



## **Barriers to Implementation of Facility-based Kangaroo Mother Care for Pre-term and Low Birth Weight Infants in River Nile State, Sudan; 2014**

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### **Authors' contributions**

*This work was carried out in collaboration between the two authors. Author EAHMA designed the study, wrote the protocol, collected and analyzed the data. Author AAA managed the literature searches and wrote the first draft of the manuscript. The two authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** Prematurity and low birth weight (LBW) currently account for approximately 40% of neonatal deaths in developing countries.

**Objectives:** To identify major factors that limit the introduction of kangaroo mother care (KMC) services in River Nile State, Sudan.

**Methods:** A facility based qualitative cross-sectional study conducted in two hospitals (Atbara and Al-Damar hospital). A total of seven pediatricians working in these two hospitals were interviewed using semi – structured interview.

**Analysis:** Analysis of the data was done manually. The interviewers' responses were entered into a data collection template. The data were reviewed and common themes were identified.

**Results:** Prematurity and low birth weight were a major health problem. Respiratory distress syndrome, hypothermia and sepsis were the leading causes of death. Problems facing pediatricians when caring for the preterm were; lack of incubators, non-functioning incubators, insufficient and untrained staff especially nurses beside rapid turnover. Only two of our pediatricians had heard about KMC but all of them were willing to adopt it in their units. Lack of

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awareness among mothers, health staff and the community, and the community health culture were the main two obstacles to KMC implementation. Financial support, staff training and isolated wards were needed for mothers' privacy. Knowledgeable practitioners to develop evidence-based policies were important for KMC implementation. Raising awareness among mothers, health cadre especially nurses caring for mothers and their babies and the community about KMC.

**Conclusion:** Lack of knowledge among health cadre, mother, families and community were obstacles to KMC. Awareness need to be raised.

*Keywords: Barriers; implementation; facility based and kangaroo mother care.*

## 1. INTRODUCTION

Preterm babies were those born alive before the 37 weeks of gestation. Most of these births happen spontaneously. It can be due to early induction of labour or caesarean birth, whether for medical or non-medical reasons [1]. Of the 3.6 million neonatal mortality every year, prematurity is the largest direct cause accounting for an estimated 29% [2].

Birth weight is a significant determinant of newborn survival. LBW which is defined by the World Health Organization (WHO) as weight at birth of less than 2,500 grams (5.5 pounds), is an underlying factor in 60–80% of all neonatal deaths. LBW is either the result of preterm birth (before 37 weeks of gestation) or of restricted foetal (intrauterine) growth [3].

LBW/premature babies are at greater risk of illness and death because they lack the ability to control their body temperature. To overcome this problem standard thermal care must be applied to them. The use of incubators is standard for thermal care of LBW babies. However, "incubator care" is not widely available in developing countries, especially outside large cities.

An alternative approach for providing better thermal care and improving survival of preterm and LBW infants is the Kangaroo Mother Care (KMC). This approach is both effective and affordable. A team of pediatricians in the Maternal and Child Institute in Bogota, Colombia created and developed the strategy of KMC. First KMC was invented by Dr. Edgar Rey in 1978, and then developed by Dr. Hector Martinez and Dr. Luis Navarrete until 1994, when the Kangaroo Foundation was created [4].

In KMC, which is a method of providing skin-to-skin contact, the preterm/LBW infant is placed vertically between the mother's breasts to provide closeness between the infant and the

mother. It has proved effective in meeting a baby's needs of warmth, breastfeeding, protection from infection, stimulation, safety and love [5].

KMC is provided both in hospital and after early discharge, until at least the 40<sup>th</sup> week of postnatal gestation age [6].

KMC terminology was derived from how kangaroos care for their young keeping them warm in the maternal pouch and close to the breasts for unlimited feeding until they are mature.

To improve outcomes of LBW infants, humanize their care, and reduce the length and cost of hospitalization, a trial was launched to assess KMC approach. This trial addressed overcrowding, cross-infection, poor prognosis and extremely high LBW mortality rates. The most dramatic result, documented through a pre- and post-intervention study of the trial, showed a drop in neonatal mortality from 70% to 30%.

Thirty-two years later, KMC recognized by global experts as an integral part of essential newborn care [4].

