The Psychological Impact of Kangaroo Mother Care (KMC): A review of the literature

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DECLARATION

I, the undersigned, hereby declare that the work in this assignment is my own original work and that this work, or parts thereof, have not been used before to obtain a degree at any other university.

ABSTRACT

This review examines the literature on the psychological impact of Kangaroo Mother Care (KMC) on the mother, infant, support personnel and other caretakers. The paper summarizes the findings of the KMC research and considers the implications of it in light of high numbers of premature and low birth weight infants in South Africa. The review briefly considers theories of bonding and attachment adopted in the research and theories on why KMC is effective.

The psychological impact of one component of KMC, Skin-to-Skin Care (SSC), used primarily in developed countries to supplement traditional care, has been extensively researched. In contrast, much less research has explored the psychological impact of full KMC programmes in developing countries. Our understanding of the psychological impact of KMC therefore relies predominantly on research from a very different context to the one in which KMC is used. As SSC has been utilised very differently to KMC and in first world settings, it cannot offer mothers or their family reliable information on the psychological demands and benefits of KMC.

Findings: Although KMC appears to offer invaluable physiological benefits and assists in 'humanising' neonatal care in important ways, there is currently very little published research on the short or long-term psychological impact of KMC on the mother, infant, support personnel and other caretakers. On the whole, research findings on the psychological impact of KMC were not conclusive but indicate some positive outcomes for increased maternal sensitivity and confidence, developmental benefits for the infant and an improvement in the clarity of infants' cues and communication with caregiver. Findings on the psychological impact of KMC for support personnel and other caretakers such as the family of the infant are also not conclusive and indicate that more research is necessary. Further research is required regarding cross-cultural experiences of KMC; maternal experiences of depression, anxiety and ambivalence; long-term developmental and attachment outcomes for the infant and the possible preventative value of KMC for maternal and infant mental health.

OPSOMMING

Hierdie hersiening ondersoek die literatuur aangaande die sielkundige uitwerking van Kangaroo Mother Care (KMC) op die ma, suigeling, ondersteunende personeel en ander opsigters. Die artikel is 'n opsomming van die uitspraak van KMC navorsing en oorweeg die gevolgtrekkings daarvan ten opsigte van die hoe getal vroeggebore en lae ligaamsgewig van suigelinge wat in Suid-Afrika gebore is. Die hersiening kyk kortliks na die teorie verbonde aan die binding en gehegtheid van die navorsing en teorie oor hoekom KMC doeltreffend is.

Die sielkundige uitwerking van een onderdeel van KMC, Skin-to-Skin Care (SSC), wat meestal in gevorderde lande gebruik word om tradisionele versorg te verryk, is deeglik ondersoek. Inteendeel is ver minder navorsing op die sielkundige uitwerking van volle KMC programme in ontwikellende lande gedoen. Dus is ons begrip van die sielkundige uitwerking van KMC afhanklik op navorsing vanuit 'n ander konteks as die een waarin die eintlik gebruik is. SSC word baie anders benut as KMC, en in eerstewereldkontekste kan dit dus nie veel betroubare inligting op die sielkundige vereistes en voordele van KMC verskaf nie.

Bevindings: Al kom dit voor dat KMC waardevolle sielkundige voordele verskaf en help in geboorte nasorg op belangrike maniere, is daar huidiglik baie min navorsing op druk oor die kort- of die langtermyn sielkundige uitwerking van KMC op die ma, suigeling, ondersteunende personeel en ander oppassers. In die algemeen, is die bevindings van navorsing oor die sielkundige uitwerking van KMC nie volkome nie, maar dui positiewe uitslae aan op verhoogde moederlike gevoelens en selfvertroue. Navorsing dui ook ontwikkelingsvoordele vir die suigeling, asook die bevordering van die duidelikheid van sy kommunikasie met die oppasser. Bevindings op die sielkundige uitwerking van KMC op die ondersteunende personeel en ander oppassers, byvoorbeeld familielede van die suigeling, is ook nie volkome nie, en dui die nodigheid van verdere navorsing aan. Verdere navorsing oor die kruiskulturele ervaring van KMC, moederlike ondervinding van moedeloosheid, angs en dubbelsinnigheid is

benodig. Langtermyn ontwikkeling en gehegtigheidsake vir die suigeling en die moontlike voorkomende waarde van KMC vir moederlike en suigeling se geestelike gesondheid is ook wel benodig.

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1. INTRODUCTION

1.1 The problem: perinatal care

On average there are five million neonatal deaths occuring globally each year and more than two-thirds of these are early neonatal deaths (WHO, 1996). Low birthweight (LBW) has been identified as the underlying cause for most of these deaths and it is estimated that 95% of LBW infants are born to mothers in developing countries (Lima, Quintero-Romero & Cattaneo, 2000). The high percentage of LBW infants found in developing countries is primarily due to the well established link between poor economic and psychosocial conditions and the problem of prematurity and LBW (Charpak, Ruiz-Palaez & Charpak, 1994; Grant, 1984; Ruiz, Charpak & Figuero de Calume, 2002; WHO, 1994; 1996). It has been found that LBW infants often suffer from neurological sequelae and poor growth and development. Unfortunately, care and maintenance of this group is expensive and sometimes impossible to provide (Charpak, Figueroa de Calume & Ruiz, 2000).

