preterm infants carried skin-to-skin (S2S) by the mother. KMC's key care practices include early, continuous and prolonged skin-to-skin contact(S2SC) between the mother and the baby, and exclusive breastfeeding (ideally) or feeding with breastmilk[12]. It is a low-technology, cost-effective, readily avaulable intervention in which mothers serve as human 'incubators'. KMC has been reported to not only more than halve neonatal mortality among babies weighing less than 2000g at birth[13] but also have long-lasting social and behavioral protective effects past the neontatal stage[14, 15].

Furthermore, Kangaroo Mother Care (KMC) as a care model enables low-birthweight infants transition from intra- to extrauterine life and supports the parent's role at the neonatal intensive care unit (NICU)[16]. Kangaroo position is the most appropriate when providing KMC[17] and it encompasses care offered to the baby by the mother while being placed vertically between the mother's breasts below the clothes with skin-to-skin contact[18]. KMC can either be continuous KMC-where parents provide the infant with skin-to-skin contact 24hours a day as an alternative to incubator care[19] - or intermittent KMC in which the practice of the skin- to skin contact occurs for limited periods, such as 30 minutes, one or two hours at a time and is alternated with the use of either a radiant warmer or an incubator care for the baby [12]. According to the World Health Organization (WHO), continuous KMC is cost effectctive and cheaper than intermittent KMC and 'releases' time for health care personel to engage in other activities. WHO further emphasizes need for the mother/carer to carry the baby for all activities and recognizes better feasibility once initiated within facilities, where mothers/carers do not engage in any activity except caring of their baby[12]. One of the positive effects of KMC, regardless of whether it is practiced continuously or intermittently, is that it makes parents feel they contribute to their infant's well-being, and the practice decreases their worries about the infant[20]. Mothers have described KMC as a safe model of care and have shown a preference for KMC to conventional care as it does not separate them from their infants[21].

Although over the past years, neonates' intensive care has upgraded from one level to another concerning psychological, technical, and medical care hence improving the survival chances of the neonates, the concept of separating the mother from her baby especially if the latter is stable is discouraged[12] more so because parents play a role in the care being offered to their neonates alongside the health workers[22]. Several factors facilitate the parents' ability to provide neonatal care, and among these is the environment in the unit and the support that the neonatal unit staff offer to the parents as they care for the infants[23, 24].

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These facilitators of KMC have got to be harnessed if one is going to realize the numerous advantages of KMC thet include among others reduced risk of hypothermia[21, 25], improved head circumference growth, positive effects on infants' cognitive, perceptual, emotional, and physical development as well as shorter duration of hospital stays[24, 26, 27] in addition to better weight gain and empowering effects on the breastfeeding process[27–29]. Advantages not withstanding, barriers to KMC that threaten its positive effects have been revealed and these include; dificulty in adoption by caregivers due to adherence to traditional newborn practices, stigma surrounding having a preterm infant, gender roles regarding child care and lack of support or assistance during and or with skin-to-skin contact[30, 31]. Moreover, fear of hurting the infant while sleeping with it in the same position throughout the whole night has been pointed out as a hindrances to KMC practice[32, 33]. Futhermore, despite KMC being four decades old, several myths hamper its practice and total acceptance. These myths include among others include the myth that it is only a hospital –basded, medical intervention for the premature babies;it is a poor-woman's choice and a simply a poor substitute for more desitrable high tech imnovations such as incubators, with the latter being considered the ideal[34].

Despite the drawbacks and lack of worth attention about KMC as an intervention that could save thousands of children in Uganda, government did embrace it and ensured accelerated investment in it in 2010 as evidenced by its inclusion in the 'Standards for Newborn care 2010'[35] and the 'Health sector strategic and investment plan 2010/11-2014/15'[36]. However a study in 2014 demonstareted that KMC services were not only largely absent in Eastern Uganda, but even where it existed, infrastructure support was inadequate[37]. This study aimed to identify the supporting factors and hindrances to the effective performance of KMC practice among mothers/caretakers in the NICU of Mbale regional referral and teaching hospital.

MATERIALS AND METHODS

Study design

A cross-sectional study design with qualitative methods was used.

