EFFECT OF 'KANGAROO MOTHER CARE' TRAINING ON KNOWLEDGE, ATTITUDE AND PRACTICE OF HEALTH CARE PROVIDERS IN SELECTED DISTRICT HOSPITALS IN NORTH RIFT REGION, KENYA

BY

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This thesis is my original work submitted in partial fulfilment of the requirement for M. Med (Child Health and Paediatrics) at Moi University and has not been submitted in any other university. No part of this thesis may be reproduced without prior written permission of the author or Moi University.

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This work is dedicated to my family for their love and support throughout the period of study.

ABSTRACT

Background

While kangaroo mother care (KMC) has been effectively used for managing low birth weight (LBW) infants since 1978, particularly even in resource abundant settings, only few areas in resource poor setting of sub-Saharan Africa, have it practiced in their health facilities routinely. Training healthcare providers has been recommended by WHO as an approach for scaling up KMC practice in low income settings. The effect of training health care providers on their knowledge, attitude and practice is not fully understood in many settings in Africa, including Kenya.

Objective

The study sought to determine the effect of training health care providers on KMC on their knowledge, attitude and practice (KAP).

Methodology

The study was a pre-post test design done in four district hospitals (Koibatek, Iten, Nandi North and Nandi South), where a one day training of health-care providers on KMC using WHO essential newborn care course manual was carried out as an intervention. The four district hospitals were randomly selected, while convenience sampling was used in selection of health-care providers. A paired test was used to determine the minimum sample of 85 subjects to be able to detect medium effect size of 0.3, with a power of 80% and 0.05 level of significance. The level of KAP on KMC was assessed using a pre-tested self administered questionnaire in the pre and post training. Eighty eight health-care providers completed the pre and post training survey, their data was entered on excel spread sheet and analysed using STATA 10.0. Mcnemars and paired t-test was used to assess any difference between outcomes of interest.

Results

Eighty eight (88) health care providers completed the study. They included 54 nurses, 28 clinical officers and 5 doctors. The knowledge on KMC was high (95.5%) among all the healthcare workers. There was a change in the knowledge about the relationship between KMC and, breastfeeding (28.6%, p=0.000) and early discharge (21.5%, p=0.003) after the training. Their attitude towards KMC remained the same before and after training (p=0.189). The practice of KMC increased in terms of supporting mothers physically to initiate it (12%, p=0.031), but there was an insignificant increase in encouraging (3%, p=0.727) and providing information (8%, p=0.146) to, the mothers.

Conclusions and Recommendations

There was good initial KAP on KMC. The knowledge about the relationship between KMC and, breastfeeding and early discharge increased after training. More health care providers assisted mothers to initiate KMC, although no change in attitude observed after the training. Therefore, promotion of KMC practice should continue. Other modes of training that will promote appropriate attitude towards KMC need to be explored.

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LIST OF ABBREVIATIONS

CMC	Conventional Method of Care
IREC	Institutional Research and Ethics Committee
KAP	Knowledge Attitude and Practice
KDHS	Kenya Demographic Health Survey
KC	Kangaroo Care
KMC	Kangaroo Mother Care
KMM	Kangaroo Mother Method
LBW	Low Birth Weight
LBWI	Low Birth Weight Infant
MCHIP	Maternal and Child Health Integrated Program
MDG	Millennium Development Goal
NICU	Neonatal Intensive Care Unit
NNDR	Neonatal Death Rates
PPIP	Perinatal Problem Identification Programme
RCTs	Randomised Controlled Trials
TC	Traditional Care
USAID	United States Agency International Development
WHO	World Health Organization

DEFINITION OF TERMS

Attitudes:

A hypothetical construct that represents an individual's degree of like or dislike for an item [48]. Attitudes are generally positive or negative views of a person, place, thing, or event. This is often referred to as the attitude object. People can also be conflicted or ambivalent toward an object, meaning that they simultaneously possess both positive and negative attitudes toward the item in question. In this study is the health care provider's attitude towards KMC was assessed on a 5-point Likert scale. The mean scores in the pre and post training were compared using a paired t-test to detect any difference.

Conventional method of care for premature infants:

This refers to keeping premature infants inside incubator machines to keep them warm and maintain their body temperatures within physiologically acceptable ranges [8,28,29]. This is because premature infants are at high risk of hypothermia due to their large body surface area, thin skin with less subcutaneous fat, less muscle mass and inadequate glycogen stores. Therefore, they lose more heat and are unable to generate sufficient heat to maintain their body temperatures. The ambient temperature and humidity within the incubator are controlled and monitored regularly. Medical and other supportive treatments as well as feeding are offered while in the incubator. the disadvantages to this method of care includes the mother being separated from her baby, and mechanical failure that may result in infant experiencing very high or very low temperatures if not properly monitored.

Kangaroo Mother Care (KMC):

The term kangaroo mother care (KMC) is derived from practical similarities to marsupial care-giving, i.e., the premature infant is kept warm in the maternal pouch and close to the breasts for unlimited feeding. The infant is held so that there is skin-to-skin contact between the infant and the parent's bare chest, tummy to tummy in between the breasts. This helps maintain the infant's body temperature [8,11,45].

Knowledge:

Refers to; (1)expertise, and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject, (2) what is known in a particular field or in total; facts and information or (3) awareness or familiarity

gained by experience of a fact or situation[48]. The health care providers understanding of KMC as a method of caring low birthweight/premature infant and its major components was assessed in this study. The health care providers were considered very knowledgeable, knowledgeable and not very knowledgeable if they scored >75%, 50-74% and <49% respectively.

Low birth weight (LBW):

Low birth weight (LBW) has been defined by the World Health Organization (WHO) as weight at birth of less than 2,500 grams (5.5 pounds). This is based on epidemiological observations that infants weighing less than 2,500 g are approximately 20 times more likely to die than heavier babies. More common in developing than developed countries, a birthweight below 2,500 g contributes to a range of poor health outcomes [13].

Practices:

It refers to a method, procedure, process or rule used in a particular field or profession [48]. For the purpose of the study this will include the role of health care provider in encouraging, assisting, and providing information to mothers regarding kangaroo mother care. Participation in educational training and having been supervised on the technique about KMC will be assessed.

Preterm birth:

The preterm birth refers to babies born before 37 completed weeks of gestation. In addition, more granularity would be helpful for programs, such as dividing moderately preterm (33 to 36 completed weeks of gestation), very preterm (<32 weeks) and extremely preterm (<28 weeks) [1,3].

Quasi-experimental study:

This term refers to a type of evaluation which aims to determine whether a program or intervention has the intended effect on a study's participants. Also sometimes called the "pre-post intervention" or "before-after intervention" study design, is often used to evaluate the effectiveness of specific interventions. Quasi-experimental studies take on many forms, but may best be defined as lacking key components of a true experiment. While a true experiment includes pre-post test design, a treatment group

and a control group, and random assignment of study participants, quasi-experimental studies lack one or more of these design elements [43,44].

Stable preterm or low-birth weight infant:

This refers to a newborn infant whose vital functions (breathing and circulation) do not require continuous medical support and monitoring, and are not subject to rapid and unexpected deterioration, regardless of intercurrent disease.

CHAPTER ONE:

INTRODUCTION

1.0 Background

While under-5 mortality rates are improving in many countries worldwide, neonatal mortality rates (deaths in the first 28 days of life) have shown less progress [(1)]. Neonatal deaths now account for more than 42% of under-five deaths, up from 37% in the year 2000[(2)]. Of all newborn who die, 27% are due to prematurity directly [(3,4)]. Even when they die from other diseases, such as neonatal sepsis and asphyxia, those who are premature have higher chances of dying [(3,4)]. Preterm birth complications are second (14%) to pneumonia (18%) as leading causes of mortality among children under age of five years worldwide.

In Kenya, children whose birth size is small or very small have 50% greater risk of dying before their first birth day[(5)]. Of these deaths, majority occur in the first 28 days of life. The smaller the size of infants at birth, the more expensive the infrastructure and skilled staff they need to survive, which is unattainable for majority of low income settings [(6)]. World Health Organization (WHO) has recommended scaling up low cost solutions that could reduce these deaths by three-quarters [(2)]. These include use of antenatal steroid injections to women in preterm labour, and kangaroo mother care (KMC). In KMC, preterm babies are held skin to skin with their mothers to provide warmth, promote breastfeeding and facilitate early or appropriate discharge from hospital [(2,6,7)].

Kangaroo Mother Care, also referred to as skin-to-skin contact, was developed in 1978 by Edgar Rey Sanabria, Professor of Neonatology at the Department of Paediatrics, Universidad Nacional de Colombia [(6)]. Its development was in response to

overcrowding, and insufficient resources in neonatal intensive care units. KMC was formally endorsed by World Health Organization (WHO) in 2003. This endorsement was followed with publishing a KMC practice guideline, from which countries can formulated policies and protocols and training manuals [8]. Further, WHO included KMC as part of essential newborn care training course of 2010 [9]. Donors, such as United States Agency International Development (USAID), through its Maternal and Child Health Integrated Program (MCHIP), have developed implementation guidelines for KMC for low income countries including Kenya [10].

1.1. Problem Statement

Although KMC benefits are known and it has been recommended for use in low income settings [11,12], an anecdotal survey and unpublished review of records showed that many facilities in the North Rift Region of Kenya have not adopted it. WHO has recommended training of Health Workers as an appropriate approach to scaling up KMC [9]. Studies for KMC training and use of this method in the care of LBW premature babies have not been reported for the north rift region of Kenya. Since understanding the appropriateness of implementation approaches in specific contexts, requires studies, this study was undertaken first to provide information on the level of knowledge, attitude and practice (KAP) among health-care providers regarding KMC. Secondly, this thesis is based on a pre and post intervention study to evaluate the effectiveness of training health-care providers on changing their knowledge, attitude and practice towards KMC in selected hospitals in a region with low use of KMC.

