

What is the evidence for kangaroo mother care of the very low birth weight baby?

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The World Health Organization has produced guidelines for the management of common illnesses in hospitals with limited resources. This series reviews the scientific evidence behind WHO's recommendations. The WHO guidelines, and more reviews are available at:

http://www.who.int/child-adolescent-health/publications/CHILD_HEALTH/PB.htm

This review addresses the question: *What is the evidence for kangaroo mother care of the very low birth weight baby?*

The WHO Pocketbook of Hospital Care for Children recommends skin contact for LBW and VLBW babies (Pocketbook chapter 3.10.2, page 53 ff).

INTRODUCTION

World wide more than 20 million babies are born each year with low birthweight. This represents 15.5% of all births. Of these low birth weight babies, 95.6% are born in developing countries [11]. The World Health Organization defines low birth weight as weight at birth less than 2500 grams, and very low birth weight as weight at birth less than 1500 grams [11]. Of these babies, approximately one third die before stabilization or in the first twelve hours. Low birth weight and very low birth weight babies require intensive neonatal nursing and care from often limited resources at a vast expense.

Kangaroo mother care was initially conceived in Bogotá, Colombia in 1978 as an alternative to traditional methods of care for the low birth weight baby. The initiative behind this method of care was to address the problem of overcrowding and insufficient and expensive resources in neonatal intensive care units, together with the associated high morbidity and mortality amongst this group of neonates. Kangaroo mother care consists of skin-to skin contact between mother and infant, both in hospital and at home, until the infant is 41 weeks corrected age. The key features of kangaroo mother care are early, continuous and prolonged skin-to-skin contact between the mother and baby, accomplished by the baby being firmly attached to the mother chest both day and night, allowing frequent and exclusive breastfeeding (formula feeds or intravenous fluids are used if required). Kangaroo mother care is initiated in hospital and can be continued at home, allowing small babies, regardless of weight or gestational age, to be discharged early, provided there is adequate support and follow-up arranged [13]. Kangaroo care is then continued at home until the infant is no longer able to cope with it – demonstrated by crying, pushing out limbs or appear uncomfortable - usually at 40-41 weeks corrected age. Different countries and studies have adopted

variations to the kangaroo method of care, including shorter durations, gavage or suck feeding, in hospital or at home care. All studies have looked at babies randomised to kangaroo mother care compared to conventional method of care (incubator and standard neonatal intensive care nursing).

Kangaroo mother care is seldom used in very low birthweight or low birthweight babies in developed nations. This review intends to determine if there is evidence to support the use of kangaroo mother care for very low birth weight babies, providing an alternative to conventional methods of care.

METHODOLOGY

The clinical search strategy employed was as follows: (kangaroo mother care OR kangaroo care) AND (very low birth weight OR low birth weight). Using the clinical filters for both "therapy" and "specific", 66 articles were found; using the same filter but restricting the filter to systematic reviews only, a further 39 articles were found.

All articles included both very low birth weight and low birth weight babies. All abstracts were read, if there was any doubt as to the relevance of the article, the complete article was sourced. We excluded articles that did not directly evaluate the benefits and problems of kangaroo mother care, and those articles that looked at kangaroo mother care of the term infant. In many of the randomized controlled trials (RCT's) kangaroo mother care was undertaken for short periods of 2-4 hours, and most of these babies were subject to both kangaroo mother care and conventional methods of care at different times in the study. These articles were excluded, except where kangaroo mother care was initiated from birth and the trial examined the effect of kangaroo mother care during the initial period of stabilization.

7 RCT's were included once the above exclusion criteria were observed; 1 trial was excluded because the intervention of kangaroo mother care was a combination of kangaroo care and incubator care.

2 Cochrane reviews were sourced. The first looked at only healthy newborns, all of which were born at term and was hence excluded. The second review included only 3 of the above listed RCT's and was included.

Broadening the clinical search strategy to "kangaroo mother care", and using the clinical filters for both "therapy" and "specific", 307 articles were found. All abstracts for these articles were read. Articles that did not look at evidence for or against the use of kangaroo mother care as a primary outcome

were excluded. If babies were subject to both periods of kangaroo mother care alternating with periods of conventional care, these articles were excluded. 4 further RCT's were included. All articles included were type 1b.

