



The importance of kangaroo care on infant oxygen saturation levels and bonding

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Abstract Kangaroo care is a method of caring for newborn infants, and has benefits that include stabilisation of cardio-respiratory system, thermoregulation and a higher incidence of exclusive breastfeeding. Skin-to-skin contact has an important role both for the sick infant and its parents because of the positive implications on the growth and development of the preterm infant. Specifically KC can improve infants oxygen saturation and significantly reduce their oxygen requirements during the contact time. Physical contact between preterm infants and parents is often very delayed. KC allows this contact sooner than normal and improves parental confidence in caring for their infant. Research shows that KC is safe and beneficial however time, space and lack of protocol inhibit regular use of KC in neonatal units. © 2008 Neonatal Nurses Association. Published by Elsevier Ltd. All rights reserved.

Introduction

Kangaroo care (KC) is a method for caring for newborn babies but has particular benefits for preterm infants (Bergman, 2005). KC can be defined as: 'early, prolonged and continuous skin-to-skin contact between a mother and her newborn' (Cattaneo et al., 1998, pp. 976). KC was developed in Colombia as an alternative to hospitalization for medically stable preterm infants because of lack of resources (Neu, 1999). It is now spreading all over the world as a technique for caring for low birth

weight infants (Fischer et al., 1998). Considerable research throughout the world on the benefits of KC shows that KC promotes cardio-respiratory stabilization, improves thermoregulation, increases rate of infant weight gain, has high incidence of exclusive breastfeeding, shortens hospital stays, functions as analgesia and reduces maternal stress levels (Feldman et al., 2002; Ludington-Hoe and Swinth, 1996). There is little data about the long term effects of KC; however, the existing data shows that early KC continues to have beneficial effects throughout the infants first year of life (Feldman et al., 2002). KC was not seen regularly in practice despite evidence suggesting that it should be used more often.

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Importance of kangaroo care

KC is becoming more common in neonatal intensive care nurseries. It once meant the difference between life and death for premature infants and in developing countries is still very important for these infants. In developed countries it is now used alongside conventional nursing care; however it could be used more often (Richardson, 1997). Skin-to-skin contact has an important role both for the sick infant and its parents because of the positive implications on the growth and development of the preterm infant (Dodd, 2002). KC is recommended for infants age 28 weeks or above and can be offered while these infants are mechanically ventilated (Ludington-Hoe et al., 2003; WHO, 2003). KC is often only offered to babies who are medically stable, not intubated and above a certain weight; however despite this common practice there is evidence that suggests that KC most benefits the most critically ill infants and can be offered to those below 28 weeks gestation (Clifford and Barnsteiner, 2001; Feldman et al., 2002). Critically ill infants may not be receiving KC because of a lack of definitive evidence and protocol for caring for these infants in this way as well as the risk of extubation (Ludington-Hoe et al., 2003; Wallin et al., 2004).

KC has many beneficial aspects to the premature infant, particularly in neurobehavioural development which is very underdeveloped in preterm infants. Ludington-Hoe and Swinth (1996) looked at the developmental aspects of KC, although the methodology is not provided, a table of the research findings provides an understanding of the inclusion criteria. The use of a framework allows a clear structure to the study and the relationship between KC and the five dimensions of neurobehavioural development. Ludington-Hoe and Swinth (1996) suggested the relationship between KC and autonomic regulation was significant and improves physiologic function. Supporting Ludington-Hoe and Swinth (1996) Crawford and Hickson (2002) found that KC increased amount of quiet sleep and decreased activity for the baby while improving confidence in parents whilst allowing them to gain parenting skills. Cattaneo et al. (1998) found shortened hospital stays and improved weight gain in infants cared using KC as opposed to those cared for in incubators. Infants who experience KC are more likely to be exclusively breastfed which is why it is one of the ten steps to breastfeeding devised by UNICEF (2005). When looking at the evidence surrounding KC we need to be aware of the limitations of the studies

because of the variations between participants' gestation and weight. These are going to have significant affects on the results.

KC has a purpose beyond the physiological benefits for the baby but psychological benefits for both the parents and the child from KC are especially important for children's nurses to consider. This article also focuses on oxygen saturations and requirement during KC because it is a way of measuring the affect of KC on the cardio-respiratory system, and has practical issues of the baby possibly being ventilated and receiving oxygen.