CHAPTER TWO:

LITERATURE REVIEW

2.1 Burden of preterm birth and low birth weight

In 2000 the United Nations estimated about 15.5% (20 million) of infants born each year had low-birth-weight (LBW) because of either preterm birth or impaired prenatal growth. Majority (95%) of LBW infants were from developing countries with Asia (14 million) and Africa (4 million) contributing the largest number. The LBW incidence rates remained roughly constant for 1990 and2000 at 24% and 23% respectively [(13)]. Similarly in 2010 (WHO 2012), estimated 15 million (11%) of the world's babies were born preterm of whom over 60% were from Africa and South Asia. Kenya's annual number of births in 2010 were 1.5 million (33.4 births/1000 population) (UNICEF) with preterm birth rate ranging between 11 and <15 per cent [(3)].

While under-5 mortality rates are improving in many countries worldwide, neonatal mortality rates (deaths in the first 28 days of life) have shown much less progress. Neonatal deaths account for more than 42% (2011) of under-five deaths, up from 37% in the year 2000 [(1)]. In Kenya (KDHS 2008) neonatal deaths accounted for 60% of infant mortality despite a reduction in infant mortality by about 32 per cent. Infants who have low birth weight or very low birth weight had 50% risk of dying than heavier infants [(5)].

Complications of preterm birth are the leading direct cause of neonatal mortality, accounting for an estimated 27% of the almost four million neonatal deaths every year, and act as a risk factor for many neonatal deaths due to other causes, particularly infections [(1)]. Preterm birth complications are second (14%) to pneumonia (18%) as

leading causes of death in children under the age of five years [2]. Most premature babies (>80%) are born between 32 and 37 weeks of gestation (moderate/late preterm), and can survive with simple, essential care such as warmth and feeding support. About 10% of preterm babies are born 28 to <32 weeks gestation, and in low-income countries more than half of those will die but many could be saved with feasible care, not including intensive care such as ventilation [3].

Hence, progress towards achievement of millennium development goal number four (MDG 4) depends on reducing neonatal deaths; and since preterm birth is the leading cause of these deaths, progress is dependent on achieving high coverage of evidence-based interventions to prevent preterm delivery and to improve survival for preterm newborns[1,2]. There is evidence that scaling up such low cost intervention as antenatal steroid injection for women in labour and KMC could reduce these deaths by three-quarters. Using KMC involves preterm babies being held skin to skin with their mothers [2].

2.2 History of kangaroo mother care

KMC was started in 1978 in Bogotá, Columbia in response to overcrowding and insufficient resources in neonatal intensive care units associated with high morbidity and mortality among low birth weight infants. Dr. Edgar Rey Sanabria, Professor of Neonatology at Department of Paediatrics - Universidad Nacional de Colombia, introduced this method to alleviate the shortage of caregivers and lack of resources. He suggested that mothers have continuous skin-to-skin contact with their low birth weight babies to keep them warm and to give exclusive breastfeeding as they needed. This freed up overcrowded incubator space and care givers. Also mortality fell from

70% to 30%. Part of freeing the space occurred because the premature baby on KMC could be discharged early [6].

The term kangaroo mother care (KMC) is derived from practical similarities to marsupial care-giving, where the premature infant is kept warm in the maternal pouch and close to the breasts with unlimited feeding [8]. Kangaroo mother care has evolved over the last 30 years with a number of studies demonstrating its benefits, safety and effectiveness. Since 1986 onwards, several studies have been done in Europe and USA. In Scandinavia and Germany, KMC is implemented widely. In Africa, Mozambique and a few others are in their early stages of implementation [7,14].

In 1996, Adriano Cattaneo and team hosted the First International Workshop in Trieste, Italy. From over thirty different terms used then, they agreed to use KMC (Kangaroo Mother Care) to define the programme of skin-to-skin contact, breastfeeding and early discharge. Therefore the term "Kangaroo Care (KC)" refers only to intervention "intrahospital maternal-infant skin-to-skin contact". Next, in 1998, Susan Ludington-Hoe arranged the First International Conference on Kangaroo Care. In October 2008, VII International Workshop on Kangaroo Mother Care was held in Uppsala, Sweden. The Purpose of the Workshop was to advance the implementation of KMC in Europe and promote the interchange of information and ideas between professionals on various aspects of the KMC method [15,16].

In 2003, WHO formally endorsed KMC and published a practical guide, from which countries can formulate policies and protocols and training manuals [8]. It recommended KMC to be initiated on stable preterm or low-birth-weight infant (below 2000grams). Since complications can be expected when a small baby is born, initial care for infants with complications is provided according to national or

institutional guideline. Therefore KMC has to be delayed until the medical conditions improve. The more preterm and small for gestational age the infant is, the more frequent the problems are. It may take weeks before their condition allows initiation of KMC. However, if preterm low-birth-weight infant is delivered at home or at a primary facility and requires referral to a higher facility for specialised care, it is safe to transport the infant while on KMC to avoid hypothermia. Further, WHO has included KMC as part of essential newborn care training course of 2010 [(9)]. Donors, such as United States Agency International Development (USAID) through its Maternal and Child Health Integrated Program (MCHIP), have developed implementation guidelines for KMC for low income countries including Kenya [(10)].

2.3 Benefits of KMC

2.3.1 Mortality and morbidity benefits

Studies are now showing that KMC is beneficial not only to the newborn infant especially preterm and low birth weight infant, but also to the parent and institutions where it has been practiced. The preterm infants have shown to have a stable heart rate (no bradycardia), more regular breathing (a 75 % decrease in apnoeic episodes), improved oxygen saturation levels, no cold stress, longer periods of sleep, more rapid weight gain, more rapid brain development, reduction of "purposeless" activity, decreased crying, longer periods of alertness, more successful breastfeeding episodes, and earlier hospital discharge [(17,18,19)]. They have also shown conduct patterns that indicated good tolerance toward this method, including open hand, sleeping, and alert tranquillity [(19).]

The preterm infants on KMC have been found to have reduced rates of severe morbidity compared to those on conventional care. Sloan N [(20)] found that low birth

weight infants on Kangaroo Mother Method(KMM) had a significant lower rate than the control group of serious illness (7 [5%] against 27 [18%], $p < 0.002$), although differences between the groups in less severe morbidity were not significant. However mortality was the same in both groups. Similar observations were made on meta-analysis of three trials by Sachdev H [(21)], which showed KMC was associated with a significant reduction in the risk of nosocomial infection at 41 weeks corrected gestational age and fewer rates of severe illness at six months. Infants in the KMC group gained significantly more weight per day at discharge from hospital, although this was of low clinical significance. There were no differences in the rates of mortality in the two groups.

Other studies have demonstrated reduction in neonatal and infant mortality. Workhu B [(22)] found out that, 14/62 (22.5 per cent) of KMC compared to 24/63 (38 per cent) Conventional Method of care babies died during the study. Majority of deaths occurred during the first 12 hour(s) of life. Survival for the preterm low birthweight infants was remarkably better for the early kangaroo mother care group than the babies in the conventional method of care in the first 12 hour(s) and thereafter. Similarly, Pattinson R [(23)] observed that the neonatal death rate (NNDR) decreased from 87.72/1000 live births before KMC to 60.76/1000 (30.7%) live births after KMC had been introduced. The large and significant reduction in the NNDR of neonates weighing between 1000 and 1999 g was associated with the introduction of KMC. Improved survival rates have been observed with infants on KMC, and it is a feasible and appropriate technology in health facilities with limited resources [(24)]. However, a few studies find no major difference in the risk of death between KMC infants and control when followed-up for one year [(25)].

A meta-analysis of studies from low and medium income countries on KMC shows evidence that it has morbidity and mortality benefits [11]. Three RCTs commencing KMC in the first week of life showed a significant reduction in neonatal mortality [relative risk (RR) 0.49, 95% confidence interval (CI) 0.29–0.82] compared with standard care. A meta-analysis of three observational studies also suggested significant mortality benefit (RR 0.68, 95% CI 0.58–0.79). Five RCTs suggested significant reductions in serious morbidity for babies weighing less than 2000 g (RR 0.34, 95% CI 0.17–0.65) [28]. Further an updated Cochrane review of 2011 shows KMC has a significant morbidity and mortality benefit as opposed to the earlier (2003) review and supports the use of KMC in LBW infants as an alternative to conventional neonatal care mainly in resource-limited settings [12].

2.3.2 Thermoregulation

The efficacy of KMC in thermoregulation and weight gain in preterm infants has been demonstrated. This may be beneficial in improving preterm survival especially in resource poor settings with inadequate medical personnel and equipment such as incubators [6]. In LBW infants weighing 2000 g or less, who are unable to regulate their temperature, KMC is at least as safe and effective as conventional care using incubators.

Studies have shown that infants on KMC maintain a stable body temperature, achieve normal body temperature faster than infants on incubator or radiant warmer and have better weight gain. Ndiaye O et al found that out, mean temperature of infants on KMC was satisfying during follow up and was stable around 37 +/- 0.5 degrees Celsius at discharge with mean daily weight gain of 33 +/- 7. 6 g [26]. The results of this study pointed out efficacy of kangaroo method on thermoregulation, weight gain

and survival of preterm babies. Closa M et al also showed that infants had stable body temperatures as well as the heart rate, respiratory rate and oxygen saturation during the kangaroo care [19]. Infant on KMC have also been observed to have slightly higher mean temperature than those cared by conventional methods (radiant warmer or incubator) and better extra-uterine body temperature adaptation in hypothermic infants [27].

The risk of hypothermia is significantly reduced among infants on KMC. This was observed in a study conducted by Ibe O et al that compared thermal regulation in low birthweight infants (< 2000 g) managed by KMC alternating with conventional care (CC) [28]. The risk of hypothermia reduced by over 90% when nursed by KMC rather than conventional care. The Micro-ambient temperatures were higher during KMC, although the average room temperatures during both procedures did not differ significantly. Ludingto-Hoe S and others did a comparison between KMC and incubator care in maintaining body warmth in preterm infants, which showed no change in body temperature across all periods and between groups [29]. Findings from these two studies confirm that KMC is effective in correcting hypothermia in stable LBW infants and, a preferable method where equipment for thermal regulation is lacking or unreliable.