Study area

Mbale Regional Referral and teaching hospital(MRRTH) is a tertiary facility and a teaching facility for Busitema university Faculty of Health Sciences(BUFHS) as well as an internship training site for several cadres such as medical, nursing, and pharmacist interns.. It serves as a referaal facilityfor about 5 million people acoss the 16 districts under her jurisdiction. MRRTH provides specialist services such as Obstetrics and Gynaecology, Paediatrics and Child Health, General and Orthopaedic Surgery, Opthalmology, and Otolaryngology. The NICU at MRRTH is housed under the Department of Obstetrics and Gynaecology was established in 2015. It has a bed capacity of around 60, and provides neonatal services to over 2000 neonates in a year. It is managed by a Paediatrician and other auxiliary staff[38]. The creation of this unit gave the real feasibility of performing KMC since this referral and teaching hospital, situated in the east about 224 km from the capital Kamapla lacked high tech incubators to cater for the preterms and the low birth weight babies, Although

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great improvements over the past 6years have been put in place, it is still far from the standard NICU and thus largely admits newborns with minimal risks. KMC implementation is thought to be far from optimal as related to the high number of neonatal deaths(21%) noted at the unit[38]. The neonates admitted in here are from obstetric unit of MRRH and referrals in(home self-referral and those from other facilities). In this facility, it is a common occurrence for preterm to be taken care of by another person other than the mother as the latter recovers from her ailments on the postnatal ward(either within MRRTH or from another referring facility) or as witnessed in a few cases deceased. Therefore, within the neonatal unit, the infants' caregivers are encouraged to participate in their care like providing KMC as much as possible. However restictions exist such as visiting hours especially for other relatives and siblings.

Study population

The study was conducted among the mothers/caregivers with preterm neonates at the neonatal unit who had been initiated into KMC at least 96 hours prior to the study. Qualitative methods using in-depth interviews(IDI) were conducted till saturation was reached.

Data collection and analysis

The qualitative data collection was guided by the phemenological theory. The discipline of phenomenology may be defined as the study of structures of experience, or consciousness. It explains Literally, phenomenology is the study of appearances of things, or things as they appear in our experience, or the ways we experience things, thus the meanings things have in our experience("phenomena") [39]

A total of twenty (20) interviews were conducted-the number being determined by saturation. The participants were randomly selected from within the neonatal unit, their telephone numbers registered and later invited for the interviews from the opposite department meeting room. This room provided ample environmemnt for the interviews, is close to the neonatal center and affords the necessary privacy. At each IDI, the notes and recordings taken were largely in the local languages of Lumasaba, Lugwere, Lunyore, Luganda, and Ateso. After each IDI, each transcript was analyzed by two researchers working independently of each other to reduce bias and later analysed using NVIVO software version 11 plus (QSR International, Burlington, Massachusetts). Coding was done manually based on the key words and phrases developed from the data. The codes were then grouped together into higher order headings. Accordingly, on a higher logical level of abstractions codes, subcategories, categories, themes and subthemes were formed. The themes were categorized according to the experiences in relation experience and perception of KMC. The data was sorted out thematically by clustering material with similar content. At this stage, we used a creative and analytical reasoning to determine categories of the meaning.

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RESULTS

Socio-demographic characteristics of the participants.

We approached 24 mothers and 20 turned up for the in-depth interviews(IDI). We stopped at twenty(20) since we had reached the point of saturation. The majority of the participants were adolescents and young adults at 55%(11/20) and largely Christians,90%(18/20). Moreover in regard to parity, majority 55% were primiparous.45% multiparous and 5 grandmultiparous (parity=9). Significantly slightly above half,55% had studied upto at least secondary school(> 7years of elementary school in Uganda) while only two(10%) participants had had tertiary education. Furthermore, of the 20 interviewed,17 were mothers while 3 were caretakers. The table below summarizes the sociodemographic characteristics of the participants.(Table 1)

Theme 1: Facilitators and barriers to KMC practice

We used the main themes emerging from the data to structure the presentation of material from the interviews.

Subtheme: Facilitators of KMC practice—From the interviews, several themes emerged as facilitators of KMC practice, and these included; adequate time, support, and community.

Subtheme: General knowledge about KMC and its benefits—65% of the caregivers knew KMC as a method to provide warmth to preterm babies through Skin to Skin Contact, usually with the mother.

> "The health worker told me that I had to tie the baby in the chest so that the baby can get the mother's warmth. She told me I place the head upwards and legs down and ensure the baby is breathing, then you add other clothes to add extra warmth then you can tie a bigger sheet around the baby and you keep holding the baby". (MPN_{12}, 22yrs)

One caregiver reported that her previous baby was a preterm neonate and that she was taught and trained how to do KMC so she knew what to do.