Oxygen saturations and kangaroo care

Evidence suggests that KC in everyday practice is beneficial to both the baby and parent (Ludington-Hoe and Swinth, 1996). Oxygen is regularly used in preterm infants because of their immature lungs and oxygen is important for metabolism and physiological functioning; Understanding that infants can receive KC whilst on oxygen is an important step in increasing the amount of skin-to-skin in NICUs where the majority of infants are receiving oxygen. KC seems to be beneficial regardless of the infant's oxygen requirement, and during KC, oxygen requirement may reduce or just become stable (Dodd, 2002; Ludington-Hoe et al., 2003). Ludington-Hoe and Swinth (1996) found that the upright contained position of KC increases the efficiency of the diaphragm and pulmonary function, improving oxygenation by promoting cardio-respiratory stabilisation. Oxygen saturation is also improved because of the relationship between KC and motor regulation; this also reduces agitation so that oxygen is not used up in unnecessary movements (Ludington-Hoe and Swinth, 1996).

Evidence also suggests that oxygen saturations in pre-term infants are stable or increased during KC, with the infants having less desaturations during the skin-to-skin period (Ludington-Hoe et al., 1998, 2003). During the transfer from the incubator to skin the baby experiences stress and oxygen requirements may increase; however this often settles relatively quickly (Ludington-Hoe et al., 2003). Infants who are mechanically ventilated appear to respond to KC particularly well, with consistently high and stable oxygen saturation levels (Ludington-Hoe et al., 2003). As a result of improved oxygenation, breathing may become more relaxed and the baby is very calm and contented (Crawford and Hickson, 2002).

However, because of inconclusive evidence in the improvement of physiologic measures some practitioners may feel uncomfortable in recommending KC

despite the fact that no untoward events have been reported in research (Dodd, 2002). In Germany Bauer et al. (1997) and Fischer et al. (1998) both concluded that there were no significant changes in oxygen saturation and consumption during KC. However, Ludington-Hoe et al. (1998) and Wallace and Ridpath-Parker (1994) both report observations of infants receiving KC having high and stable oxygen saturations during this time. Both studies have limitations, but indicate that KC has no adverse effects on oxygen saturation and indicate that the infants who are more unstable and critically ill and mechanically ventilated benefited from receiving KC which could be seen through direct observation (Feldman et al., 2002; Ludington-Hoe et al., 1998).

Bonding and kangaroo care

Early contact between infants and mothers is vital for initiating their relationship. Preterm infants and mothers are often separated at birth and physical contact is very delayed; this may impede the development of the mother infant relationship (Miles et al., 2006; Roller, 2005). KC allows mothers to have this physical contact with their preterm newborn and it is shown to improve mother-infant relationship, improve the parenting process and made mothers feel more confident (Feldman et al., 2002; Roller, 2005). Mother infant contact also appears to be important in the growth and development of the infant as can be seen in the Ludington-Hoe and Swinth (1996) study which looks at the neurodevelopment of preterm infants and concludes that KC has a significant effect on their neurodevelopment. KC is important in the bonding process for mothers whose babies are taken to the NICU immediately after birth so nurses need to recognise the importance of introducing KC as early as possible (Clifford and Barnsteiner, 2001; Roller, 2005). KC has a big impact on the experience of parents in the NICU as parents often feel helpless and inadequate. It allows nurses to implement family centred care in a practical and effective way which is supported by current research (Crawford and Hickson, 2002).

Several studies have looked at parents perceptions and experiences of skin-to-skin care including Neu (1999) and Roller (2005). This kind of study is important in understanding the affect of KC on bonding. The studies both indicated that the impact of KC on parents improves their experience of the NICU. Both studies were conducted in the USA and are culturally usable. Neu (1999) had a sample of nine and consisted to two interviews

one immediately after skin-to-skin and one after discharge. The detailed methodology and analysis suggest that the results are valid. Three themes emerged; yearning and apprehension about holding their baby, need for a supportive environment and parent infant interaction (Neu, 1999). The first two indicate that nursing staff need to be supportive and positive. From placement experience staff on a NICU did this once KC had been initiated, but they were also apprehensive initially due to lack of experience. Despite the negative feelings towards staff and environment parents all felt an intense feeling of connectedness and that they were nurturing their child, a feeling which was reported by parents doing KC on the NICU I was at. Similarly Roller (2005) found that mothers felt that KC was a calm, warm, positive bonding experience and that they started to get to know their baby. Limitations in this study make it less transferable to the general population because seven out of ten participants were African American, two White and one Asian (Roller, 2005). Culture, race and ethnicity may have biased the results, however it is important to understand the experiences of parents from all backgrounds. These all indicate that the ability to bond with their child during admission in the NICU through KC had continued affects in the long term.

Case study

A 24 week infant who was 28 days old was being held by KC, she had been held by dad for 30 min then transferred to mum for about 90 min. During this time the baby did not have any desaturations and her oxygen requirement reduced from 43% to 38% while she was being held skin-to-skin. The improvement of her vital signs indicates that KC was beneficial for this baby, as much of the research into KC indicates (Richardson, 1997).