Facility-based KMC is underutilized in developing countries where need is great and resources scarce. It is an effective method equips mother with skills to protect and nourish her premature or LBW baby in hospital. Besides, involving the family members after discharge will support the mother to continue KMC at home.

A review conducted by the Cochrane Collaboration to compare between KMC and conventional treatment (incubator care). The aim of the review was to determine if there was evidence supporting the use of KMC as an alternative to incubator care in LBW infants). Infants cared for by KMC had better weight gain by discharge. They also showed risk reduction in nosocomial infection, severe illness and lower

respiratory tract infection. There was no evidence of a difference in infant mortality. The conclusion was insufficient evidence to recommend the routine use of KMC for LBW infants [7].

In 2011, a second Cochrane review showed reduction in the risk of mortality, nosocomial infection, sepsis and length of hospital stay. KMC was found to increase breast feeding, mother-infant bonding and some measurements of infant growth. They concluded that KMC should be used as an alternative to conventional neonatal care in LBW infants, especially in low resource settings [8].

KMC wasn't yet implemented in Sudan. There must be sensitization to the policy makers. If the idea of KMC is accepted, then we need to introduce and expand phases of its implementation. To be implemented in health facilities, KMC must be accepted by medical professionals. After facility implementation, it would be easier to extend the approach to the community. This research aims is to provide national policy makers and managers of newborn health programs about the major obstacles to implementation of Kangaroo mother care in order to address these problems.

## 2. MATERIALS AND METHODS

### 2.1 Study Design

A qualitative – cross sectional study.

### 2.2 Study Area

Atbara and Aldamar hospitals. Atbara and Aldamar were two towns in River Nile State, Sudan. Atbara is known as the "Railway City" while Al-Damar is the capital of the state.

### 2.3 Ethical Clearance

Ethical Clearance was obtained from the ethical committee of the Faculty of Medicine, University of Khartoum. Letters for ethical approval from River Nile State Ministry of Health, the research

committee within the selected hospitals as well as from the respondents were obtained.

### 2.4 The Study Population

The study population was total coverage of the pediatricians working in Atbara and Aldamar hospital nurseries. They were found to be seven.

### 2.5 Data Collection Means and Methods

Data collection mean was semi – structured interview. It was tested among 4 pediatricians in other hospitals not included in the study. This pilot study revealed poor knowledge about KMC, so an introduction containing the definition, types, requirements and how the procedure is applied was done before the interview. Data was collected over 1 month period by means of face to face semi – structured interview carried by one of the researchers. Each of the seven pediatricians was given a number according to its turn in the interviews; the first one interviewed from Aldamar hospital was given the symbol P1, the second one from the Atbara hospital (P2) and so on. Five pediatricians were from Atbara hospitals (P2, P3, P5, P6 & P7) while two (P1 & P4) were from Aldamar hospital.

The interview which lasts for approximately 25-30 minutes was composed of pre-determined set of open and closed questions that covered the study objectives which were:

1. Major obstacles regarding current preterm care
2. Knowledge about KMC
3. Willingness to adopt KMC in the facility
4. Major obstacles that may face the implementation of KMC
5. Solutions to overcome such obstacles

The interviews were recorded and then transcribed verbatim by the researcher. The transcribed interviews (responses) were entered into the data collection template. The interviewer then reviewed the data and common themes were identified (Table 1). Analysis of the data was done manually.

**Table 1. Themes and sub themes of the interview**

Themes	Sub themes
Current situation of preterm	<ul style="list-style-type: none"> <li>• Magnitudes of the problem of LBW and preterm babies</li> <li>• Care delivered to LBW and preterm and its quality</li> </ul>
Kangaroo mother care	<ul style="list-style-type: none"> <li>• Knowledge about KMC and adoption of KMC</li> <li>• Barriers to KMC implementation</li> <li>• A solution to the implementations' barriers</li> </ul>

### 3. FINDINGS AND RESULTS

The main themes that emerged from the interviews were.