2.3.3 Breast feeding

Breastfeeding a preterm baby is a special challenge. In the first few days a preterm baby may not be able to tolerate oral feeds and has to be fed intravenously. As soon as the condition allows oral feeds should be initiated. Mode of feeding depends on gestational age and neurological development of the infant. Babies less than 30 to 32 weeks gestational age will need to be fed by nasogastric tube. Babies between 30 and

32 weeks gestation can take feeds from a cup, and those above 32 weeks gestation or more are able to start suckling on the breast. It is advised that national or institutional guideline to be followed as to how and when to initiate oral feeds. KMC is initiated and continued regardless of the mode of feeding as long as the preterm infant and mother are ready [8].

Breastfeeding is one of the three main components of KMC. Studies have demonstrated that mothers who practiced KMC achieved successful breastfeeding practices. Hake-Brooks S found out that Kangaroo Care (KC) dyads, compared to control dyads, breastfed significantly longer [30]. More KC dyads than control dyads breastfed at full exclusivity (100 percent breast milk) at discharge and at 1.5, 3, and 6 months, with mean KC contact per day of 4.47 hours. A meta-analysis of three trials done by Sachdev H showed that KMC was associated with reduced likelihood of not exclusively breastfeeding at discharge from hospital; however, there was no difference in exclusive breastfeeding rates at one month and at six months of follow-up [21].

2.3.4 Benefits to the mother

Benefits to the parents include feeling close to their babies (earlier bonding); having confidence that they can care for their baby, even better than hospital staff; gaining confidence that their baby is well cared for; and feeling in control, not to mention significantly decreased cost!

Mothers' perception of her child, attributable to the skin-to-skin contact in the kangaroo-carrying position has been observed [31, 32]. Majority of these mothers practicing KMC feel more competent and confident than do mothers whose babies are under conventional incubator care. Most mothers are happy because they feel it is

safe, and did not separate them from their infants [22, 28]. Sachdev H observed that fewer mothers who practiced KMC were likely to be dissatisfied with the method of care of their newborn babies [21].

Infants on KMC have better weight gain and therefore are discharged early. This also translates to reduced cost of health care especially to the mother. This is supported by findings of Nathalie et al which showed that , **i**nfants who weighed 1500 g at birth and were given KMC spent less time in the hospital than those who were given standard care [25]. Findings by Lima G in Brazil demonstrated that, KMC was less expensive (US$20per bed/day) over previous conventional care (US$66 per bed/day [33]. This study confirms that KMC for stabilized LBW infants is feasible, acceptable and affordable to both the mother and the hospitals in settings with limited resources as an alternative to conventional incubator care. Although it has been observed KMC mothers have more unscheduled clinic visits than controls during follow-up, their infants had fewer re-admissions and so the cost of care was lower [20].

2.4 KMC Training, Knowledge, Attitude and Practices among Health-Care Providers

Scaling up the implementation of new health care interventions can be challenging and demand intensive training or retraining of health workers. Various methods of training health workers on KMC have been tried. Berg A-M and others compared the effectiveness of two different kinds of face-to-face facilitation used in conjunction with a well-designed educational package in the scaling up of kangaroo mother care in South Africa [34]. The methods used were 'on-site' and ‘off-site' educational facilitation approaches in two groups of hospitals. Evaluation of practice after six to eight months in all hospitals showed no difference between the two groups (p =

0.633). Therefore either approach can be used depending on the feasibility and availability of resources.

One day training has been found to be sufficient in improving health workers knowledge on KMC. Parikh T et al conducted a study to assess the improvement on KMC knowledge and practices amongst health care personnel (n=95) caring for newborn babies following a one day skill based awareness training [35]. Participants who attended the workshop comprised of paediatric and obstetric nurses (n=65), paediatrician and obstetricians (n=30). None of the participants were supporting the method at their institutions and only a minority knew about the KMC and its related domains. After the intervention of one day skill based awareness program, the participants knowledge improved significantly in all the aspects of KMC training ($p<0.001$). However, there was no follow-up study to establish sustainability of knowledge and continued practice. Harmesh S et al also assessed the immediate cognitive impact of KMC workshop on Sixty three final professional medical students at a Neonatal unit of a teaching hospital in India [36]. Knowledge about KMC was assessed by a pre-test questionnaire at the beginning of study. A one-hour lecture cum demonstration was carried out, followed by post-test assessment with same questionnaire. 54% of the participants had zero score in the pre-test, and after the intervention 54% had a score of over 76%. The immediate cognitive impact was excellent from this study. However, there was no follow-up on this study to assess the effect of the one day workshop in terms of practice, and the students' attitudes on KMC were never studied.

KMC as a method has been well received in settings where it has been implemented. Kaur R et al conducted evaluation on the feasibility and attitude of nurses towards

Kangaroo Mother Care (KMC) in low birth weight neonates in an Intensive Care Unit at Charndigarh, India where KMC is a routine practice since August 2002[37]. Doctors, nurses and paramedics had been educated and trained in KMC and its benefits. On assessment of attitude, nurses felt that the requirement of manpower, close supervision by them and use of heat convectors in the neonatal intensive care unit (NICU) decreased considerably.

Findings from surveys have shown that health care providers have good knowledge and positive attitude towards KMC with majority implementing it. Pauline and others assessed the attitudes and practices of neonatal nurses in the use of kangaroo care in a 48-bed NICU of a major teaching hospital in Melbourne, Australia [38]. They found out that all neonatal nurses' surveyed assisted and encouraged parents to provide kangaroo care (KC). Majority of the nurses strongly agreed on the benefits of KC in promoting bonding (73.5%), enhancing the physical wellbeing of the infant (52.9%) and increasing parents' confidence (55.9%). However respondents were uncertain whether KC results in more effective breastfeeding (32.4%). The authors also emphasized that there was need for in-service education to provide neonatal nurses with up-to-date information on the efficacy and beneficial effects of KC for infant and parents. They also emphasized need for appropriate skill acquisition and opportunity for supervised practice.

Similarly in Ireland, Ann F and Patricia L found out that fifty six (90.3%, n=62) of neonatal nurses, believed KC was a safe alternative method of care for stable growing preterm infants, agreeing on the benefits for both infants and parents [39]. Their overall level of knowledge varied from good to excellent with lowest score at 68% despite being a new occurrence in Irish neonatal care.

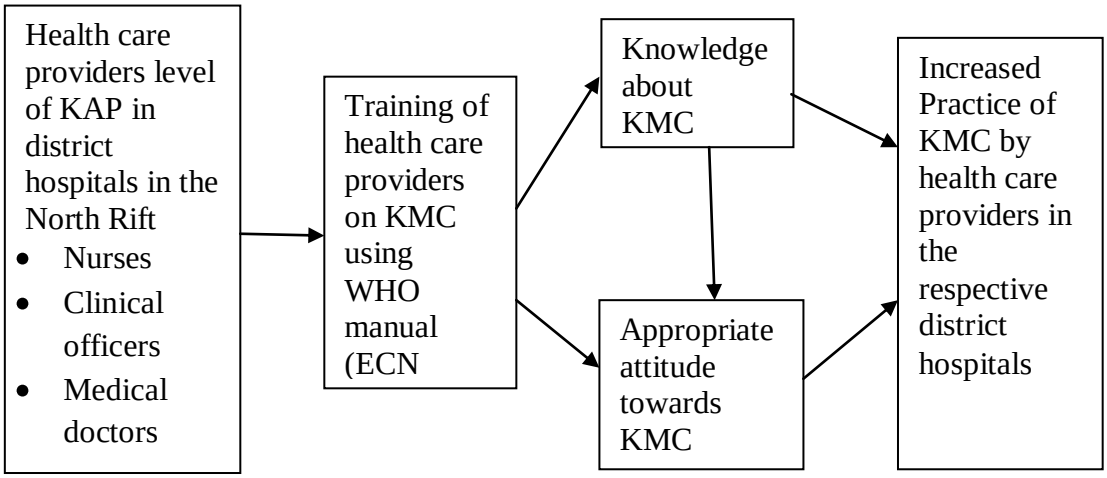
A national survey conducted in the United States by Engler et al assessed the practices, knowledge, barriers and perception regarding Kangaroo care among neonatal nurses on 1,133 hospitals providing neonatal intensive care services [(40)]. Over 82% of respondents reported practicing kangaroo care. Nurses were also knowledgeable about kangaroo care. Major barriers to practicing KC for certain types of infants were infant safety concerns, as well as reluctance by nurses, physicians, and families to initiate or participate in KC. However, over 60% of respondents agreed that low gestational age or weight were not contraindications. From this survey, it was noted that nurses needed educational offerings highlighting the knowledge and skills needed to provide KC safely and effectively with emphasis on the value of KC to infants and parents.

The level of training is still low among health care providers even in countries with established KMC policy in Africa. The survey by Solomons S at a sub-district hospital in South Africa revealed that, 60% of nursing staff interviewed were not formally trained in KMC despite required policy being in place and the hospital was already implementing KMC program [(41)]. However, all (n=15) nurses agreed that KMC promoted mother-infant bonding, enhanced mothers confidence with regard to how to handle her LBW infant and resulted in effective breastfeeding. They all believed that KMC was beneficial and not burdensome to the nursing staff.

2.5 Conceptual Framework

While existing literature indicates high level of knowledge and practice in high income settings, there is nonetheless a scarcity of information on it use in low income settings such as the North Rift region of Kenya. WHO has recommended training of Health Care Providers to scale up KMC and incorporated it as part of essential

newborn care course. However, no studies have demonstrated the effect of KMC training of health care providers on their knowledge, attitude and practice particularly in low income settings. To address this gap in the literature, this particular study was conducted specifically to determine the level of knowledge, attitude and practice among Health Care Providers regarding KMC. Secondly, evaluate the effectiveness of training health care providers in changing their knowledge, attitude and practice towards KMC.