> "for me, the first premature I had given birth to was from Jinja Hospital and it was 8 months and 2 weeks of gestational age and we placed the baby in a machine and the baby stayed there but I would remove the baby put the baby under and place the baby in the chest for only spend 30 minutes and remove it" (MPN_6, 32yrs)

> "For me learned about kangaroo from Busiu health center IV, when I gave birth to my baby it was almost dying and then the doctor came and told me to tie the baby in the chest then I can transfer you to Mbale, I was then put in an ambulance and bought here then doctor Kathy also told me to do so". (MPN_{11}, 21yrs)

Subtheme: Ability to have a substitute KMC provider—While most parents reported that the mother is the KMC provider, they also agreed that other family members could also deliver KMC.

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"for me, I came here with my granddaughter that was after my daughter had been operated on because she had high blood pressure. After the baby was removed, I was told to come and take care of the baby so when I arrived the nurse inquired if I had performed kangaroo before so I told her I had never done kangaroo so the health worker taught me and even helped me tie the baby on the chest". (MPN_{15}, 34yrs)

Subtheme: Mothers agreed that KMC promotes breastfeeding and infant bonding.

"Sometimes they can't even breastfeed because their temperature is low but when you place them in the chest you find that they are a bit warm and can even show that they can breastfeed on their own". (MPN_5, 26yrs)

"When you place the baby on the chest it increases the bonding and love between the mother and the baby". (MPN_5, 26yrs)

Caregivers felt that KMC generally improved their babies' well-being in terms of weight gain, increase in temperature as well as skin color.

"As for my baby every time I do kangaroo, he tends to gain more". (MPN_{17}. 27yrs)

"After doing kangaroo the baby's skin color changes". (MPN_{16}, 21yrs)

"When I put the baby on the chest by the time, I remove the baby it feels warm and somehow improves because it even does things it wasn't able to do initially like moving their hands, gains energy and even able to blink". (MPN_5, 26yrs)

Subtheme: Improved monitoring of unstable neonates and well-being.—The majority of parents also felt that KMC leads to improved infant monitoring. Three mothers also described how practicing KMC gave them a sense of responsibility in caring for their babies and improved their baby's well-being.

"kangaroo is very effective because after doing the kangaroo you see a change in the temperature" (MPN_{17}, 27yrs).

Subtheme: Positive attitude—The majority of the mothers reported that they wished their babies to be well so they didn't mind doing KMC.

"I care to put my baby on the chest because it's the main reason why I came here and by all means I want my baby to survive" (MPN_4, 45yrs)

"When I put the baby in the chest, I noticed that it became lively because when I remove it from the chest, I notice he is lively because the baby becomes warm, happy and looks energetic" (MPN_4, 45yrs).

"*I gave birth to my baby at five months of amenorrhoea but I now feel happy because it has somehow grown*" (MPN_9, *17yrs*).

"the good thing I have obtained from a kangaroo is that after I have fed the baby with milk when I place it in the chest the milk moves smoothly and the baby can

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breathe properly and ever since I started doing kangaroo the baby is fine and better" (MPN_6, 32yrs)

Subtheme: Family support—Some mothers attributed their ability to perform kangaroo several times as instructed due to the availability of time as they at least had people that would help them with other chores like washing clothes and cooking food hence able to create time to tie the babies on the chest as required.

> "I have enough time and I can do kangaroo because there is another person who helps me do the kangaroo and also, they help me do other things like washing clothes and cooking food". (MPN_6, 32yrs)

> "I have enough time to take care of the baby because my family helps me with the rest of the things I am meant to do like cooking and washing clothes" (MPN_{16}, 21yrs)

> "I have enough time to place the baby in the chest and they become warm". (MPN_2, 25yrs)

> "As for me I do it according to the weather and if I have enough time, I place the baby in the chest". (MPN_{10}, 24yrs)

Subtheme: Lack of religious, cultural, and tribal sentiments against the practice.—Some mothers felt that the mere fact that their religion, cultures, and tribes didn't prohibit them from practicing kangaroo hence they were able to provide kangaroo to their babies.

> "My religion as a protestant doesn't stop me from practicing kangaroo so then even my culture doesn't prohibit me to come to the hospital" (MPN_3, 45yrs).

> "I have observed from the "Banyakole" who tend to tie their babies on the chest, as for me am a born again but my religion does not prohibit me" (MPN_8, 30yrs).

> "as for me, I have never heard that because I am a born again and I do kangaroo not basing on any beliefs so I believe in kangaroo as a person" (MPN_4, 17yrs).

> "I am catholic and my religion accepts me to do kangaroo" (MPN_{15}, 34yrs).