Current situation of preterm and low birth weight regarding the following sub themes:

- Basic statistics on neonatal mortality (magnitude of the problem)
- The contribution of LBW/preterm babies to neonatal mortality
- Current care provided for LBW/preterm babies in the facilities under study.
- Quality of care of LBW babies

#### 3.1 Magnitude of the Problem

All pediatricians agreed that prematurity and low birth weight were a major health problem. The two pediatricians from Al-Damar hospital said that the prematurity had contributed to about 72% of total admitted to the hospital and 44% of total neonate deaths during the year 2014. Most of the premature gestational age was 32-35 weeks. During January and February/ 2015, 13 preterm died. P {1,4}

##### 3.1.1 Some of their comments

"A lot of cases and poor outcome, respiratory distress syndrome was the leading cause of death, comes next hypothermia" {P1}

"Most of the cases die because of respiratory distress syndrome, hypothermia and sepsis" {P6}

"Atbara hospital receives a lot of population from Abu- Hamad to near Shendi, this may be the cause of high prevalence" {P2}

"Bearing in mind that there were preterm delivered at home and not admitted to hospitals" {P2}

"No exact statistics in Atbara hospital, but roughly about 5-6 preterm per month per unit, there is 5 units, so about 25 preterm per month and 25% of the mortality in the nursery was attributed to prematurity" {P3}

"No available statistics" {P5}.

#### 3.2 Quality of Care Provided in Hospitals

All of pediatricians said that there were a lot of problems facing them while caring for the preterm. These problems were; lack of incubators, non-functioning incubators, insufficient and untrained staff, especially nurses

beside rapid turnover. There was no surfactant, no resuscitation equipment; even water for hand washing was not available.

##### 3.2.1 Some comments

"Lack of integrated work between pediatricians and obstetricians" {P1}

"Lack of antenatal care" {P4}

"Formulas for preterm are not available" {P2}

"No infusion pumps or mechanical ventilators. Even the nursery building in Atbara Teaching Hospital cannot be described as a nursery" {P6}

".. Even glucometers were not available" {p7}.

#### 3.3 Kangaroo Mother Care

##### 3.3.1 Knowledge about KMC and adoption of the idea

Only two of our pediatricians had heard about KMC, the others knew about skin to skin contact in malnourished children.

Some of the comments after the orientation given by the researcher:

(It resolves a lot of problems that we face) {P2}  
(It is simple, cheap, can be applied at any time, even if there is no electricity and it shortens the duration of hospital stay) {P6}

All of the participants were willing to adopt the idea of KMC in their hospitals.

##### 3.3.2 Barriers to implementation

There were different opinions:

Lack of awareness among health staff and the community and the community health culture were the main two obstacles to KMC implementation. Most of them addressed that financial problems were one of the major obstacles, since staff training and isolated wards were needed for mothers' privacy.

##### 3.3.2.1 Comments

"KMC is new methods we need to know about. We depend primarily on conventional methods of care. We depend upon our experience and books and we have no problem of hypothermia, we usually face problems when adopting new policies" {P7}

"The way the Sudanese ladies wear is one of our problems" {P7}

"Our culture prohibits Sudanese mothers to expose their breasts, especially if the care provider was a male" {P7}

"We need efforts to explain to the mothers" {P1}

"Some people live far away from hospitals, and if we have to adopt this strategy, we should do it in a near center, because if it is failed, incubators will be a wise alternative" {P2}

"Some people may not accept the idea, because they think it is hazardous" {P2}

"Availability of staff and their acceptance to the idea is an important issue" {P3}

"We need volunteers working in maternal & child health to deal with the community components" {P6}

"We have to address problems of follow up at the community level" {P6}.

### **3.3.3 Solutions to these problems**

All of the participants agreed that the awareness about KMC should be raised. One of them said that high media work should be established through magazines, T.V and social networks so as to raise the awareness among the health cadre and the mothers. One of them added that the awareness in the rural areas should be raised.

Three of the pediatricians said that practical lessons should be given to the mothers. Other countries' experiences should be disseminated to the mothers so as to convince them.

Some of them said that the idea of KMC should be accepted and adopted by the Ministry of health.

## **4. DISCUSSION**

### **4.1 Magnitude of the Problem**

Prematurity and low birth weight in Atbara and Al-Damar hospitals had accounted for 25% of neonatal mortality in the nurseries of the two hospitals. The result was not so far from global estimates as research done by Lawn et al, 2005 showed that 27 percent of neonatal deaths were attributed to preterm birth [9].