RESULTS

In all studies, the birthweight of babies ranged from 1000grams to 2000grams. In all but one study [1] approximately 20-30% of very low birth weight and low birth weight infants died before and during the stabilization period – in these studies babies were eligible to the trial only once stabilized (not requiring ventilatory support, not suffering from frequent apnoeas, stable temperature, not requiring intravenous nutrition). Babies once stabilized and eligible to enrol in the trial ranged from 3-11 days old. In all studies, including the study done in Ethiopia looking at early enrolment, a further 10-50% were excluded for reasons of multiple births, mother not available for care, malformations, consent not gained, early detection of major perinatal conditions participation refusal. Overall, usually only 30-60% of potential babies were enrolled in the studies.

A Cochrane review was done in 2003 to determine whether there was evidence to support the use of kangaroo mother care in low birth weight infants as an alternative to conventional care after the initial period of stabilization with conventional care [2]. This review looked at randomized trials and included only 3 studies [4, 5, 6]. The review concluded that although kangaroo mother care appears to reduce severe infant morbidity without any serious deleterious effect, there was insufficient evidence to recommend its routine use in low birth weight infants and well designed randomized controlled trials were needed. [2]

The primary outcome in five studies looked at the mortality rate from the initiation of kangaroo mother care, starting after the baby was stabilized, up to 12 months of age. The studies showed no increase in mortality when babies were nursed via the kangaroo method as opposed to the conventional method of care [3, 4, 6]. One study demonstrated a non-significant difference in increased survival in these babies; there was a reduction, though not statistically significant, in infant mortality from 2.9% to 1.6% (RR + 0.59, 95% CI 0.22-1.6) [6]. In all studies the majority of deaths occurred in the first 12 hours. One study of 123 very low birth weight babies from Ethiopia looked at the effect on survival if kangaroo mother care was commenced from delivery, prior to stabilization of the low birth weight infant. Conventional care in this study had been care in a small heated room, rather than care in an incubator. The mean age at enrolment was 10 hours of age. This study revealed a significant decline in death rate from 38% (24/63) in the conventional care group to 22.5% (14/62), $p < 0.05$ [1]

Morbidity associated with kangaroo mother care was looked at by four studies. Focussing on infection, less infants in the kangaroo care programme suffered from nosocomial infections during the period of eligibility to 41 weeks corrected age, the difference being approximately 3.4-3.8% compared to 6.8-7.8% ($p = 0.02$, RR 2.01, 95% CI 1.04-3.87) [3, 6]. In all but one study, there was no significant difference in the number or severity of overall infections during this period, up until 12 months corrected age [3, 5, 6], with only one study showing a significant reduction in severe respiratory infections at six months [4]. However, there was a significant difference seen in one study from Columbia between those infections that could be managed as an outpatient, 6.7% in the kangaroo care group compared to 2.8% in the conventional care group ($p = 0.019$). [6]

Kangaroo mother care, in three trials, was shown to have a positive effect on exclusive breast-feeding at 41 weeks corrected age and at 6 weeks post-term [3,5,6]. One study carried out in the different settings of Ethiopia, Indonesia and Mexico found a significant increase in exclusive breast feeding at discharge if nursed by the kangaroo care method, 88% vs. 70% ($p = 0.00001$) [5].

In addition, these babies had better mean daily weight gains in all studies, after the first week of life, ranging from 15.9 to 21.3 g/day vs. 10.2 to 17.7g/day ($p < 0.05$) [3, 4, 5, 6]. Along with increased rates of breast feeding and better weight gains, the average length of stay in hospital, from eligibility to 41 weeks corrected age, was reduced [1, 2, 4, 6, 8] Babies in the kangaroo care group were discharged earlier (13.4 days vs. 16.3 days after enrolment) [5]. The maximum reduction on hospital stay was seen for those infants with a birth weight less than 1500g [3, 6].