Subtheme: Male involvement.—The caregivers attributed their success for performing kangaroo to the presence of family support that involved partner and other relative support who helped them with chores and as well

> "my husband greatly supports the practice he even calls me often to find out if I do the kangaroo properly and to see if I follow the health workers' instructions. He strongly believes kangaroo is of great relevancy" (MPN_3, 45yrs).

> "My family has no problem with me doing kangaroo I have enough time to take care of the baby because my family helps me with the rest of the things I am meant to do like cooking and washing clothes" (MPN_{16}, 21yrs). "I am always with my in-laws and my husband and they are supportive". (MPN_{11}, 21yrs)

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Subtheme: Medical /Health workers ' support—Caregivers felt that the ability of the health workers to take off some time and instruct them to place the babies on the chest especially when cold or even show them how to do kangaroo has been a very big supportive factor to their success in performing kangaroo

> "They do teach us at least every day and they even take off some time and show us how to do the kangaroo. Sometimes when the weather is not good, they take time and instruct us all to place the babies on our chests and when it gets hot, we are instructed to remove the babies from the chest because the baby's body can tend to overheat." (MPN_3, 45yrs)

Some caregivers felt that the mere fact the health workers were able to give them the knowledge and as well teach them what to do in terms of kangaroo facilitated their success to perform kangaroo.

> "Even the health workers are of great importance in terms of giving us knowledge and teaching us what to do in terms of the kangaroo". (MPN_{19}, 26yrs)

> "As for I have been taught how to care for the baby how to not bathe the baby but just wipe the baby, how to take thermometer reading, not to take the baby outdoors until it reaches 9 months and even dressing the baby in a head cap even also hand washing before touching the baby". (MPN_{15}, 34yrs)

Subtheme: Peer counseling—Some caregivers felt that they could do kangaroo effectively because they had fellow mothers in the ward who would remind and encourage them to place their babies on the chest if they didn't want their babies to die.

> "the other reason is that I have some other people who remind me to place the baby in the chest, and in case I don't the baby might die". (MPN_2, 25yrs)

Theme 2: Barriers to KMC practice.

Several themes emerged as hindrances to KMC and these included; inconsistent support, maternal health-related barrier, environmental hindrances, lack of KMC education, infant related as well as religion, culture, and tribe

Several challenges were raised from the interviews that were conducted among the caregivers as stated below;

Subtheme: Inadequate health workers support—Most caregivers stated that the failure of the health workers to provide them with information about KMC, teaching them how to do it like how many clothes they needed to tie the baby and they also didn't know how to place the baby on the chest so some felt this contributed to their failure to provide kangaroo appropriately as stated below;

> "The thing is that the training is lacking and most of us don't know how to tie the babies because we don't know and we don't know how many clothes we need and how to place the baby on the chest before tying them because the health workers don't teach us". (MPN_{17}, 27yrs)

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Others felt the health workers weren't providing them with enough information and they felt they didn't know what to do.

> "I don't think enough information has been provided because mothers tend to come and they don't know what to do and how to do the kangaroo". (MPN$_{16}$, 2yrs)

> "They haven't taught us much it feels like there are things we don't know like how to care for the baby while at home after being discharged" (MPN$_{14}$, 21yrs)

Subtheme: The attitude of health workers—The majority of the caregivers felt the attitude of the health workers was a bit scary to the people who were willing to help them do kangaroo so instead of being welcoming to the fathers they were scaring them off and some had even never set eyes on their babies due to the scary nature of the health workers.

> "The health workers scare off the fathers and chase them out and they remain outside pepping through the windows and even others have never seen their children, the health workers are a bit scary to the people we request to help us do kangaroo". (MPN$_3$, 45yrs)

Subtheme: Lack of male involvement—Mothers face several challenges while doing kangaroo especially when they are alone without assistance from their families this seems to affect even their personal life/space as men tend to have reasons like they didn't have breasts so they wouldn't be able to do the kangaroo.

> "Kangaroo is hard if someone is alone because I can be here with my husband but he refuses to do kangaroo because he says he has no breasts so he always tends to call me even in the night when I want to rest.". (MPN$_{17}$, 27yrs)

Other mothers felt that their daily activities were being interfered with since they always had to do the kangaroo and they weren't able to do other things like attending to their work or even washing clothes and as well bathing as stated below;

> "It does interfere because you may want to bathe, wash clothes but you can't afford to leave the baby alone" (says, MPN$_4$, 17yrs)

Subtheme: Environmental hindrances

Infrastructural challenges: Most caregivers reported that they didn't have beds to sleep on and space was limited so they always had to use chairs to sleep on hence they had to squeeze on the few available chairs.