South Africa is a developing country where technological, financial and human resources are insufficient to cope with the demands of the high numbers of LBW and premature infants. In a recent study Pattinson (2003a) surveyed 27 hospitals in an effort to estimate a national perinatal mortality rate (PNMR) for South Africa. State hospitals representing metropolitan areas, cities and towns and rural areas were included in the study. It was found that there were 4 155 perinatal deaths (with a birth weight of 1000g or more) out of 123 508 births, suggesting a PNMR of about 4%.

The study found that the neonatal death rate was highest in the city and town groups (14.8/1000 live births), followed by the rural group (12.1/1000 live births) and the metropolitan group (7.6/1000 live births). The LBW mortality rate was highest in the metropolitan group (18.4%), followed by the city and town group (17.0%) and the rural group (12.5%). Spontaneous preterm delivery was the highest primary cause of death in the city and town group (6.07/1000) and the second highest in the rural group (4.88/1000). Complications of prematurity and hypoxia were the most common final neonatal causes of death in all groups. Patient-related avoidable factors were reported to be present in 35.9% of perinatal deaths, followed by health worker-related factors

(29.1%), and administrative avoidable factors (7.4%). The most common patient-related avoidable factors were late initiation of, or no, antenatal care or infrequent attendance at antenatal clinic (present in 20% of all cases). Lack of transport for the mothers was the most common administrative factor.

Problems identified in the study were the structure of antenatal care, management of labour, resuscitation of the asphxyiated neonate and care of the premature neonate. Pattinson (2003b) suggested that attention should be focused on these priority problems to reduce perinatal mortality in South Africa. This, he said, might be done by ensuring that 'equipment, protocols and trained health workers are always available and by specifically introducing kangaroo mother care (KMC) for the care of the premature infants' (Pattinson, 2003b, p.450).

An earlier study was conducted by the Medical Research Council (MRC) to assess causes of admission of infants over seven months to a South African district hospital neonatal nursery (Wilkinson, Connolly & Stirling, 1995). Prematurity and low birthweight accounted for 81% of the 149 admissions and researchers concluded that a substantial proportion of district perinatal mortality (around 27%) occured in the neonatal nursery (Wilkinson et al., 1995).

It seems clear then that in South Africa high rates of prematurity and LBW infants are closely linked with neonatal mortality (Pattinson, 2003a). However, Cattaneo, Davanzo, Bergman and Charpak (1998, p. 279) stated that 'many of the almost five million neonatal deaths occurring annually in low-income countries could be prevented by appropriate, good quality care of low birthweight (LBW) infants'. The question of how to provide affordable, appropriate, good quality care is not an easy one to answer. Kangaroo Mother Care (KMC) can be considered as one response to the problem of caring for large numbers of premature and LBW infants in a developing country.

1.2 KMC as one response to the problem: a brief history of KMC

Broadly speaking there are three main uses of KMC and its components in developing countries. The first is in settings without appropriate neonatal care facilities, where the

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intervention is the only alternative to the lack of incubators. The second is in settings with easy access to all levels of neonatal care, where early mother-to-infant skin-to-skin holding may enhance the quality of mother-to-infant bonding and encourage successful breastfeeding. The third is in settings where technical and human resources are of good standards but insufficient to cope with all the demand. In this case it is an alternative for a neonatal minimal care unit once infants have overcome major extrauterine life adaptation problems (Charpak, Ruiz-Pelaez & Figueroa de Calume, 1996). In developed countries the skin-to-skin component of KMC is often used to supplement methods of traditional care (TC). This is referred to as skin-to-skin care (SSC) and it is discussed in more detail in the section on 'conceptualising KMC'.

Drs Edgar Rey and Hector Martinez first proposed and developed Kangaroo Mother Care at the Instituto Materno Infantile in Bogota, Colombia in 1978 (Rey & Martinez, 1983 in Whitelaw, 1990). They were searching for an alternative method of care for LBW infants. Due to limited financial and human resources prognosis was poor and infant mortality rates were high. Nosocomial infection was common and the high rate of abandonment of LBW infants was a major concern (Whitelaw & Liestol, 1994). The possible benefits of KMC were thought to be as follows: (i) that bonding would be improved between mother and infant leading to a decrease in abandonment; (ii) over-crowding and nosocomial infection would be reduced due to an early discharge policy; and (iii) resources could be spread further if babies were fed primarily on mother's milk.

Initially the KMC programme gained widespread interest due to claims of a significant reduction in mortality rates for very LBW infants in Bogota, Colombia (Rey & Martinez, 1983). The mortality rate for LBW infants was thought to have dropped from 70% to 10%. With the original publication on KMC further publicised with funding by UNICEF, international interest was sparked and researchers Whitelaw and Sleath (1985) visited the project to investigate further (Whitelaw & Liestol, 1994). They found that infant mortality statistics included only infants healthy enough to join the KMC programme, so those that had died before reaching eligibility were not included. Nevertheless, infant mortality and rates of abandonment had decreased and international interest in KMC and its popularity began to spread.