In Al-Damar hospital prematurity contributed to about 72% of the total admission. This was a high percentage compared to a study done in Wad Madani hospital, which revealed that

(25.4%) of the neonatal admission was due to prematurity [10]. Regard neonatal deaths in Al-Damar hospital, prematurity contributed to about 44% during the year 2014. It was found that almost all (99%) neonatal deaths rise in low- and middle-income countries, the highest rates were generally in sub-Saharan Africa [9]. In another study it was stated that developing countries contribute to 30% of neonatal mortality [11]. P1&P6 said that respiratory distress syndrome, hypothermia and sepsis were the main causes of death. Sepsis can cause asphyxia and respiratory distress. In another study it was found that asphyxia and sepsis contributes to 23% and 26% of neonatal deaths respectively [9].

### **4.2 Quality of Care Provided in Hospitals**

High cost, difficulty in maintaining, repairing and inadequate cleaning of incubators, beside intermittent power supply and shortage of skilled staff were the main difficulties to establish and maintain neonatal intensive care for LBW infants in developing countries. For sharing the incubator, risk of neonates' infection was very high. KMC which can be an alternative can be practiced in any situation. No special equipments or technology like cots, heaters or incubators were needed. Mothers who act as incubators were the main source of food, warmth and stimulation to the LBW babies [12]. That was why all of the participants were willing to adopt the idea of KMC in their hospitals. This is because KMC can be a solution to most of the problems of low birth weight and prematurity that faces the neonatologists in countries with low resources like ours.

### **4.3 Barriers to Implementation and the Solutions**

Lack of awareness among health staff and the community and our community health culture were the main two obstacles to KMC implementation. Another study showed that resistance from health professionals, mothers and families was often related to local cultural practices [13]. Comment of one of our participants (P7) showed some sort of health professional's resistance. We should have knowledgeable practitioners so as to develop evidence-based policies and procedures that will lead to successful KMC implementation. Availability of nursing staff and their acceptance to the practice of KMC is an important issue as stated by {P3}. The nursing staff who were involved in intensive neonate care unites should

be trained in KMC so that they can train mothers to provide it safely and effectively [14].

Barriers due to mothers and familial resistance can be overcome by health education. Mothers should be educated that all of them were eligible to provide KMC irrespective of age, parity, education, culture and religion. The mother must be willing to provide KMC, free from serious illnesses, receiving adequate diet and maintaining good hygiene. Family members should be supportive to the mother, encouraging her to provide KMC. They should be trained to provide KMC when the mother is sick, wishes to take rest and when she deals with the daily household tasks while the infant is requiring KMC. Community should be supportive. Community awareness about the KMC benefits is very important, especially when there were social, economic or familial constraints [15].

Educational materials such as information sheets, posters and video films on KMC in local language should be available to mothers, families and community. One of the doctors mentioned that the Sudanese ladies traditional wear can be a barrier. This problem can be solved very easy by convincing mothers to wear suitable form of dress to hold baby in kangaroo position. The rural mothers can hold their babies skin to skin beneath their female Sudanese traditional wear (the toob) which look like saris. In a community-based study done in Sylhet (Bangladesh) mothers mentioned that they hold their babies skin-to-skin beneath their saris without wearing a blouse. Another doctor mentioned that volunteers from the community were needed to disseminate the idea. This can be done by the health guides and the community midwives who can teach the mothers, families and the community about KMC. In sylhet the community based nutrition promoters who were female community residents had done the teaching [16].

Implementing KMC doesn't need sophisticated costly equipments. If possible reclining chairs in the nursery and postnatal wards and beds with adjustable back rest should be arranged. Mothers can provide KMC sitting on any comfortable chair/sofa or in a semi-reclining posture on a bed with the help of pillows.

P7 mentioned that the Sudanese cultures prohibit mothers to expose their breasts in front of male health care providers. This makes the mother nervous and de-motivates her to practice

KMC. Mother's sensitivities in this regards should be respected by maintenance of culturally acceptable privacy standards in the nursery and the wards when KMC is practiced [15].

Although KMC is a simple and low-cost technology, but involvement of policy makers and managers were of great benefit for its implementation.

## 5. CONCLUSION

Neonatal mortality due to prematurity and low birth weight was high. Insufficient incubators and untrained staff were major problems. Knowledgeable practitioners and trained nursing staff, health education to the mothers, families and the community about KMC were the solutions to the problem.

## CONSENT

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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