> "here we have limited space so mothers tend to squeeze among themselves because the chairs are placed in between the small beds and since we have no beds, we use the chairs for sleeping on". (MPN$_4$, 17yrs)

> "sometimes because the baby is small you ought to stay seated and sometimes the chairs are few or limited so you end up sitting and even fail to change the position of the legs even breastfeeding becomes difficult". (MPN$_3$, 45yrs)

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Subtheme: Maternal health status

Physical and mental health hindrances: Most of the caregivers raised concerns related to their physical health as hindrances to performing kangaroo and these are included fatigue, general body weakness, swelling of legs due to overstanding, chest pain, back pain, and wast pain and they felt these acted as hindrances to them to be able to do kangaroo as stated below;

> "some of the challenges we face, one of them is fatigue due to over standing because you might sit when you have placed the baby on the chest and you notice its breathing becomes difficult or changes and when you stand it tends to normalize". (MPN_5, 26yrs)

> "I have experienced swelling of legs, back pain, chest pain, and waist pain". (MPN_{20}, 22yrs)

Caregivers felt that they didn't have adequate time to rest as most of the time their attention was drawn to the babies and even the fathers themselves felt the mothers would do the kangaroo better given the fact that the mothers had breast yet for them, they didn't have.

> "The other challenge is that all the attention is directed to the baby because you might try to sleep and the baby's state worsens so you ought to wake up and attend to the baby urgently in terms of breathing". (MPN_2, 25yrs)

Some of the mothers had undergone cesarean sections and this left a wound behind that needed healing and placing the baby on the chest was a bit hard for them since the baby presses against the wound it becomes challenging and does for them to do kangaroo.

> "As for me, my baby was operated so placing the baby on the chest is a bit hard and challenging for me". (MPN_{10},24yrs)

Some mothers reported that they would tend to over sweat while during kangaroo and this is a bit uncomfortable for them.

> "My feet swell but since I have a high pressure, I get palpitation once in a while and I also tend to over sweat". (MPN_8, 30yrs)

Subtheme: Stress—One of the caregivers reported that she experienced stress which in turn created worries towards practicing kangaroo especially when the baby's SPO_2 dropped.

> "I also experience stress, pain but I persevere for the sake of my child.". (MPN_{11}, 21yrs)

Subtheme: Multiple roles—Considering mothers who had other older children at home who as well needed to be catered for, kangaroo always required the mother's full attention to the preterm neonate so most likely the older children would be abandoned home on their own or even left in the care of the oldest or another relative. In the end, all the attention is concentrated on the preterm neonate in the hospital.

> "Like for me who has older children, I don't even get to go home and see my older children because ever since I came here, I don't think I even know how the gates of the hospital look like". (MPN_3, 45yrs)

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Subtheme: Religion, culture, and tribe.—Concerns about prohibition from religion and tribe were expressed as hindrances or challenges to practicing kangaroo as a caregiver stated that some religions don't allow their believers to seek health services from any facilities but instead, they believe in the ancient Biblical teaching where people got healed with the usage of herbs alone so in the long run practices like kangaroo are as well prohibited;

> "Some religion believes that taking children to the hospital is forbidden as they tend to believe in the ancient biblical teaching and they further say people can be healed with only herbs so we don't necessarily need hospitals. So, kangaroo as a practice it's forbidden as well as immunization, they do believe in also giving birth from home, not the hospital. This religion is called "**Kanyiriri**" (MPN_5, 26yrs)

KMC was perceived as a forbidden act within some societies hence this created fear among the mothers while doing kangaroo.

> "But my tribe as a Mugwere the people out there tend to look at kangaroo as a bad practice and it is viewed wrongly from society". (MPN_8, 30yrs)

Subtheme: Infant related hindrances

Misconceptions about preterm deliveries: Within the community, several misconceptions point towards KMC, and these directly affect its performance. In the communities, some believe that if a woman does not use local herbs when pregnant they are more likely to deliver a preterm neonate and some people within the community didn't understand the importance of practice. A mother said that most of the time her neighbors laugh at her so she decided to always keep her previous premature indoors and in case her neighbors inquired about the baby she would deny them a chance to see the baby.

> "They used to laugh at me but I would not mind so I would keep my baby indoors always and even if people came around to visit like my neighbors, I would still not show them, my baby". (MPN_6, 32yrs)

Within society, some people tend to perceive that mothers who have preterm neonates had engaged in sexual intercourse a little earlier when young.