In addition the proven physiological and psychological benefits associated with the approach, other reasons for the widespread appeal of KMC may include recent western trends of a return to what is 'natural' in discourses around childbirth and mothering (Eyer, 1992). Furthermore, the KMC and skin-to-skin care (SSC) approach relate well to a raised consumer awareness of the quality of neonatal services on offer to parents and the move to 'humanise' neonatal care, particularly in the field of nursing (Spear, Leef, Epps & Locke, 2002). From a biological perspective KMC research has supported the idea that a baby's most appropriate place is skin-to-skin and at its mother's breast (which is the 'habitat') and being breastfed (which represents the 'niche' or pre-programmed behaviour designed for that habitat) (Kirsten, Bergman & Hann, 2001).

KMC in South Africa

Pattinson (2003b) suggested that KMC is one of the simple and effective interventions that exist to minimise neonatal loss in district hospitals in South Africa. In the last five years of the 20th century South Africa began to expand its network of KMC facilities (Bergh & Pattinson, 2003) and these facilities have offered successful KMC programmes in a number of hospitals with few resources. Dr. Nils Bergman (2004a), who first initiated KMC in South Africa, suggested that one of the main reasons for its effectiveness is that the length of time the baby stays in hospital can be shortened with the early discharge policy of KMC. With KMC the baby is exclusively breastfed (if at all possible). As the baby grows faster it reaches its discharge weight sooner and because the mother is better able to look after the baby herself, the discharge weight can be made much lower than was regarded as safe in the past. He suggested that ultimately this results in huge financial saving for hospital and health services, while at the same time giving a better result. The other main saving comes from dramatic reduction in complications and infections (Bergman, 2004a).

An important reason that KMC is effective and relevant for South Africa relates to the finding that it extends lactation. In a developing country a mother's lactation is vital because of poor socioeconomic conditions and limited resources. Thus, the finding that mothers who used SSC with their infants (weighing less than 1500g) lactated for four weeks longer on average, than mothers who had not, has significant implications

(Whitelaw, Heisterkamp, Sleath, Acolet & Richards, 1988). As Whitelaw (1990, p.605) stated, 'In developing countries, temperature regulation and maintenance of lactation by kangaroo care may be lifesaving for preterm infants with only a cot and milk formula as alternatives'.

1.3 Reviewing the literature on the benefits of KMC

It is clear that the problem of infant and maternal morbidity is a significant one, also in South Africa. Much has been written about the possible benefits of the KMC approach in developing countries.

To date four literature reviews on the impact of SSC and KMC have been published. The first was on SSC by Anderson (1991) and the second was on both SSC and KMC by Charpak et al. (1996). Since these, two Cochrane reviews have been published, one on KMC (Conde-Agudelo et al., 2003) and the other on SSC (Anderson, Moore, Hepworth & Bergman, 2003).

The first review, published by Anderson (1991), was an exhaustive review of published and nonpublished research regarding the impact of limited SSC in developed countries. With regard to the psychological effect of SSC contact on parents, the findings of the review were that mothers reported improved feelings of self-confidence, fulfillment and less stress. Mothers also felt significantly more confident in breastfeeding (Anderson, 1991).

The second review was published by Charpak et al. (1996) and included all published research on both KMC and SSC after 1990. They found that not many papers had been published during the five-year period and that most of the research dealt with SSC in developed countries. They noted however, that researchers were beginning to assess the effects and potential benefits of skin-to-skin contact in the quality of the mother (or family) and infant relationship, and as an aid to the successful discharge of a fragile newborn infant from an ICU (Charpak et al., 1996). They noted that most studies were exploratory.

Charpak et al. (1996) found that only one paper (Charpak et al., 1994) evaluated results from a full KMC intervention. This paper looked at one year mortality in a two-cohort study and not at the psychological impact of KMC. The authors of the review noted that few papers dealt with the effectiveness and safety of KMC in less developed countries and from a methodological point of view their value was limited (for example, small sample size, design weakness and insufficient follow-up). They noted that despite the appeal of KMC, more rigorous scientific evaluation was needed to allow its widespread use. Three important areas were identified as deserving deeper exploration, one of which was the short- and long-term effects on neuropsychological and emotional development of the infant. The other two were provision of Kangaroo Care on an ambulatory basis and economic consequences of the use of the method, that is, cost-effectiveness and cost-utility analysis (Charpak et al., 1996, p.112). Research into the psychological impact of KMC was again called for in 1997 when it was stated that data regarding long-term outcomes, including the quality of mother-to-child bonding and emotional development, are necessary to complete the evaluation of benefits and risks of this technique (Charpak, Ruiz-Palaez, Figueroa & Charpak, 1997).

A third review considered research that involved randomised controlled trials comparing KMC and conventional neonatal care in LBW infants (Conde-Agudelo et al., 2003). Three studies were included and all were conducted in developing countries (Charpak et al., 1997; Cattaneo, Davanzo, Uxa & Tamburlini, 1998; Sloan, Camacho, Rojas & Stern 1994). The review found that KMC was associated with the following reduced risks relating to the psychological impact of the interventions. Firstly, it decreased maternal dissatisfaction with method of care (there was no evidence of a difference in paternal or family satisfaction with care). Secondly, scores on mothers' sense of competence according to infant stay in hospital and admission to neonatal intensive care unit (NICU) were better in KMC than in the control group. Thirdly, scores on mothers' perception of social support according to infant stay in NICU were worse in KMC group than in control group (Conde-Agudelo et al., 2003).