2.6 Justification

Kangaroo mother care has consistently been shown to be safe and effective low-cost intervention in the care of premature low-birth weight infants [11,12]. While KMC is effectively practiced in the resource abundant settings such as North America and Europe, its use is being reported in a few African countries such as South Africa, Mozambique and Malawi [6,24,34].

Previous authors have emphasised the need for educational opportunities for health care providers in promoting use of kangaroo mother care [38,39,40,41]. In Kenya, the level of knowledge, attitude and practices of the health care providers regarding KMC

to inform the design of intervention programs to increase its utility remain undetermined.

It is not known if health care providers in the district hospitals have adequate knowledge, appropriate attitude and to what extent they practice KMC. It is also not clear what effect training would have on their knowledge, attitude and practice. In addition, the effect of training health-care providers on KMC especially in the African context has not been sufficiently studied.

The purpose of the study was to assess the knowledge, attitude and practice and the effect of training health care providers in the use of kangaroo mother care at the district hospitals in the North Rift region of Kenya. The information obtained from this study will inform the design of programs for implementing and promoting KMC.

CHAPTER THREE:

RESEARCH QUESTIONS AND OBJECTIVES

3.1 Research Questions

1. What is the level of knowledge, attitude and practice of health care providers on kangaroo mother care?
2. Does training improve knowledge, attitude and practice of health care providers on kangaroo mother care?

3.2 Objectives

3.2.1 Broad Objective

To determine the effect of training health care providers using WHO Kangaroo Mother Care training manual on their knowledge, attitude and practice.

3.2.2 Specific Objectives

1. To assess the level of knowledge, attitude and practices on KMC among health-care providers before and after training.
2. To determine changes in the level of knowledge, attitudes and practices among health care providers after being trained on KMC.

CHAPTER FOUR:

STUDY METHODOLOGY

4.1 Study Design

The study was a Pre- and post-test design. This method is recommended when one is testing the effectiveness of an intervention in an institution or organization [46, 47].

4.2 Study Site

The study was conducted in selected district hospital in the North Rift Region of Kenya. Four out of the eight district hospitals in this region were included. This included Eldama Ravine (Koibatek), Nandi South, Nandi North and Iten District hospitals. All of them have medical officers, clinical officers and nurses. They serve as referral centres for Health Centres and sometimes dispensaries. The services offered in these facilities include out-patient clinics, in-patient care, maternity, paediatric and new-born care services.

Each of these hospitals has a separate room next to maternity wards as a nursery for low-birth-weight preterm babies. The rooms are usually small and babies are left alone most of the time. Most of the hospitals do not have functioning incubators, and babies are kept warm using electrical space heaters. This is difficult in regulating the room temperatures as well as maintaining that of the infants'. None of these hospitals had a KMC program in place, for example having a separate room or ward for mothers who want to practice it.

4.3 Study Population

The study subjects included nurses, clinical and medical officers in respective district hospitals. They work in different sections within hospitals such as out-patient clinics/emergency room and in-patient (maternity, paediatric, medical and surgical

wards). These health care providers rotate within these sections on a regular basis (every 3-6 months), and do get involved in handling and care of preterm newborn infants. Each of the selected district hospitals had approximately 85 to 100 health care providers, with an estimated total of 380 health workers in all the four hospitals. Two out of the 8 are smaller than the rest, and are classified as Sub-district Hospitals.

4.4 Sampling Method and Sample Size

Sample size:

Using a paired t-test, power of 80% and 0.05 level of significance, the study intended to achieve a sample size to be able to detect medium effect size of more than 0.30. This needed a minimum of 85 participants. Anticipating a loss of 30% due high staff turn- over, leaves and possible withdrawal of consent, a sample size of 120 was estimated. Eighty eight (88) participants completed the entire study and their data was fit for paired analysis. Using a paired test, this could be able to detect an effect size of 0.302.

Selection of district hospital:

The names of the eight district hospitals were divided into 2 categories, the 6 District Hospitals and the 2 Sub-District Hospitals. The names 6 of the districts were written on small plain pieces of paper folded and mixed. An independent colleague was asked to select three out of the 6 pieces of paper and reveal the names picked. The same process was repeated for the two Sub-District Hospitals. The selected names yielded the hospitals included in the study.

Identification of participants:

The Matron in charge gave the names and availability of the health workers in their facility. Each worker was requested by the Matron to offer audience to a student

doing research and hear what he has to say. The researcher then approached each participant for consent to be recruited into the study. After consenting, with the help of nursing or clinical officer in-charge, a date was selected for training from the continuing medical education (CME) calendar for each hospital.

4.5 Inclusion and Exclusion Criteria

Inclusion criteria:

Health care providers (nurses, clinical officers and medical officers) working both in out-patient and in-patient sections, who gave consent to participate in the study during the pre-test, training and post-test.

Exclusion criteria:

Health-care providers in specialized fields not directly involved in the care of preterm/LBW infants such as surgeons, nurses (ophthalmic nursing), clinical officers (orthopaedics, anaesthesia and, chest and skin diseases) or did not give consent to participate in the study.

4.6 Study period

The study was conducted over a period of one year between May 2010 and May 2011.

4.7 Study methods and Data collection

Procedure:

The dates and venues for the trainings were set by the nursing or clinical officer in-charge for each facility. During the CMEs, pre-training assessment using self-administered questionnaire on knowledge attitude and practice on KMC was filled by each participant independently. The training was done by the researcher. During training, a check list for filling out the pre-training questionnaire and participating in

the training was kept. After training had been done for all participants, a Post-training assessment was done on health-care providers starting with the earliest participants. Each participant was approached three months since training for their post-training assessment using the self administered questionnaire.

The training Manual:

The content of the information was based on WHO manual (2003) on KMC [8] and 1st edition of Essential New-born Nursing for Small Hospitals (India, 2004) [45]. WHO Essential new-born care training course (2010) module 5, session 14 format on KMC was adopted [9] (appendix 3). This was carried out by the following methods; (1) demonstration using power point projection, (2) role play and skill demonstration by using a doll and a linen (binder), hat and a pair of socks for every 5-10 participants, (3) question and answer sessions where clarifications on various issues were made, (4) video session where two video clips were shown, one on the procedure and benefits of KMC and another on the successes of KMC in Malawi. This was to ensure 'active learning' of the participants and help them to learn the facts the best way possible by ensuring clarity, relevance to the future and to previous experiences.

The training was divided into eight sessions: (1) Introduction; definition and components of KMC (2) Advantages of KMC, (3) When to start KMC, (4) KMC; The practical issues, (5) Mothers activities during KMC, (6) Feeding the baby, (7) duration, discharge and follow-up, (8) group exercise/ video clips. The duration for training was one hour. The researcher also visited the labour wards and new-born nurseries to observe the care of the new-born and demonstrate KMC method where possible.

Questionnaire:

The questions were adopted from the questionnaire used by Pauline et al [38] in which it's content validity was established by an expert panel of four neonatal nurses and modified for this study.

The questionnaire was pre-tested prior to commencement of the study on a small sample of Health care providers (n=9) who were not included in the study. This was meant to ensure clarity of instructions and that items were understandable and worded appropriately. The same questionnaire was then used in the pre-test and post-test. The questionnaire had four sections; (a) demographic data such as age, sex, profession, level education of the health worker and years of working experience (b) questions on knowledge with "yes", "no" and "don't know" answers (c) statements to assess the health workers attitude towards KMC using a 5-point Likert scale "strongly disagree, disagree, neutral, agree and strongly disagree" (d) Closed-ended questions requiring a 'yes' or 'no' answer were used to ascertain KC practices.

4.8 Data analysis

The data was coded and entered on a spread sheet and analyzed using STATA version 10.0. Descriptive statistics were carried out for continuous variables using measures of central tendency such as mean, median, and measures of dispersion such as standard deviation and range. Frequency listings and percentages were used for categorical variables. To assess whether there were any differences between the outcome of interest pre and post training, the Mcnemar's test was used for categorical variables and paired t-test for continuous variables. In cases where the variable was not binary, the chi-square test was used to assess whether there was any association

between the outcomes pre and post training and the Fisher's exact test was used where the cell values were small.

4.10 Ethical consideration

Permission to carry out the research was obtained from the Institutional Research and Ethics Committee (IREC). Permission from the Medical Superintendents/ Medical Officers in-charge in each of the selected hospitals was also obtained. A written informed consent from the health care providers who agreed to participate in the study was obtained before the pre-test. The questionnaires did not bear the names of participants and all information collected was treated with confidentiality.

4.9. Study limitations

Using Self-administered questionnaire, it was difficult to get respondents clarification later on some of the unmarked responses. It was not possible in this study to verify the practice responses of health care providers through direct observation of mothers' actual participation in KMC. The evaluation three months after training may not have been a sufficient duration to realise benefits of KMC and therefore could not have had any effect on their attitude.