> "People out there say that I gave birth to preterm because I engaged in sexual intercourse when I was still young. (MPN_{13}, 26yrs)

Some think that when you refuse to use herbs or tend to have high pressure when pregnant they end up having preterm.

> "Some say that those who give birth to preterm refused to use local herbs and others say if you have a high pressure while pregnant the baby might be delivered before time" (MPN_{15}, 34yrs).

Most mothers expressed fear for hurting or the babies dying in the process of practicing kangaroo as some had witnessed the death of the other babies in the neonatal unit, it created a fear that their babies would die when placed on the chest

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"the fear could be if I tie the baby badly it might die. Since it has happened to some people before It sounds like a warning" (MPN_{15}, 34yrs)

Other caregivers expressed their concerns about their babies getting infections or even falling sick due to the sweat that comes from the mother's skin as it contains dirt in it hence the fear of the babies getting ill and damaging the baby's umbilical cord.

"I fear that my baby might get infections or sick due to the sweat from the mother's body" (MPN_{13}, 26yrs)

"Some people believe it's tiresome and I was wondering if the baby was going to survive and make it or it was going to die immediately and since they had joined the cord wasn't it going to be affected or damaged" (MPN_{7}, 20yrs)

A few caregivers had concerns if their babies' bones would break or even slip through and fall since they were really small and fear of the babies to cease in breath if tied tightly or wrongly.

"I fear that my baby is really small and it is hard so I fear my baby's bones might break, cease breathing and also the baby might slip through and die". (MPN_{17}, 27yrs)

"For me, I fear that I might wrongly tie the baby's head and it fails to breathe properly then suffocate.". (MPN17,27yrs)

To other caregivers, their concern was that the baby's temperatures would rise too high or even the warmth would be too much and the babies would end up getting seizures or even getting ill due to the so many clothes that they tied around the babies.

"My fear is with the temperature due to the so many clothes we tie around their bodies so that scares me a lot and I think the baby might end up getting seizures". (MPN_{17}, 25yrs)

Subtheme: Lack of enough time to anticipate and psychologically prepare for such a time—The majority of the caregivers especially the mothers reported that they were not told about KMC during their ANC visits. As much emphasis was placed on other health educative topics.

"In antenatal it is not even mentioned". (MPN_{17}, 27yrs)

"I for one I have never heard about kangaroo before I even used to think that the baby is placed in a box filled with cotton then put in a machine and left there". (MPN_{3}, 45yrs)

Other mothers felt that if they had not given birth to preterm neonates they would never have heard about kangaroo.

"I had never heard about before it was until I gave birth and when I looked on the wall, I saw a word on the wall kangaroo corner and I thought probably I had given birth to a kangaroo but before I had never had about it" (MPN_{12}, 22yrs)

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> "I have never heard about it from there but I was just told after delivering to bring the baby to the Mbale regional referral hospital where the baby will be placed in an incubator and cared for from there and the baby won't die. (MPN_6, 32yrs)

Discussion

To the best of our knowledge, this study is the first investigation of what parents in a neonatal unit at a Mbale regional referral and teaching hospital perceived as supportive factors and barriers for their application of KMC.

The majority of KMC providers enrolled for the in-depth interviews were mothers, which points out that most mothers are believed to be the best natural infant care, providers. Moreover, we did not find any male doing KMC. This may be explained by the socioetal belief that babycare is a duty of women/mothers. This has been reported in several studies elsewhere [40, 41]. This is in contrast to findings in societies where gender roles are more balanced such as in Scandinavian countries where fewer barriers to fathers performing kangaroo mother care are reported [42, 43]. The majority of the respondents were adolescents and younger mothers because largely Uganda has a young population[44].

KMC facilitators.

The majority of the participants knew that KMC was a method to provide warmth to preterm babies through skin-to-skin contact(S2SC) usually through the mother. The participants were aware of the KMC benefits that included the promotion of infant bonding between mother and baby, improved baby's wellbeing, improved monitoring of unstable neonates, and improved breastfeeding. This created a lot of opportimism and positive attitude to fully engage in KMC albeit with challenges as we report below. This positive attitude and acceptance has been reported in other studies in sub-saharan Africa[31, 45]. In a study in Ghana, whereas only 11.4% of the mothers at admission knew about KMC,99.5% were very positive at discharge and 98% agreed that they would recommend it to other persons[46]. Like in this study in Ghana, we attribute this knowledge and positive attitude to counselling by the care team. Other similar studies carried out in low-resource settings have also reported similar benefits to KMC practice[14, 34]. Indeed KMC has been reported to significantly affect infant bonding between mother and infant[15, 34, 47]and hence minimized depression and anxiety[47] and enhanced child cognitive development and executive functions from 6 months to 10 years[15]. Furthermore, it must be emphasized that a study in Uganda, reported a shorter hospital stay compared to the infants monitored in the incubators[48].