The fourth review published to date includes seventeen randomised and quasi-randomised clinical trials comparing early skin-to-skin contact with usual hospital care (Anderson et al., 2003). No full KMC programmes were included in this review.

With regard to the psychological impact of SSC, the authors concluded that although a number of the infant attachment outcomes demonstrated little or no clinically significant differences with or without SSC, no negative short- or long-term effects on infant attachment variables were found. Studies were weakened by a lack of consistency in the measurement of attachment variables as research teams had different definitions of what constituted attachment behaviour (Anderson et al., 2003).

Until Tessier et al. (1998) published their paper on 'KMC and the Bonding Hypothesis' no other research paper had focused exclusively on the psychological impact of a full KMC intervention. Since then only a few more papers were found which have considered the psychological impact of KMC in more detail, although the importance of this line of investigation has been highlighted and encouraged by experts in the field (see International KMC Conference, 2002). Research topics reflect an increase of interest in this area. These include a study of the long-term effects of early KMC on mothers' sensitivity to their infants (Bigalow, Littlejohn & Bergman, 2002), maternal perception and interaction with preterm infants (Cattaneo & Scalembra, 2002) and cognitive development at 12 months and attachment between mother and child at 15 months (Martha, Velez, Tessier, Giron & Charpak, 2002).

These reviews of the literature seem to highlight a few points concerning the existing literature on KMC: First, in the research on the benefits of KMC the physiological benefits of the intervention (related to breastfeeding, mortality and morbidity), have been prioritised, with much less attention being paid to the possible psychological benefits. (Tessier et al., 1998). One possible reason for this is that KMC was first developed in an attempt to reduce mortality and morbidity in preterm infants. As the physical safety and effectiveness of KMC has become better established, attention has been turned towards the psychological benefits of it. However, it is still significantly under-investigated as indicated by the findings of published review papers. Second, when there was research on psychological benefits, it was mostly research on the psychological impact of some components of KMC, known as SSC, and it typically was conducted in developed countries.

1.4 Questions concerning the psychological impact of KMC

Given its emotional, economic and political appeal, an intervention such as KMC can easily be assumed to be psychologically beneficial for everyone concered. There are, however, important issues that need to be explored in considering whether KMC is indeed psychologically beneficial to all roleplayers involved.

KMC mothers may face challenges that mothers who are financially stable and socially supported in developed countries do not. These 'high-risk' KMC mothers are often young, single and unemployed with a low literacy rate (Lincetto, Vos, Graca, Macome, Tallarico & Fernandez, 1998). The context of these mothers is therefore likely to include multiple stressors. From a psychological perspective this is important for understanding what the benefits and challenges of KMC are. It is important as this context may affect the overall success of the programme (a mother may chose not to continue KMC due to other stressors). It affects her experience (she may feel overwhelmed rather than empowered using KMC and need additional support) and it therefore also indirectly and directly affects her infant. Furthermore the context of mothers in developing countries and their experience of KMC informs the direction of future research.

If some mothers feel empowered by KMC, with increased feelings of self-confidence and competence, improved bonding and sensitivity to their infants, as some studies have shown, we may surmise that there are many short and long-term benefits for both mother and infant. Many physiological benefits have also been found for KMC infants and these are thought to be improved developmental and attachment outcomes. The full extent of these benefits as well as the possible ameliorating effects of KMC (in maternal stress or depression for example) may not be fully utilised if the psychological impact of KMC is not thoroughly explored. If understood more fully, it may also be possible to adapt KMC to better suit the mothers' context, needs and vulnerabilities. This is possible because KMC can be adapted to suit various settings (Charpak et al., 1996). Depending on institutional requirements, KMC programmes differ and can include a number of variations such as, among others, intermittent KMC, 24 hour KMC with early discharge or in-hospital KMC. Therefore, some of the

benefits of this approach may still be utilised even if a mother is not able or willing to participate in 24 hour KMC.

The demands of KMC in a developing country occur in a context that may include a lack of financial support, unemployment, lone responsibility for the 24 hour care of the infant and a sense of decreased social support (Tessier et al., 1997). This context may exacerbate feelings of stress, disempowerment and depression for some mothers and the initial benefits of KMC may be lost. It is important to note that women at highest risk for developing post-partum depression include those with inadequate social support (Logsden, Birkimer & Usui, 2000). Some researchers warn about the danger of initiating a KMC programme before all the necessary support structures are in place (Charpak et al., 2000). They state that a programme begun under precarious conditions may be counter-productive in developing countries. There is also the added danger that the experience of the KMC mother will be 'overlooked' due to the pressure and legitimate urgency to provide care for the infant. This is particularly relevant in South Africa where a lack of facilities is often a main concern.

In carefully considering the contexts within which KMC is utilized, various issues concerning the psychological impact of KMC emerge. In the light of these complex issues it seems important to carefully analyse research findings on the psychological impact of KMC.