CHAPTER FIVE:

RESULTS

Table 6Demographic characteristics of Health Care Providers

Variable	**Frequency (%)** **N=88**
Sex	
Male	37 (42.0)
Female	51 (58.0)
Site	
Iten	17 (19.0)
Kapsabet	22 (25.0)
Nandi hills	36 (41.0)
Eldama Ravine	13 (15.0)
Profession	N=87
Clinical officers	28 (32.0)
Medical officers	5 (6.0)
Nurses	54 (62.0)
Age in years	
Mean (Std)	38.41 (5.3)
Median (Range)	38 (27, 51)
Work experience	N=73
Mean(std)	13.56 (6.0)
Median(range)	13 (2, 28)

Majority (62.0%) of subjects were nurses. Male-to-female ratio was 1:1.4. Most (41%) of them were from Nandi Hills. Median age 38years and mean working experience of 13.6 years

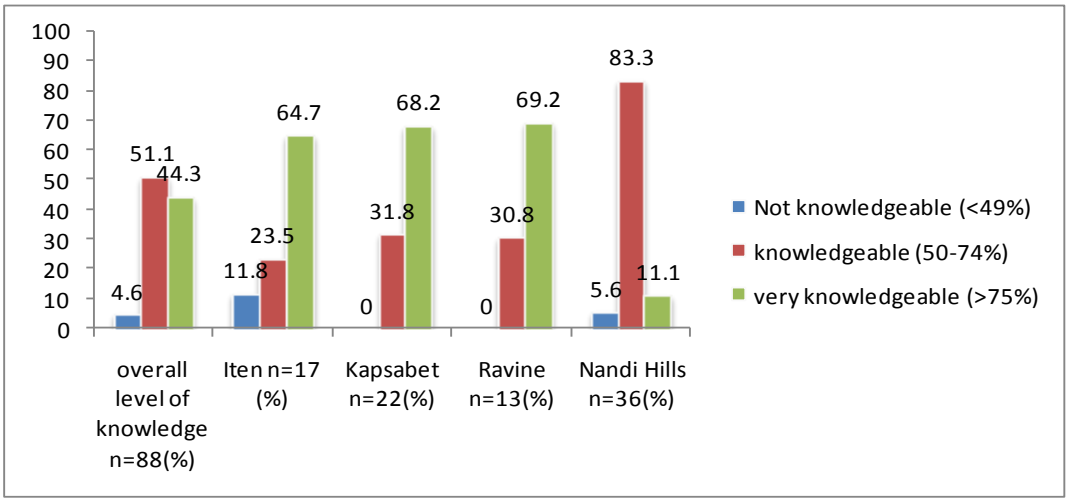


Figure 3: Health care providers overall level of knowledge and site based on score before training

95.5% of the respondents were knowledgeable about kangaroo mother care.

More than 64% of respondents were very knowledgeable in three out of the four hospitals.

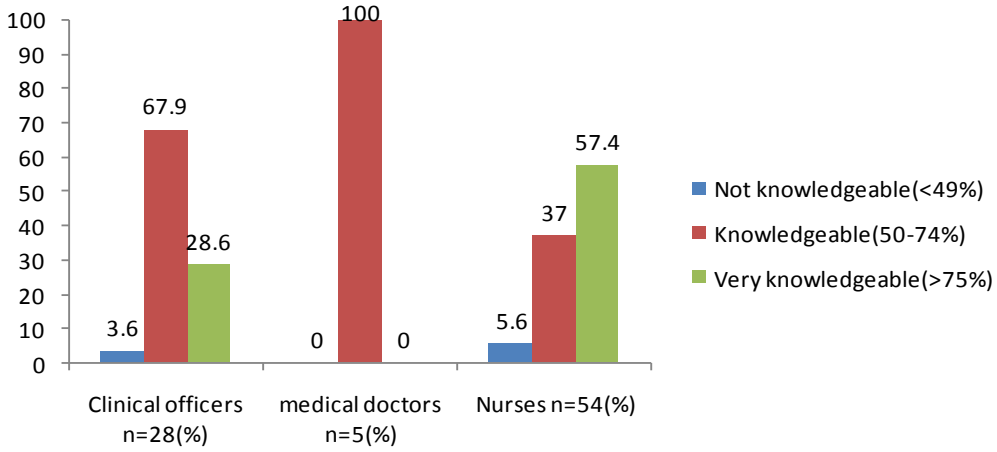


Figure 4Health care providers' level of knowledge by profession based on score before training

More than half (57.4%) of the nurses were very knowledgeable, while all the five doctors were knowledgeable.

Table 7 Health Care providers knowledge responses before and after training

Variable	Pre training (%)	Post training (%)	p- value
KMC is a method of caring for stables low birth weight infant	77 (87.5)	80 (91.0)	0.629[3]
KMC involves skin to skin contact	83 (94.3)	78 (88.6)	0.267[3]
KMC involves placing baby in a kangaroo position on mothers chest	67 (76.1)	62 (70.5)	0.557[3]
Baby can be breastfed while on KMC method	55 (63.0)	79 (90.0)	0.000[3]
Infant on KMC can be discharged early	43 (49.0)	63 (70.5)	0.003[3]
Infant on KMC can be discharged if stable and gaining 15-20gm/day	73 (83.0)	60 (68.2)	0.047[3]
KMC practicing mothers need support in hospital and at home	71 (80.7	64 (72.7)	0.310[3]

[3] Mcnemars' test: test for agreement in knowledge responses before and after training

There was change in the relationship between KMC and, breastfeeding and early discharge by 28.6% and 21.5% respectively.

Table 8Health Care providers attitude towards KMC before training

Variables, n=88	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
Kangaroo mother care has positive effect on physical well being of the infant	38(44.2)	33(38.4)	3 (3.5)	12(14.0)	0
Infants on kangaroo mother care have low risk of hypothermia and infection	47(53.4)	36(41.0)	4(4.6)	1(1.1)	0
Kangaroo mother care results in more effective breastfeeding	34(38.6)	23(26.1)	3(3.4)	27(30.7)	1(1.1)
Kangaroo mother care will reduce length of hospital stay and cost of health care	30(34.1)	24(27.3)	3(3.4)	31(35.2)	0
Kangaroo mother care enhances the parents' confidence	20(22.7)	60(70.5)	3(3.4)	3(3.4)	0
Kangaroo mother care will promote mother-infant bonding	65(74.7)	19(21.8)	2(2.3)	0	1(1.2)
Parents should be encouraged to practice kangaroo mother care	16(18.2)	59(67.1)	6(6.8)	7(8.0)	0
Parents should be given relevant information on kangaroo mother care	30(34.1)	52(59.1)	3(3.4)	2(2.3)	1(1.1)
Facilitating kangaroo mother care is an added burden to the health staff	4(4.6)	10(11.4)	8(9.1)	29(33.0)	37(42.1)

31.82% and 35.23% of the respondents disagreed on KMC resulting in more effective breast feeding, and reduced length of stay and cost respectively. 75% do not believe KMC is burdensome.

Table 9: The attitude means scores of Health Care providers towards KMTC before and after training

Variable	N	Mean	Std error	95% confidence interval	p-value
Pre score	75	34.95	0.56	(33.82, 36.07)	
Post score	75	35.65	0.44	(34.78, 36.53)	
Difference	75	-0.71	0.53	(-1.77, 0.36)	0.189[4]

[4] Paired t-test

The difference in attitude scores pre and post training were not statistically significant (p=0.189).

Table 10: Role of Health Care providers in promoting KMC before and after training

Variable n=85	Pre training (%)	Post training (%)	p-value
Encouraged mothers in the participation of KMC	80 (94.0)	82(97.0)	0.727[3]
Assisted mothers in the participation of KMC	68 (80.0)	78(92.0)	0.031[3]
Provided information to the mother about KMC	76(89.0)	82(97.0)	0.146[3]

[3] Mcnemars' test

The number of respondents who assisted mothers in participation of KMC increased by 19%, while those who provided information and encouraged mothers to participate in KMC increased by 4% and 3% respectively.

CHAPTER SIX:

DISCUSSION

6.0: Demographics

Majority of health care providers in most hospitals are nurses, which explains their large number of participation in this study. The clinical officers made the second largest category of health care providers. There are usually fewer medical officers working at the district hospitals and this explains the small number of respondents in this category of health care providers.

The subjects in the surveys that have been conducted by Pauline et al, Engler et al [40] and Ann Flynn[39] regarding knowledge attitude and practice on KMC were neonatal nurses. In this study, the subjects are of different cadres (nurses, medical doctors and clinical officers) with different training background. Therefore, they are likely to differ in their level of knowledge regarding KMC. However, in the study by Parikh et al [35], the subjects included nurses, obstetricians and paediatricians. KMC is largely a nursing procedure and is usually conducted and supervised by the nursing staff in most centres where it is being practiced. But the promotion of kangaroo mother has been advocated by different cadres of the medical profession including medical doctors and nurses.

The majority of health care providers in this study had a working experience of more than 10 years. The experience of participants in this study is considerably greater than that of the participants in the study by Solomons N [41], where majority of the subjects interviewed had a working experience of between 1 to 5 years. However, it is not clear how this affected their knowledge, attitude and practice regarding kangaroo mother care.

6.1: Knowledge of kangaroo mother care

Majority of the health-care providers were knowledgeable about KMC before training. Except in Nandi Hills hospital, more than two thirds of the participants in three out of the four hospitals were very knowledgeable. Only a minority of health care providers from Nandi Hills were very knowledgeable about KMC. It is likely that they had no sufficient prior educational training and therefore their level of knowledge was lower compared to those from Kapsabet, Eldama Ravine and Iten district hospitals.

Although nurses were the majority, more than half of them were very knowledgeable about KMC compared to doctors and clinical officers. This is possible because nurses spend more time in assisting mothers and newborn infants to practice KMC which is mainly a nursing procedure.

The pre-training level of knowledge was comparable with findings of a survey conducted by Engler AJ et al [(40)], where majority of respondents (82%, n=553) were knowledgeable and reported practicing kangaroo care. However, there has been advocacy and practice of KMC for over 25 years in this setting, as a result of which KMC has become a widely accepted method of care of newborn babies. Similarly in the survey by Ann Flynn [(39)] the overall level of knowledge of neonatal nurses (n=62) regarding KMC varied from good to excellent (least score of 68%) although it was a new occurrence in Irish neonatal care.

However, the pre-training level of knowledge in this study was higher compared to the findings by Parikh TB et al [(35)] where a minority of participants knew about KMC and related domains before the training. After a one day skill-based awareness training program, the participants' knowledge improved significantly ($p<0.001$).