Mothers' knowledge greatly influences her attitude and one would guess that this would have multiplier effect on the other family memmbers and the community.

Research elsewhere has highlighted the need for the mother/caretakers or family to buy-in [49] and the best way to achieve this is having the family, community and paternal/male involvement. The participation of the other family members helps relieve stress and anxiety on the side of the mother, allows her enough time to rest, get engaged in other activities and also heal from the stresseses and physiological changes of postnatal period. Our study shows

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that the majority of the caregivers felt having both staff and family support and the desire for their babies to improve, were great contributors to KMC provision. The role of other members of the family and willingness to help the mother during childcare greatly improved KMC uptake as was reported in Scandinavian countries[42, 43], Bangladesh [50] and Brazil [51]. A few mothers from our study felt adequate time, peer counseling, education and absence of cultural and tribal hinderances allowed them to practice KMC. This was in agreement with findings of another study in east-central Uganda about the facilitators of KMC practise[31] and in Ghana[46]. Furthermore in communities where culture has been a stumbling block, many mothers were unwilling to practice KMC outside the confines of the their homes despite expressing willingness to carry it on outside the health facility[46]

KMC barriers.

This current study found that the major barriers to KMC included inadequate staff support, maternal health-related issues, misconception, lack of education and family support, stigma, multiple and gender roles, concerns related to infant monitoring, and culture, tribe, and religion. Just like our study, a study about KMC practice in east-central revealed lack of resources (beds/space, monitoring devices) privacy issues, inadequate education, and difficulties motivating mothers to devote time to KMC)[31, 52, 53], lack of policies and supplies and inadequate staffing[54].

In a agreement with our findings, a studies elsewhere revealed adherence to newborn practices, stigma, gender roles, and fear of having preterm neonates as the significant hindrance to KMC practice[46, 55]. A study conducted in Bangalore, India, revealed that some mothers considered practicing KMC for about 5-15 minutes instead of an hour because it's tiring and hectic (Alenchery et al., 2018) while one in Ghana reported less time spent on KMC during the day and at night than had generally been the case in the health facility[46]. Futhermore, Mazumder et al, identified fatigue, post-delivery backache, mother's poor health, and lack of family support in nuclear families as barriers[56].

Several studies have noted that having quality training for both staff and caregivers and ensuring quality implementation of KMC will have a great impact on KMC provision[46, 49, 57, 58]. Therefore just like in other studies [55], we re-emphasise that KMC programs must be introduced to mothers and other caregivers as positive, cost-effective evidence based intervention that has enormous benefits. Furthermore, health workers need to prioritise the issue of male involvement in KMC and harnessing all the available family and other social support, such as from peers and nurses, in promoting KMC. This has been highlighted in other studies elsewhere[26, 31, 32, 46].

For such barriers such as training of and adequate staffing, and several infrastructural challenges that would address issues such as visiting hours and privacy, the involvement of the facility administrators and management is key. Where facility management has been actively involved and offered support to the health workers, uptake has been improved [53, 59, 60]. Facility leadership further allowed the emergency of champions/advocates of KMC, ensured oretenetion of trained staff and would probably stop/discourage unnecessary interdepartmental and intradepartmental transfers that hampered KMC activities. As was concluded in one study, “Effective adoption of KMC practice requires synergy of effort

and alignment by health policy makers, senior management in health facilities, nurses and other health workers at the front-line and mothers and families who often face challenges in effective communication and sharing of best practices"[53]. Our study did not focuss on this area and so could not report about the influence of MRRTH management on KMC uptake.

This study reports myths and societal misconceptions as barriers to KMC uptake. The incident of having a preterm was associated with having been involved in sexual intercourse at a tender age and refusal to take herbal medicine. Uganda is a country with high teenage pregnancy[44] and teenage pregnancy is highly condemned[9]. These misconceptions about health outcomes have been reported in another study in eastern Uganda and affected the uptake and acceptability of caesarean section[11]. Not surprising, some mothers reported 'hiding' the preterms from people. The stigma thus affects uptake of KMC as has been reperted elsewhere[40, 46]. Futhermore, other mothers/caretakers reported the misconceptions of that over covering the baby would lead to high temperatures and eventually seizures, tying the baby would lead to suffocation and death of the baby and also 'breaking' of the latter's bones. These health concerns have been reported in other studies[61–63]. These concerns continue to highlight the need for continuous engagement of the mother, family and community.