1.5 Goals of current paper

While KMC has become a much-advocated response to the significant problem of infant mortality and LBW infants in developing countries, there are still many questions regarding the psychological advantages and disadvantages of this approach particularly in the context of developing countries. The current paper attempts to review the literature on the psychological impact of KMC. In this review both the psychological benefits and the psychological challenges of KMC for all parties involved will be considered. It is hoped that such a careful review of the literature will (i) add to the discussion about the appropriateness of using KMC in developing countries and (ii) clarify which areas of research need to be further explored.

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Although it can be argued that much research into the psychological impact of SSC may have relevance for KMC, this review attempts to discuss KMC and SSC separately for two main reasons. The first is to highlight the fact that SSC and KMC are not the same intervention and therefore research findings on the psychological impact of these interventions should be considered separately. For example, we cannot simply assume that mothers who participate in 24 hour per day KMC will experience reduced stress as did some mothers who participated in one hour of SSC per day (probably with financial security and support). The second reason was to highlight the paucity of research into the psychological impact of full KMC interventions. Very few published articles explore the psychological benefits and demands of full KMC programmes. Many of those included in this review are unpublished papers that were presented at the latest International KMC Conference in 2002.

The review will start with a brief conceptual clarification of the concept of KMC (Section 2) and a short discussion of the theoretical underpinnings of KMC (Section 3). Although not the focus of this paper, there will also be a brief review of research about the physiological impact of KMC (Section 4) – it is clear that many of the psychological benefits of KMC are directly related to the physiological impacts. In the discussion of the psychological impact of KMC, there will be an attempt to delineate the impact on the mother, the infant, support personnel and other caretakers. The paper will be concluded with a summary of main findings, a discussion of problems inherent to KMC research and suggestions for futher research (Section 6).

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2. CONCEPTUALISING KMC

2.1 Defining KMC

The Medical Research Council (MRC) of South Africa defines KMC as a system of caring for small newborn babies that entails skin-to-skin contact, breast-feeding and early discharge (2004). The approach is considered to be an affordable and safe alternative to the conventional incubator and bassinet care of certain stable LBW infants (Bergh & Pattinson, 2003; Bergman & Jurisoo, 1994; Charpak et al., 1994). It includes three key elements, which are the kangaroo position, kangaroo feeding and kangaroo discharge. These are outlined by Charpak et al. (1996) as follows:

(i) The 'kangaroo position' refers to the mother who holds the premature infant inside her shirt, in skin-to-skin contact (SSC) 24 hours a day, between the mother's breasts, upright against the chest. The mother thus becomes a 'human incubator' for her infant. This position helps to reduce reflux and aspiration and is kept until the infant no longer tolerates the position. SSC is ideally started at birth and can also be offered by other caregivers such as the father. A cap for warmth and a small nappy for comfort may be used. Apart from maintaining warmth SSC is believed to improve bonding.

(ii) 'Kangaroo feeding' refers to exclusive or near-exclusive breast-feeding which occurs on demand and by suckling, if the infant is able. Pre-term formula supplements and essential nutrients may be indicated to guarantee adequate weight gain (20g per day).

(iii) 'Kangaroo discharge' refers to the fact that the infant is discharged home, in the kangaroo position, as soon as it has overcome the main adaptation problems to extra-uterine life. Discharge does not occur until the infant can suckle and swallow properly; has received treatment for infection and has achieved positive weight gain regardless of actual weight or gestational age. The early discharge policy of KMC assists in reducing nosocomial infection. Follow-up care at a clinic, hospital or through ambulatory care is necessary for this component of KMC to be safe and effective.

Bergman (2004a) suggests that support for the dyad is a crucial component of KMC. This support means that 'whatever is needed for the medical, emotional, psychological and and physical wellbeing of mother and baby is provided to them, without separating them'. He suggests that this might mean adding 'ultramodern equipment if available, or purely intense psychological support in contexts with no resources'. This support is also essential for the mother individually, as an important principle of KMC is to educate and motivate her as the baby's main resource (Whitelaw & Sleath, 1994).

Over the years different versions of KMC have been adopted around the world, as it was adapted to particular settings (Charpak, 1996). Variables included exclusive and non-exclusive breastfeeding, breast or gavage feedings, completely or partially naked exposure of the infant skin-to-skin with exposure varying in length from 1 to 24 hours per day, with or without early hospital discharge (Conde et al., 2003).

2.2 Defining skin-to-skin care (SSC)

In developed countries usually just the SSC component of KMC is used. SSC has been defined as 'intra-hospital maternal-infant skin-to-skin contact' and is sometimes also referred to as Kangaroo Care (KC). SSC is only one of three core components of KMC and they are therefore not the same intervention. There are other important differences between KMC and SSC. SSC is usually started later than KMC, on stabilised premature infants and is generally used only to compliment traditional care. It may be implemented with or without exclusive breastfeeding but does not include early discharge. Whitelaw (1990, p.605) states that in developed countries SSC 'is certainly not an alternative to intensive care for life-threatening illness but offers a means of helping mothers and fathers to overcome the feelings of separation and inadequacy that frequently accompany preterm delivery'.