Similarly in the study by Harmesh Singh [36] showed that a one day training workshop had an excellent immediate cognitive impact among final professional medical students who participated in the study with 54% scoring over 76%. Majority of the students didn't know about KMC in the pre-test. The post-test assessment in the two studies was done immediately after the training, unlike in this study where post-test was done after 3 months. This is likely to differ in terms sustainability of knowledge.

In the two surveys by Pauline C et al [38] and that by Solomons N [41], nurses demonstrated good knowledge regarding KMC. However, in these studies participants were nurses who were working specifically in neonatal units in institutions already implementing KMC. Therefore, they were likely to be more knowledgeable about KMC. In contrast, this study included participants of different cadres working in various sections both in-patient and out-patient. However, the level of knowledge did not differ significantly.

There was a change in the knowledge about the relationship between KMC and, breast feeding and early discharge. However, there was a decrease in number of respondents agreeing on the discharge of infants based on their weight gain. Although the health care providers were aware of early discharge of the babies on KMC, it may be impractical for them to make decision based on weight gain in situations where measurements are not consistently done. There was no significant change in the remaining four out of the seven knowledge responses after the training. Despite using validated WHO training manual, the instructor factor confounding the effect of training on the outcome on knowledge cannot be ruled out. Although the trainer ensured that the methods and training materials used were the same in all the four

hospitals, no similar studies evaluating effect of KMC training in the North Rift region to make comparisons.

6.2 Attitude on Kangaroo Mother Care

Overall, majority of health care providers agreed that KMC had a positive effect on physical well being of the infant and, results in low risk of hypothermia and infection, enhanced mothers' confidence in caring their LBW infants, and promotes mother-infant bonding. The participants felt that parents should be encouraged to practice KMC (85%) and be given information regarding the method (93%). However, a third of the respondents (32% and35%) disagreed with the effects of KMC on breastfeeding and, reduced length of stay and cost of health care. Majority (75%) of the respondents do not believe KMC is burdensome to the health-care providers.

The pre-training survey findings were similar with those by Pauline C et al[38] where majority of the respondents agreed that KMC promoted mother-infant bonding (100%, n=34), enhanced parents' confidence (91.2%) and had a positive effect on physical well being of the infant (94.1%). However, 44.1% were uncertain whether KMC resulted in effective breast feeding. Seventy percent of respondents also felt that KMC was not burdensome to the nursing staff.

The attitudes of respondents in this study differed with those in a study by Solomons N [41], where all the respondents (n=15) agreed that KMC promoted mother-infant bonding, enhanced mother's confidence with regard to how she handles her LBW/preterm infant and that KMC resulted in effective breastfeeding. However the sample size was small, and subjects were nurses working in the KMC ward and antenatal clinics in one hospital. Therefore it is difficult to draw general conclusions from these findings.

The attitude scores prior to training were compared with those obtained after the training using a paired t-test. The attitudes towards KMC remained the same after the training. It is likely that training alone is not sufficient to result in positive change in attitude toward KMC. It is possible some of the health-care providers have not observed benefits of KMC and or not directly involved in preterm care, therefore their opinions were the same.

6.3. Practice on Kangaroo Mother Care

Eighty five out of 88 participants responded on practice questions pre and post training. Majority of the participants indicated practicing KMC before the training. In comparing findings before and after training, the practice of KMC increased in terms of supporting mothers to physically put infants on it. Although there was increase in terms of providing information on KMC and encouraging mothers to participate in it, it was not statistically significant.

The pre-training level of practice was comparable with that found by Pauline C et al [(38)], where majority of neonatal nurses (85.3%, n=34) interviewed provided mothers with information on KMC. In this same study all the participants indicated that they did encouraged and assisted parents to provide KMC. However the study was conducted in one hospital and specifically interviewed nurses trained to work in the neonatal intensive care unit (NICU). Specialized units such as NICU have not been established in the District Hospitals and Sub-District Hospitals in Kenya. Due to lack of equipment such as incubators in these district hospitals, a higher rate of KMC utilisation could have been expected.

Similarly, the level of practice was comparable with findings by Engler AJ et al [(40)], where majority of respondents (over 82%) reported practicing kangaroo care. this

despite having sufficient resources available for care of preterm low-birth-weight babies with higher survival rates. KMC is an acceptable alternative to conventional method in this setting. However, this survey also targeted nurses working in the neonatal intensive care units (NICU) and who were most knowledgeable about kangaroo care in the respective hospitals.

Since these were self reported practice responses, it is difficult to determine actual number of babies who were put on KMC from this study. In the absence of a KMC policy with clear national guideline on its implementation by the ministry of health, health facilities are not likely to implement it as part of essential newborn care. Therefore, the level of practice is likely to be low.

CHAPTER SEVEN:

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusion(s):

1. Health-care providers had good knowledge regarding KMC before training.
2. There was a change in the knowledge about the relationship between KMC and, breastfeeding and early discharge.
3. The training did not result in change of health-care providers' attitudes regarding KMC despite majority agreeing with its benefits.
4. The practice of KMC increased in terms of supporting mothers physically to put infant on it, but there was an insignificant increase in providing information and encouragement to mothers.

7.2 Recommendation(s):

1. Promotion of KMC practice by concerned health sector should be continued.
2. Other modes of training that will promote appropriate attitude towards KMC among health care providers need to be explored.

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APPENDICES

APPENDIX I : Questionnaire

SR No.

Part A

Background

Age (years):_____

Gender: male [ ] female [ ]

Profession:

Nurse [ ]

Clinical officer [ ]

Medical doctor [ ]

Working experience (years) ------

Part B

Knowledge on KMC

1) Kangaroo mother care is a method of caring stable low birth weight preterm infant below 2000grams

Yes [ ]

No [ ]

Don't know [ ]

2) Kangaroo mother care involves skin-to-skin contact between the mother and the low birth weight preterm baby

Yes [ ]

No [ ]

Don't know [ ]

3) In kangaroo mother care method the baby is placed in a kangaroo position on a mother's chest

Yes [ ]

No [ ]

Don't know [ ]

4) The baby can be breast fed while on kangaroo mother care method

Yes [ ]

No [ ]

Don't know [ ]

5) The preterm infant on kangaroo mother care method can be discharged early

Yes [ ]

No [ ]

Don't know [ ]

6) Infant on kangaroo mother care method can be discharged if the infant is stable Gaining weight 15-20gm/kg/day

Yes [ ]

No [ ]

Don't know [ ]

7) The mother practicing kangaroo mother care needs support in the hospital and at home

Yes [ ]

No [ ]

Don't know [ ]

Part C: Attitude on KMC

8. Kangaroo mother care has positive effect on physical well being of the infant

Strongly agree [ ] agree [ ] neutral [ ] disagree [ ] strongly disagree[ ]

9. Infants on Kangaroo mother care have a low risk of hypothermia and infection

Strongly agree[ ] agree[ ] neutral[ ] disagree [ ] strongly disagree[ ]

10. Kangaroo mother care results in more effective breastfeeding

Strongly agree[ ] agree [ ] neutral [ ] disagree[ ] strongly disagree[ ]

11. Kangaroo mother care will reduce hospital stay and cost of health care

Strongly agree[ ] agree[ ] neutral [ ] disagree[ ] strongly disagree[ ]

12. Kangaroo mother care enhances the parents' confidence

Strongly agree[ ] agree[ ] neutral[ ] disagree[ ] strongly disagree[ ]

13. Kangaroo mother care will promote mother infant bonding

Strongly agree[ ] agree[ ] neutral[ ] disagree[ ] strongly disagree[ ]

14. All parents should be encouraged to practice kangaroo care

Strongly agree[ ] agree[ ] neutral[ ] disagree [ ] strongly disagree[ ]

15. All parents should be given relevant information on kangaroo care.

Strongly agree[ ] agree[ ] neutral [ ] disagree[ ] strongly disagree[ ]

16. Facilitating kangaroo care is an added burden to the health staff.

Strongly agree[ ] agree[ ] neutral [ ] disagree[ ] strongly disagree[ ]

Part D: Practice on KMC

17. Encouraged mothers in the participation of kangaroo mother care

Yes [ ]

No [ ]

18. Assisted mothers in the participation of kangaroo mother care

    Yes [ ]

    No [ ]

19. Provided information about kangaroo mother care to parents

    Yes [ ]

    No [ ]

20. Participated in a training program about kangaroo mother care

    Yes [ ]

    No [ ]

21. Been supervised in the technique of kangaroo mother care

    Yes [ ]

    No [ ]

APPENDIX II: Consent form

I……have agreed to be part of the study conducted by Dr. BOGONKO GEORGE of the department of Child Health and Paediatrics, Moi University on '**Assessment of the impact of training on the knowledge, attitude and practice, among health care workers in promoting use of kangaroo mother care in rural district hospitals in Kenya**'.

The study involves answering questions on a questionnaire and participation in a training session on 'kangaroo mother care'. My participation in this study shall be on a voluntary basis.