Infants managed by kangaroo care exhibit more temperature stability as found in three studies [5, 7, 8]. Hypothermia was significantly more common in conventional methods of care infants (RR 0.74, 95% CI 0.62-0.88, $p = 0.0005$) [5]. A significant reduction in episodes of hypothermia was seen in babies nursed by the kangaroo mother care method (10/44 vs. 21/45, $p < 0.01$). [8]

Two trials showed that Kangaroo mother care results in no difference in psychomotor development using the Griggith Quotient at 12 months corrected age [3, 6]. There was no significant difference seen for growth indices of infants enrolled in the kangaroo method of care [4, 6]. In one study, head circumference in kangaroo mother care babies was significantly increased by 0.5cm greater ($p = 0.05$) compared to conventional method of care babies from 3 to 12 months corrected age. [3]

One study looked at the benefit of early kangaroo care with respect to physiological stabilization, from birth, in very low birth weight infants [8]. These babies reached stability (cardiovascular, respiratory and oxygenation) sooner than those being cared for in incubators. All babies were stable after 6 hours of kangaroo care compared to only half on the incubator babies [7] Babies spend more time in quiet sleep and less time crying [12]. No adverse events were recorded in this study. Kangaroo care has also been shown not to compromise the maturation of the pituitary-thyroid axis and adrenal function in healthy preterm infants [9].

In five studies staff and mothers were surveyed, reporting a high level of satisfaction and comfort [1, 3, 5, 6, 8], whilst more than 95% of those surveyed found kangaroo mother care both acceptable and feasible [1, 8]. Mothers providing kangaroo care also gained confidence in the care of their low birth weight babies [3]. The kangaroo care method, in all countries where the studies were done, was deemed socially acceptable [8]. Kangaroo mother care resulted in observed changes in the mothers' perception of her child, attributed to the closeness of the skin-to-skin contact – the "bonding effect" by the empowering nature of kangaroo mother care. [8]

DISCUSSION

Kangaroo mother care has been used successfully in developing countries throughout the world for the last 25 years as a "humanizing" alternative to conventional methods of neonatal care with the aim to improve the health and potentially survival of low and very low birth weight babies. The neonatal mortality rate of very low birth weight and low birth weight babies is high, with more than 30% of babies dying before stabilization

and hence eligibility for kangaroo mother care. However, evidence to date seems to suggest that the outcome of these babies improves if kangaroo mother care is commenced early, before stabilization, and indeed, allows for earlier stabilization. More large randomised controlled trials are required to show the true benefit on neonatal mortality.

The current evidence suggests that kangaroo mother care may be associated with a reduction in nosocomial infections and severe illness, increased early weight gains with no reduction in growth indices, reduced length of stay in hospital, and high levels of maternal satisfaction.

To date, the randomized trials have mainly focussed on the healthy, medically stable, singleton of very low and low birth weight, born in hospital, and have hence excluded up to 70% of babies born with a birth weight less than 2000grams. Only one trial included infants prior to stabilization, though still excluding 50% of potential low birth weight babies due to reasons of malformation, multiple birth or mother being unavailable. No studies have been conducted looking at kangaroo mother care for very low birth weight infants in an ambulatory setting. No trial has evaluated the effect of kangaroo mother care with respect to costs involved in the managements of these babies. Due to lack of available evidence, kangaroo mother care must be used with caution in the unwell and unstable baby, babies delivered at home, multiple birth babies or those with congenital malformation. Further trials are needed focussing on all very low and low birth weight babies looking at the effect of kangaroo mother care initiated from birth, as well as kangaroo mother care initiated at home.

SUMMARY

Very low birth weight and low birth weight babies have a high risk of mortality and morbidity. The care of such babies requires the use of expensive and often scarce resources and adequately trained staff. Evidence suggests that kangaroo mother care is a safe and effective alternative to conventional methods of neonatal care for very low birth weight babies. It reduces the mortality rate if introduced early and reduces the risk of nosocomial and severe infections. Kangaroo mother care has a positive effect on breast-feeding at term and during the neonatal period. It does not lead to impairment in growth or psychomotor development. It leads to high levels of satisfaction by staff and mothers, promoting bonding and installing confidence in the mothers of very low birth weight babies. Care must be taken with the use of kangaroo mother care in babies who are not medically stable and in multiple birth babies as no evidence exists regarding the benefit of kangaroo mother care in these settings.

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