2.3 Key theoretical concepts: bonding and attachment

In most discussions of the psychological impact of KMC the concepts of bonding and attachment are used. It has been proposed that one of the important benefits of KMC is improved bonding between mother and infant (Tessier et al., 1998) and its positive

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impact on the mother-infant attachment process (Feldman, Eidelman, Sirota, & Weller, 2002). This is particularly relevant with preterm infants whose parents often report a sense of loss, guilt and dismay at not producing a healthy full-term infant (Gennaro, 1988; Spear et al., 2002).

The theory of improved bonding, referred to by some KMC researchers as the 'bonding hypothesis' (Tessier et al, 1998) appears to relate to bonding and attachment phenomena as outlined by Bowlby and others. Concepts of attachment and bonding differ but for the sake of simplicity it may be useful to consider Klaus and Kennell's (1982) distinction, which is that a bond is a tie from parent to infant, whereas the word attachment refers to the tie in the opposite direction.

The terms 'bonding' and 'attachment' refer to large areas of research and some contentious debate, which are beyond the scope of this work. Some of the issues of the debate will be briefly outlined below. However, it is first necessary to define attachment and bonding as it is used in the literature.

Bonding

In their influential book on maternal-infant bonding, Klaus and Kennel (1982) propose that bonding refers to a phenomenon whereby adults become committed by a one-way flow of concern and affection to children for whom they have cared during the first months and years of life.

During the 1970s the biological argument of a 'sensitive period' for bonding was proposed (Kennell, Trause & Klaus, 1975; Klaus, Jerauld, Kreger, McAlpine, Steffa & Kennell, 1972) and the effects of maternal-infant separation on attachment were investigated (Klaus & Kennell, 1970; Leifer, Leiderman, Barnett, Williams, 1972; Peterson & Mehl, 1978). This research contributed to the concept of a 'sensitive period' for bonding gaining widespread popularity and exposure (Tessier et al., 1998). The research suggested that there may be a 'critical time' during which mothers are physiologically and psychologically 'primed' to bond with their infant. This 'sensitive period' was thought to affect the quality of the mother-infant dyad's relationship in both the short and the long term.

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The short and long-term effects of extra contact during the first hours post partum on mother-infant behaviour were investigated by researchers such as Klaus and Kennell (1972) and de Chateau and Wiberg (1977-I, 1977-II, 1984). For many parents of premature infants and others who had been separated from their children early on, the research claims caused great distress. Although tempered over time (see Klaus & Kennell, 1983), these claims still appear to influence research including some that investigates the psychological impact of early KMC. For example, Bigalow, Littlejohn & Bergman's exploratory study (2002) hypothesised that KMC in the first 20 hours of life would improve a mother's sensitivity to her infant even months after the birth.

Although it continues to be a highly contentious area, research on mother-child bonding clearly assisted in 're-humanising' the process of giving birth (Tessier et al. 1998). The concept of bonding had a widespread effect on the improvement of NICU conditions; greater tolerance for parent's involvement in the birth process; fewer infants being separated from their mothers at birth and improved 'rooming-in' facilities and recognition of parents' rights (Curry, 1982; Tessier et al., 1998)

Tessier et al. (1998) state that based on the literature and available empirical data, it is still not clear if a postnatal bonding effect exists. They suggest that the duration of the bonding period and its effects are unknown and the nature of the attachment behaviour is not clearly defined. In a review on bonding and maternal-infant attachment research Lamb and Hwang (1982, p.33) agree, stating, 'It is clear that strong claims concerning the relationship between early contact and mother-infant bonding are not supported by the empirical evidence'. This view is supported by Eyer (1992) who argues that bonding is more a scientific fiction than a reality - that it serves to hold mothers (and thus women) responsible for the shortcomings of children, rather then placing responsibility with society as a whole.

Many agree, however, that there is a complex interplay of factors that contribute to a mother's behaviour and feelings towards her infant, with numerous influences on the 'bonding' she may feel or the 'mothering' she will provide (Bowlby, 1988; De Chateau & Wiberg, 1977; Eyer, 1992; Klaus & Kennell, 1982). These influences may

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include her own experiences of care; her personal history, interaction with her family, partner and partner's family; her own genetic make-up and her infant's responses to this. The degree to which she has adopted the values and practices of the culture she is in may play a part; her own need for love, attention, support and the degree to which these are met, may all affect the 'mothering' she will offer her child. It seems likely that there are both physiological and the psychological factors affecting the 'bonding' that occurs between mother and infant (Curry, 1982).

Attachment

According to attachment theory, attachment is affectional, learned, specific and enduring and the result of interaction between mother and infant. Attachment is evident in the attachment behaviour of the infant who is bound to his mother by affectional bonds (Ainsworth, 1970; Bowlby, 1977, 1982).

The concept of attachment has changed and developed over years. The all-important role previously attributed to the infant's feeding experiences in the making of affectional bonds was challenged by research on 'imprinting' in baby birds (Hess, 1959) and the affectional behaviour of infant Rhesus monkeys (Harlow & Zimmerman, 1958; 1959). This research showed that the infant monkeys preferred the more comforting 'wire and cloth' mother substitute during times of stress to the 'wire mesh' one from which they were fed. Bowlby (1977) considered the father of modern attachment theory, expanded on these findings, theorising on the nature and formation of the child's tie to the mother. He rejected the secondary drive theory of social development, suggesting instead that social tendencies are primary and that a number of inborn behaviour patterns (such as following, clinging, sucking, smiling and crying) serve to bind the child to the mother from the beginning.