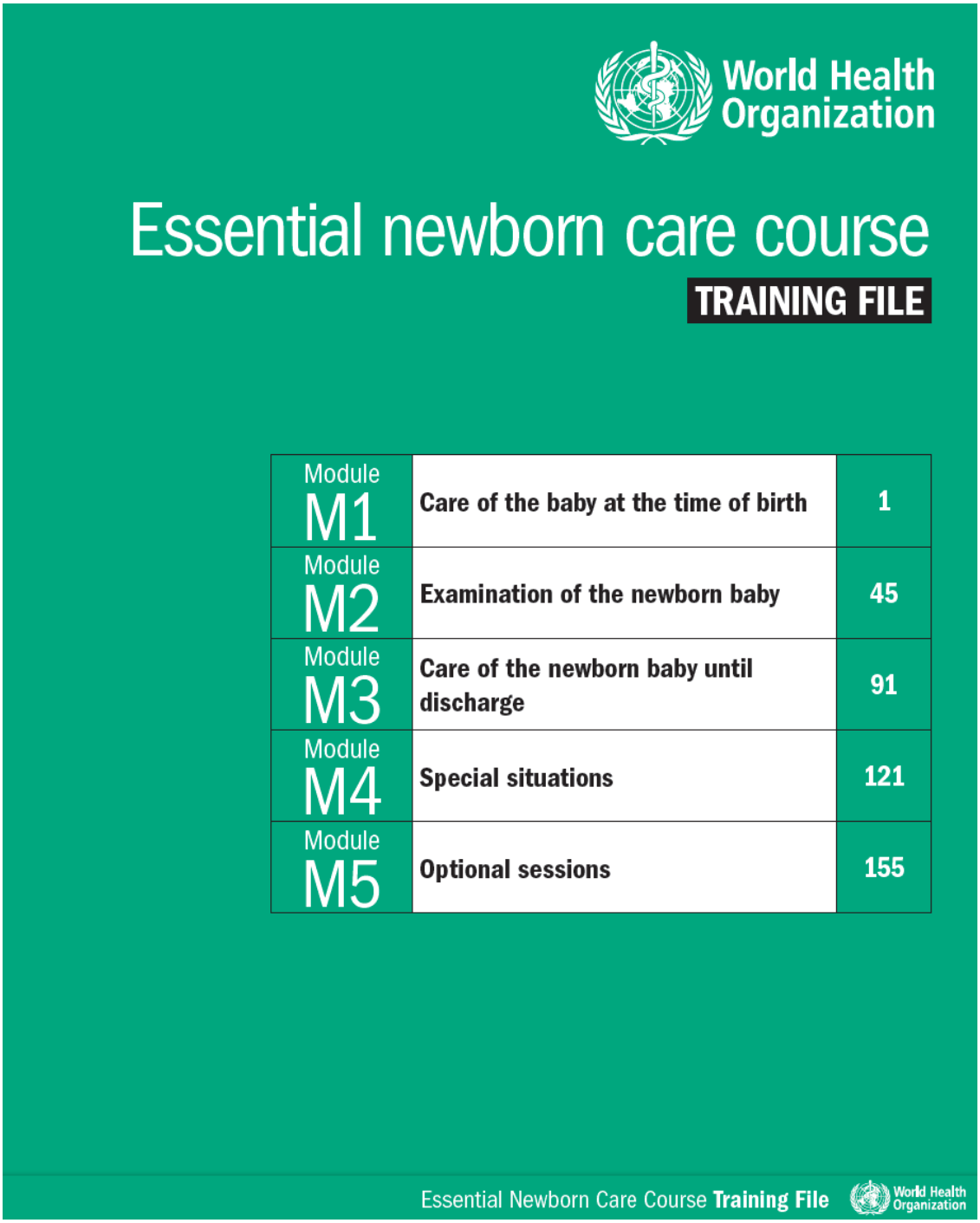
I have understood the foregoing and hereby give consent to participate in the study.

Signature of officer……Date……....

Signature of investigator……Date……...

APPENDIX III:

KMC training manual: WHO 2010, Essential Newborn Care Course Training File, Module 5, session 14. Kangaroo Mother Care.



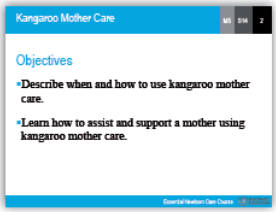
1. Introduce the session

DURATION 5 minutes

MAKE THESE POINTS

- Kangaroo mother care is more than simply placing the baby skin-to-skin with the mother. It is a way of providing a well preterm or low-birth-weight baby with the benefits of incubator care, by keeping the mother and baby together with body contact both day and night.
- The baby "lives" next to the mother's skin, inside her clothes. This kind of care has many advantages.
- It also emphasizes the important central role the mother plays in the survival and well-being of her baby.

SHOW slide/overhead 14/2 – Objectives



SHOW slide/overhead 14/3 – A mother and baby using kangaroo-mother care

ASK Do any of you work in a hospital where kangaroo mother care is practised?

- If any participant(s) answer "Yes", ask them the next question.

ASK Which babies receive kangaroo mother care?

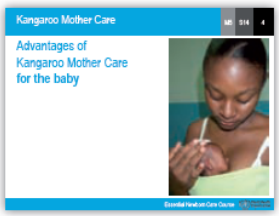
- Well small babies, particularly the preterm or low-birth-weight babies who need their initial care in a special newborn unit.

2. The advantages of kangaroo mother care

DURATION 10 minutes

MAKE THESE POINTS

- Kangaroo mother care offers a number of advantages to the baby, to the mother and to the health services.
- Many (research) questions remain unanswered when comparing kangaroo mother care to conventional methods for caring for preterm and low-birth-weight babies in hospitals.
- Even so, KMC appears to offer the best way to care for these babies in areas where facilities do not exist or are insufficient.
- Even where expensive technology does exist and adequate care is available in a hospital setting, KMC offers a uniquely personal humanized form of care that helps with the bonding of the mother and her baby and helps to promote breastfeeding. It is therefore a form of care which should always be considered for the stable small baby.



SHOW slide/overhead 14/4 – Advantages of Kangaroo Mother Care for the baby

ASK What are the advantages of kangaroo mother care for the baby?
Write responses on flip chart paper.

- The baby is next to his mother's breasts. This helps to:
- Keep the baby warm and his temperature stable, so the baby uses less energy.
- May reduce hypothermia, i.e. babies becoming clinically cold.
- Keep the baby's heart and breathing rates stable.
- Keep oxygenation, oxygen consumption and blood glucose levels equal or better than infants receiving conventional treatment. In other words, in an incubator.
- Maintains sleep patterns.
- Reduced stress in preterm and low-birth-weight babies, which results in less crying.
- Growth rates are equal to babies not receiving KMC. Larger daily weight gain whilst in hospital.
- The baby has ready access to the breast.

SHOW slide/overhead 14/5 – Advantages of Kangaroo Mother Care for the mother

ASK What are the advantages of KMC to the mother and the rest of the family?

- It helps the mother to form strong emotional bonds to her baby.
- The mother feels more confident in handling her baby.
- The mother feels good about herself and the care she can give her baby.
- The mother feels less stressed during kangaroo mother care.
- The mother is more likely to exclusively breastfeed her baby.

MAKE THESE POINTS

- All mothers giving birth to a small baby, whether or not kangaroo mother care is being considered, should be encouraged to start expressing her breast milk within 6 hours of delivery.
- The father and other relatives can be involved in providing kangaroo mother care if the mother is sick or needs to be away from her baby.

ASK What other general advantages of KMC are there to the health services?

- Lower capital investment and recurrent costs.
- There is less need for incubators, which are a source of hospital-acquired infections.
- Earlier discharge times are possible for small babies; reduced readmission rates.
- The mother and family are involved, leaving staff free to provide medical and nursing care.

3. When to start Kangaroo mother care (KMC)

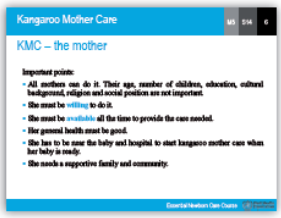
DURATION 10 minutes

MAKE THESE POINTS

- When to begin kangaroo mother care depends upon the condition of both the mother and the baby. It is necessary to look at each mother/baby pair separately as they will each have their own unique set of circumstances to be considered.

- The care of a small baby will depend on his condition. The more preterm the baby and the lower the birth weight, the more problems that are likely to occur. Experience indicates that babies of 1800 g and above can in most cases start KMC after birth, if they are in a stable condition. Babies below this weight commonly have problems that need hospital care and treatment for several days or weeks. The more premature the longer it takes before the baby is stable enough to begin KMC.
- However, kangaroo mother care may provide a sick baby with his best and in some cases, only chance of survival in a situation where referral to a specialized newborn unit is not possible.
- Before starting KMC, the following issues should be considered.

SHOW slide/overhead 14/6 – KMC – the mother



TELL a participant to read aloud the points on the slide/overhead

- It is important that the mother and father do not smoke.
- Tell the parents of the dangers of other people smoking near their baby or in the same house – this particularly applies to other family members and friends.

SHOW slide/overhead 14/7 – When to start KMC – the baby

- The ability to coordinate sucking and swallowing is NOT an essential requirement as both preterm and low-birth-weight babies can be fed by gastric tube and later by cup or another feeding method.
- The baby must be free of life-threatening disease or life-threatening malformations. (The management of these conditions has priority over kangaroo mother care, though skin-to-skin contact will still be beneficial until KMC is possible.)

MAKE THESE POINTS

Before starting KMC, the mother needs to be well-prepared.

Discussion should cover the following points:

- The need for continuous skin-to-skin contact;
- How her baby will be fed;
- How to position and attach her baby for breastfeeding;
- How to express her breast milk;
- How she will care for her baby; and
- What she can and cannot do.

DURATION 10 minutes

4. Kangaroo mother care: The practical issues

SHOW slide/overhead 14/8 – What should the baby wear?

ASK What do you think the baby should wear?

- Show the class appropriate baby's clothes and dress a doll ready for the demonstration.

MAKE THESE POINTS

- If the surrounding temperature is 22–24 °C, then the baby should be naked inside the "pouch" except for a diaper, a warm hat and socks.
- If the temperature is below this, in addition to the diaper, warm hat and socks, the baby should wear a sleeveless cotton shirt. The shirt should be open in the front to allow the baby's face, chest, abdomen and arms and legs to remain in skin-to-skin contact with the mother's chest. The mother then covers herself and her baby with her usual clothes.

SHOW slide/overhead/video clip 14/9 – What should the mother wear? (Video clip: The mother with the pink binder)

MAKE THESE POINTS

- The mother should wear whatever she finds most comfortable and warm for the surrounding temperature. She should ensure that her clothes are big enough to accommodate the baby and that skin-to-skin contact can be maintained. In the slide/overhead you will see mothers wearing special clothes, but these are not necessary unless traditional garments are too tight.
- Temperatures below 18 °C may not be high enough to keep the mother warm and her clothing may not provide enough warmth for her baby. In this situation, the room they are in will need to be warmed.