Another barrier that was reported was that the mothers having no time to anticipate and psychologically prepare for KMC and lack of knowledge about KMC prior to delivery. In fcat one mother on admission to the nicu and seeing the kangaroo mother care statement on the walls, thought she had given birth to a kangaroo.

> "I had never heard about before it was until I gave birth and when I looked on the wall, I saw a word on the wall kangaroo corner and I thought probably I had given birth to a kangaroo but before I had never had about it" (MPN_{12}, 22yrs)

This lack of prior knowledge was also reported in other studies in Uganda [52], Malawi[64] and elsewhere[65].

Conclusion

The majority of the mothers were knowledgable about KMC and had positive attitude about its implementation. However the major facilitators to this intervention was health workers support and positive attitude of the mothers. The major barriers to KMC were inadequate staff and family support, concerns related to infant monitoring, misconception, lack of education about kangaroo mother care especially during antenatal care, multiple gender roles, maternal health-related issue and socital norms and limited male involvement in sexual and reproductive health services.

Recommendations

We recommend that since adequate infrastructure and staffing are major facilitators of KMC practice, the hospital administration and management in consultation with other stakeholders should put into consideration a plan on how to improve the unit by expanding it to create more space, improve privacy, and advocate for more staffing.

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As a regional referral and teaching hospital with supervisory roles to the lower level health facilities, continuous professional and onsite mentorship would go along way in helping the latter to open similar units especially for the low-risk neonates and thuis reduce congestion at the referral hospital.

In addition, KMC should be made part of the antenatal care (ANC) health education and community health education outreach during. This will allow a broader understanding of the practice, dymystify it and create more acceptance.

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Data Availability

The data used to support the findings of this study are available from the corresponding author upon request at Jntezi@gmail.com

Abbreviations:

ANC	Antenatal care
MRRTH	Mbale regional referral and teaching hospital
KMC	Kangaroo Mother Care
LBW	Low Birth Weight
NMR	neonatal mortality ratio
NICU	Neonatal Intensive Care Unit
S2SC	Skin to Skin Contact
WHO	World health Organisation

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Table 1:

Sociodemographic characteristics of the participants.

Serial number	Age(years)/Tribe Teens <20=4/20=20%% Young mothers (20-24)=7/20=35% Older mothers (25-30)=6/20=30% Elder mothers (>30) =3/20=15%	Religion Chistians18/20=90% Moslems=2/20=10%	Address	Parity Primiparous 11/20=55% Multiparous 8/20=40% Grand=1/20=5%	Education level No formal /primary education 9/20=45% secondary 11/20=55%
MPN_1	17/Japhadhola	Protestant	Tororo	1	O' level
MPN_2	25/Gishu	Protestant	Mbale	3	O' level
MPN_3	45 /Mugwere	Protestant	Budaka	9	informal only
MPN_4	17 /Itesot	Pentecost	Butalejja	1	Primary
MPN_5	26 /Mugwere	Pentecost	Kadama	1	Primary
MPN_6	32 /Gishu	Moslem	Mbale	4	Primary
MPN_7	20/ Sabiny	Protestant	Kween	1	Tertiary
MPN_8	30/ Mugwere	Pentecost	Mbale	3	informal only
MPN_9	17 /Gishu	SeventhDay Adventist	Mbale	1	Primary
MPN_{10}	24/Mugwere	Catholi	Mbale	3	O' level
MPN_{11}	21 /Gishu	Protestant	Mbale	1	Primary
MPN_{12}	22 /Gishu	Catholic	Sironko	2	O'level
MPN_{13}	26 /Gishu	Protestant	Mbale	1	O' level
MPN_{14}	21/Ganda	Catholic	Mbale	2	Primary
MPN_{15}	34/Gishu	Moslem	Mbale	1	Only informal education
MPN_{16}	21/Atesot	Protestant	Mbale	1	A level
MPN_{17}	27/Langi	Pentecost	Tororo	1	Tertiary
MPN_{18}	18/Munyore	Protestant	Mbale	1	O level
MPN_{19}	26/Gishu	Pentecost	Sironko	2	O' level

Key: MPN; Mbale Regional Referal Hospital Postnatal Ward-Neonatal Unit

MPN3, MPN13 and MPN15- were caretakers(helping mothers to take care of the neonates)