Bowlby's theories stimulated work such as Ainsworth's (1970) 'Strange Situation Assessment' (SSA) of attachment, which is still often used in attachment studies today and has been used to assess infant attachment in KMC and SSC studies. Bowlby (1988) believed all infants would become attached regardless of the type of care they receive. He noted that infants can be cared for in a responsive, abusive or inconsistent manner but will still develop an attachment to their caregivers. The

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important difference is the quality, or type of attachment. It is argued that this quality of attachment is the foundation upon which children build their sense of self and others and this in turn affects the way they relate to others throughout their life (Simpson & Rholes, 1998; Sroufe, 1983).

The reciprocal interaction of the infant with its mother has been used in KMC and SSC research to measure their attachment behaviour. Infants are active participants in the social life of the family and their behaviour is not only affected by the behaviour of others, it also serves to modify others' behaviour (Rheingold, 1988). Infant mental health is promoted when this reciprocal interaction is encouraged and assisted (Rheingold, 1988, Schore, 2001). Some propose that KMC may be effective because it encourages this same interaction.

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3. THEORISING KMC

Apart from a paper by Tessier et al. (1998), very little KMC literature explains how researchers have conceptualised the psychological effectiveness of the approach. KMC literature appears to rely on, and refer to, findings on the psychological impact of SSC research.

Tessier et al. (1998, 3) state that theoretically, 'KMC is based on the idea that a bonding effect is induced by early skin-to-skin contact between the child and its caregiver'. Evidence for this is found in the decreased rates of abandonment of premature infants by their mothers (reported in Bogota, Colombia for example) and the known importance of early social interactions with the caregiver, such as holding, touching and eye-contact (Tessier et al., 1998). They add that the KMC approach is an attempt to improve communication and attachment between caregiver and child and that KMC creates a family atmosphere in which parents become exposed and more prone to sensitive caregiving (Tessier et al., 1998).

Tessier at al. (1998) further suggest that the skin-to-skin contact practised in KMC will have an effect on the mother's attachment behaviour which manifests as a positive perception of the infant and a state of readiness in the mother to detect and respond to infant cues. Martha et al. (2002) suggest that the positive effect of KMC on the mother's feelings of confidence, acceptance, and adaptation may have to do with the way KMC might favour the child's capacity to emit cues and to respond to the mother's requests during the first year of life. This hypothesis highlights the interactional nature of the mother-infant relationship.

Additional ways of conceptualising the psychological effectiveness of the skin-to-skin component of the KMC approach have been considered in related literature on attachment and the reciprocal nature of the mother-infant relationship. They include hypotheses on improved emotional communication and security, mother-infant synchrony, containment and the provision of an optimal environment for the infant.

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'Emotional communication and security'

In an exploration of secure attachment and infant mental health, Schore (2001) states that the infant's emerging social, psychological and biological capacities cannot be understood apart from its relationship with its mother. He notes that in 1969 Bowlby inquired in detail into the mechanisms by which the infant forms a secure attachment bond of emotional communication with the mother. It is hypothesised that this 'emotional communication' is possibly well facilitated by early and ongoing skin-to-skin holding, during which infant and mother are in close, extended contact. Schore (2001) states that this early socioemotional learning is then internalised in the form of an enduring capacity to regulate and thereby generate and maintain states of emotional security.

'Mother-infant synchrony'

Curry (1982) suggests that the positive effect of skin-to-skin contact on later maternal behaviour appears to be primarily, its effect on the mother's self-confidence and the establishment of maternal-infant synchrony. This synchrony relates to attachment theory, which proposes that secure attachment is, among other things, the result of ongoing interaction between mother and infant (Ainsworth, 1970, Bowlby, 1969, 1977). This interaction is not uni-directional from mother to infant however. As Curry (1982) notes, the infant can already react to interactions initiated during the early period after birth, can encourage and sustain these interactions, and can engage his mother in social interaction during this time. Curry (1982) provides an overview of a theoretical and conceptual framework for understanding how the mother and infant interact and influence one another.

Research highlights the reciprocal nature of the dyad's relationship and emphasises the mother's increased sensitivity to her infant's cues, which serves to facilitate improved communication, security and attachment and a decrease in stress. As Ludington-Hoe and Golant (1993) explain, the mother and her infant function as partners and act together in a self-regulatory way. Part of the idea of self-regulation is that the newborn infant is able to communicate what it needs by giving cues. With the mother's increased sensitivity to her infant's cues and the ability to respond to these

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cues appropriately, the infant's need to communicate stress decreases (Ludington-Hoe & Golant, 1993).

'Containment and continuity'

Containment through skin-to-skin holding is a 'psychological experience of safety which results from the physical experience of being held securely and firmly but gently in position by either mom or dad' (Ludington-Hoe & Golant, 1993, p.88). Being held in this way offers a re-creation of some of the comforts the infant experienced in the womb where certain stimuli become salient to the fetus. Examples of these include the mother's heartbeat, the sound of the mother's voice, sucking and being rocked physically (Ludington-Hoe & Golant, 1993). When provided for the infant after birth, these stimuli have soothing and regulating effects (Anderson, 1999).