MAKE THESE POINTS

- The mother with the "pink binder" is from a very hot country. She has a long piece of cloth that she uses to support her baby. As you watch the video look at how simply the cloth is tied.
- A mother does need one special item – "a support binder". This helps her to hold her baby safely close to her chest preventing the baby from slipping down. Binders can be made from a length of traditional locally available materials.

Show the class one or two examples of "binders" used for KMC.

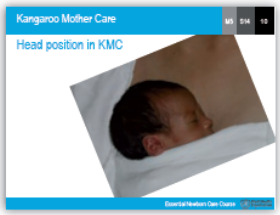
DEMONSTRATE KMC with a doll or mannequin.

Ask one of the students or a facilitator to model the practical aspects of KMC.

Follow these directions:

- Use a doll.
- Place the doll in an upright position between the mother's breasts, chest to chest.
- Secure the doll in this position with a support binder.

SHOW slide/overhead 14/10 – Head position in KMC



This slide/overhead shows some of the practical steps necessary to practise KMC.

MAKE THESE POINTS

- The baby's head should be turned to one side and slightly extended. This slightly extended head position keeps the airway open and allows eye contact between the mother and baby.
- The top of the binder is just beneath the baby's ear.

MAKE THESE POINTS

- Tie the cloth firmly enough so that when the mother stands up the baby cannot slide out.
- Ensure that the tight part of the cloth is over the baby's chest.
- The baby's abdomen should not be constricted and should be somewhere at the level of the mothers stomach. This way the baby has enough room to breath. The mother's breathing helps stimulate the baby.
- The hips should be flexed and extended in a "frog-like" position; the arms should also be flexed.

Moving the baby

MAKE THESE POINTS

- Whenever the baby is taken out or put back into the pouch or binder it should be as stress free as possible and comfortable for the baby. This can be done in the following way.

DEMONSTRATE this manoeuvre with a doll and a participant playing the role of the mother.

- Hold the baby with one hand placed behind the neck and on the back.
- Lightly support the lower part of the jaw with your thumb and fingers to prevent the head from slipping down and blocking the airway when the baby is in an upright position.
- Place the other hand under the baby's buttocks.

5. The mother's activities during KMC

DURATION 5 minutes

SHOW slide/overhead 14/11 – Everyday activities

MAKE THESE POINTS

- Once the baby is positioned correctly, during the day the mother can do whatever she likes; she can walk, stand, sit or engage in different activities, recreational, educational or income-generating.
- The only requirements she has to meet are cleanliness and hygiene, including washing her hands frequently, maintaining a low level of noise and regular feeding of the baby.

SHOW slide/overhead/video clip 14/12 – The sleeping position

MAKE THESE POINTS

- When the mother wants to rest or sleep, a reclined or semi-sitting position is best, as in the slide/overhead. Pillows or cushions or folded blankets can help achieve this on a bed. A semi-sitting position helps the baby to breathe normally.
- If the mother finds the semi-sitting position uncomfortable and cannot sleep she should sleep in her usual position because the advantages of KMC are greater than the risk of her baby developing breathing problems.
- In the video clip mothers caring for their babies using KMC are seen sharing a postnatal ward.

DURATION 5 minutes

6. Feeding the baby

SHOW slide/overhead 14/13 – KMC: Feeding the baby

MAKE THESE POINTS

- Initially, many KMC babies need to use an alternative feeding method. Some require gastric tube feeding. An ideal size tube is a number 5 to 8 French gauge, which can be left in the baby's stomach between feeds. It needs to be well secured with tape by the side of the baby's nose.
- Before a baby is able to totally breastfeed some babies need the help of other methods of feeding such as a cup, spoon, syringe or dropper, while other babies are able to move straight from milk expressed into their mouths or from tube feeding to breastfeeding. This transition takes varying amounts of time; about a week is the usual time period.

- Explain to the mother that she can breastfeed her baby in a kangaroo position using the same directions as for direct expression of expressed breast milk into the baby's mouth; although for the first breastfeeds, the baby should be taken out of the pouch and wrapped so that he does not get cold.
- It is helpful to teach the mother about attachment and positioning in advance, otherwise, at this point, teach her the key points to correct positioning and attachment.
- Ask the mother to breastfeed at regular intervals, every 2 to 3 hours during the night and during the day. Continue with frequently scheduled exclusive breastfeeding until the baby shows a satisfactory growth (15 g/day or more) or until the baby reaches 1800 g of weight. Then tell the mother to breastfeed on demand.
- If the mother notices the baby seems to be tired or looks blue or dusky or his colour is not right, then tell her to stop feeding and let the baby rest. Check the baby's breathing after a few minutes.

DURATION 5 minutes

7. How long should KMC last?

Kangaroo mother care can be used for babies until they are about 2.5 kg or 40 weeks post-conceptual age. It should continue at least until the baby can maintain a stable body temperature.

ASK **How long should kangaroo mother care last each day?**
Kangaroo-mother care should last for as long as possible each day. It may be difficult for the mother to have skin-to-skin contact with her baby continuously for 24 hours a day.

SHOW slide/Overhead 14/14 – The wider family can help with KMC

ASK How can skin-to-skin contact be continued when the mother needs to interrupt it for a short period?

The father or another relative or a close friend can be asked to take over. In this slide/overhead you can see a grandmother, a husband and a mother's brother.

MAKE THESE POINTS

- If the mother needs to have a bath and the air temperature is not too low, the baby can be wrapped in warm towels, cloths and laid on the mother's bed for 10–20 minutes without any harm.
- It is important to reassure the mother that most of the care the baby needs can be done while the baby is in skin-to-skin contact. The only routine reasons the baby will need to be taken from skin-to-skin contact are:
  - For clinical assessment
  - Cord care
  - Cleaning and nappy (diaper) change.
  - Sometimes for feeding, especially for cup feeding

Show the video of kangaroo-mother care, if available.

8. Group exercise

DURATION 10 minutes

Divide the class into pairs or groups of 4. One facilitator for 8 participants. Give each pair a doll, clothes and a binder.

Each group should practise teaching a mother by:

- Dressing a doll appropriately.
- Placing and supporting a "baby" in kangaroo position.

MAKE THESE POINTS

- The slightly extended head position to keep the baby's airway open.
- The flexed position of the hips and arms.
- The binder cloth needs to be tight enough to prevent the baby slipping out, without constricting his abdomen, which would restrict his breathing.

Participants should practise moving the baby in and out of the binder.

Facilitators should emphasize:

- Holding the "baby" with one hand behind his neck and on his back.
- Lightly supporting the "baby's" jaw to prevent his head slipping and airway blocking when upright.
- Placing the other hand under the "baby's" buttocks.

ASK if there are any questions.

Recommended reading

- Kangaroo Mother Care: A practical guide. Geneva, WHO, RHR, 2003.
- recommended video: Kangaroo mother care, rediscover the natural care for your newborn baby. Dr Niels Bergman 2005. (Available from the Author).

Implementation needs

- Institutions planning to implement KMC should have both a policy and guidelines to cover KMC in order to ensure that all health workers working with low-birth-weight infants are trained to support KMC.
- Health workers should also be trained in breastfeeding. Early implementation should be monitored, supported and supervised by experienced KMC staff.

Appendix IV: Video clips

(a) Juanita Stevenson. 0 to 5 in 30 minutes, Kangaroo care, www.kvpt.org

(b) Save The Children. Kangaroo Mother Care in Malawi, 2004 www.savethechildren.org

Appendix V: List of the eight district hospitals in the North Rift region

THE EIGHT GAZETTED HOSPITALS IN THE NORTH RIFT REGION 2010		
S/NO	**DISTRICT**	**HEALTH FACILITY NAME**
1	Baringo Central	Kabarnet District Hospital
6	Koibatek	Eldama Ravine District Hospital
8	Nandi Central	Kapsabet District HOSPITAL
12	West Pokot	Kapenguria District Hospital
13	Keiyo	Iten District Hospital
28	Trans nzoia west	Kitale District Hospital
33	Nandi East	Nandi Hills District Hospital
34	Turkana Central	Lodwar District Hospital

Appendix VI: List of the selected district hospitals

FOUR SELECTED HOSPITALS IN NORTH RIFT REGION		
S/NO	**DISTRICT**	**HEALTH FACILITY NAME**
6	Koibatek	Eldama Ravine District Hospital
8	Nandi Central	Kapsabet District HOSPITAL
13	Keiyo	Iten District Hospital
33	Nandi East	Nandi Hills District Hospital

Appendix VII. IREC approval

INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

MOI UNIVERSITY
SCHOOL OF MEDICINE
P.O. BOX 4606
ELDORET
Tel: 33471/2/3

Reference: IREC/2009/107
Approval Number: 000414

4th August, 2009

Dr. Bogonko O. George,
Moi University,
School of Medicine,
P.O. Box 4606,
ELDORET.

Dear Dr. Bogonko,

RE: FORMAL APPROVAL

The Institutional Research and Ethics Committee have reviewed your research proposal titled:

"Assessment of the Impact of Training on the Knowledge, Attitude and Practice, among Health Care Workers in Promoting use of Kangaroo Mother Care in Rural District Hospitals in Kenya".

Your proposal has been granted a Formal Approval Number: **FAN: IREC 000414** on 4th August, 2009. You are therefore permitted to continue with your study.

Note that this approval is for 1 year; it will thus expire on 3rd August, 2010. If it is necessary to continue with this research beyond the expiry date, a request for continuation should be made in writing to IREC Secretariat two months prior to expiry date.

You are required to submit progress report(s) regularly as dictated by your proposal. Furthermore, you must notify the Committee of any proposal change (s) or amendment (s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. The Committee expects to receive a final report at the end of the study.

Yours Sincerely,

PROF. D NGARE
CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE
APPROVED
04 AUG 2009
P.O. Box 4606 ELDORET

cc: Director - MTRH
Dean - SOM
Dean - SPH
Dean - SOD