The infants mother provided KC for her infant and showed obvious signs of increased confidence with handling and caring for her baby once she had commenced KC. As soon as this baby was having time off CPAP which was relatively soon after she started having KC her mother felt confident to hold her baby with out asking staff which empowered this mother, she was confident enough to transfer her baby alone despite still being connected to monitoring. It was uncommon to see parents holding their baby in intensive care and by allowing this mother skin-to-skin when her infant was more critically ill allowed her to gain confidence and skills she otherwise would not have acquired until later.

Kangaroo care in practice

There are many practical issues about KC and the role of the nurse in facilitating KC is paramount, however parents play a very important role and need to understand the benefits of KC to both themselves and the baby. The knowledge of the staff in my placement seemed of a high level but parents seemed unaware of this technique of care and its benefits unless they had done personal research. The reluctance of health care professionals to recommend KC may be because there is a lack of definitive evidence supporting KC and its long term benefits as some research suggests that there is no difference between KC and incubator care on cardio-respiratory stability (Fischer et al., 1998; Wallin et al., 2004). Staff have become reliant on technology and changing behaviour of staff and is an obstacle in implementing KC in current practice (Wallin et al., 2004). However there is clear evidence that shows KC is safe and has important benefits for growth and development of premature infants but lack of time, space, knowledge and parental confidence to hold their sick babies are among many factors which will interfere with the possible provision of KC (Neu, 1999; Dodd, 2002; Ludington-Hoe and Swinth, 1996).

Conde-Agudelo et al. (2003) did a review to determine if there was evidence to support the use of KC as an alternative to conventional care once the infant was stable, and the objectives reflected this question. In this review only three of the 14 studies identified met the eligibility criteria despite a thorough literature search and each researcher applying the inclusion criteria to the studies separately to prevent any bias. The three studies chosen took place in Ecuador, Colombia and Ethiopia, Indonesia and Mexico, these areas will have significantly different cultures and practices to the UK so the results of this review would need to be interpreted with caution. They suggest that there is a lack of evidence to recommend its use in low-birth-weight infants; however, infant mortality is significantly decreased. Interpretation needs to be with caution due to the limited number of studies and the identified poor methodologies within the trials. With evidence such as this it is not surprising some health care practitioners are reluctant to promote KC; however we need to be aware of the differences in culture and available neonatal medical equipment and training when considering KC in the UK.

In practice, time and space are major inhibitors to the practice of KC. However, once initiated it will have noticeable benefits to mother and baby

and the time required by the nurse will become less as the parents become more confident in handling their infant as was noticeable in case study A. To introduce more KC into the NICU and on general children's wards both the ward environment and the ward culture need to change before KC will become regular practice (Eichel, 2001).

Recommendation for practice

All children's nurses would benefit from learning more about the benefits of KC and know where to look for up-to-date research. KC has not been studied in older babies but there appear to be no contraindications to practicing it in other acute care settings where parents want ways of comforting their child. Research has shown that oxygen, IVs and even ventilation does not affect KC (Johnson, 2005). Further education for nurses in this area would enable more parents to conduct KC and result in more infants benefiting from its numerous good effects (Richardson, 1997). Literature needs to be produced for families so that they are able to understand the importance of KC. If the wider society became more aware of KC then it would become more accepted in both NICUs and on general wards. This is an area for community nurses, health visitors and midwives to promote KC.

Development of evidence-based guidelines is essential as lack of protocol is a factor which will inhibit the provision of KC in both general wards and NICUs (Wallin et al., 2004). Ludington-Hoe et al. (2003) developed a protocol of KC to ventilated infants as part of a three year study; there were no adverse events such as extubation associated with the criteria and protocol. This protocol and criteria could be adopted by NICUs in the UK and could also be adapted to use for all infants not just those who are intubated (Ludington-Hoe et al., 2003).

Conclusion

As nurses caring for sick newborns we need to be aware of the emotional impact of having a baby in the NICU has on parents and need to allow parents to get to know their babies in this difficult environment. KC enables this to happen while benefiting the baby and it is the nurses' responsibility to facilitate this (Roller, 2005). There is a greater number of babies who are exclusively breastfed if they receive KC; this makes promoting skin-to-skin even more important and will contribute to

meeting the government's breastfeeding targets (Cattaneo et al., 1998). KC needs to be utilised on neonatal units and be introduced in practice on general children's wards. All paediatric and neonatal nursing staff need to recommend its use where appropriate and provide families with adequate information. Despite evidence becoming available it is still rare to find literature providing evidence-based strategies on how to achieve change in practice (Wallin et al., 2004). Practice needs to change and follow the evidence being produced about the benefits of KC so that all babies and families can benefit from the skin-to-skin experience.

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