'The optimal environment'

From a biological perspective KMC may be understood to provide an optimal 'niche' for the infant (through breast-feeding) as well as an optimal 'habitat' (being held skin-to-skin) thus offering care 'as nature intended' (Bergman, 2004b). In their attempt to understand what dynamics underlie the premature infants' improved outcomes from skin-to-skon holding, Feldman and Eidelman (1998) suggest that the key may be the self-regulatory, minimal handling, tactile stimulation, and sensory enrichment perspectives within the setting of parent-infant physical contact.

Sloan et al. (1994) hypothesise that the observed benefits of SSC and KMC are attributable to a range of factors. These factors include the more extensive and improved instruction in neonatal care for mothers and improved maternal-infant bonding. They propose that bonding helps to establish physically and emotionally closer ties, which affect infant health and growth during and after the time that skin-to-skin care is used. They also propose that there is more assertive use of health services by mothers and increased concern with the infant's health by both parents and health-care providers.

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Discoveries in the fields of endocrinology, ethology, infant development, immunology, and bacteriology have greatly increased knowledge of the reciprocal linkages between the mother and infant and indicate that it is misleading to look only at one member of the dyad in this complex interaction (Klaus & Kennell, 1976). As Ludington-Hoe and Golant (1993) state, so much communication and symbiosis between mothers and infants occurs hormonally, chemically, electrically, and tactually that many of the possible benefits of this kind of care are as yet unknown. These complex interactions make the following divisions of a 'physical' and 'psychological' impact of KMC artificial. These 'categories' should not be viewed as independent of each other. It is hoped that the following divisions between the physiological and psychological impact of KMC simply offer some measure of clarity when considering the literature.

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4. THE PHYSIOLOGICAL IMPACT OF KMC

In this section the research concerned with the physiological impact of KMC will be briefly discussed. Physiological benefits discussed in the literature include increased and maintained lactation in mothers and reduced morbidity in LBW infants (Conde-Agudelo et al., 2003). KMC studies have found a reduced risk of severe illness, nosocomial infection, lower respiratory tract disease at six months follow-up and not exclusively breast-feeding at discharge (Conde-Agudelo et al., 2003). They also found that KMC infants gained more weight per day by discharge than control infants and one study has shown that it may also reduce mortality (Bergman & Jurisoo, 1994).

Skin-to skin holding has been shown to help with the maintenance of body temperature control, heart rate and oxygenation (Acolet, Sleath, Whitelaw, 1989). Findings have included improved neurobehaviour, reduction in apnoea and periodoc respiration (Ludington, 1990; Messiner, Todriguez, Adams, 1997). Further research has been conducted on duration of hospital stay and the effects of exclusive breast-feeding. The physiological outcomes discussed here are breastfeeeding, the infant's quality of sleep and arousal, skin-to-skin holding, crying, thermal control and weight gain.

Breastfeeding

KMC encourages exclusive breastfeeding as a central component of the approach. The infant can feed on demand while being held skin-to-skin. In developing countries, where resources are few, the quantity and duration of lactation can be a significant factor affecting infant survival (WHO, 1994). Studies of the effects of KMC on breastfeeding show that breastfeeding is prolonged, breast milk production is more stable, the number of feeds per day is increased, breastfeeding competence is increased and more premature infants are discharged on exclusive breastfeeding (Kirsten et al., 2001).

Breastfeeding provides a number of benefits for both mother and infant. Unlike sweat or saliva, milk contains a range of antibiotic substances and is nutrious, bacteriostatic and rich in factors involved in immunoregulation (Michie & Gilmour, 2000). These

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factors help to protect the breast from infection or mastitis and there is strong evidence to suggest that they also promote the protective immunity of the breastfed infant (Ebrahim, 1997).

Furthermore, marked prolactin secretion and oxytocin release are induced through breastfeeding and the infant's licking of the nipple. These hormones cause the uterus to contract thereby reducing postpartum bleeding (Klaus & Kennell, 1976); biologically support maternal attachment and promote lactation (Anderson et al., 2003). During breast-feeding the activation of sensory nerves in the oral mucosa, nipple, or skin leads to an activation of vagally mediated hormone secretion from the gut and pituitary. Researchers have concluded that many types of neurogenic reflexes induced in mother-infant interactions are also important for the energy economy of the mother and her infant (Anderson, 1999).

The promotion of lactation with KMC is shown in a number of studies where the mean duration of breastfeeding was found to be longer in the SSC group compared to the normal-contact group (Affonso, Wahlberg, & Persson, 1989; Wahlberg, Affonso & Persson, 1992; Whitelaw, Heisterkamp, Sleath & Acolet, 1988). Mothers of SSC infants were found to be twice as likely to be breastfeeding one to three months postbirth, compared with mothers in the control groups (Anderson et al, 2003).

Sleep and arousal

Ludington-Hoe and Swinth (1996) state that skin-to-skin holding and care results in a significant increase in the amount of quiet sleep for the infant. This occurs as this holding provides containment similar to in utero containment, thus evoking quiesence and decreased arousal for the infant. Decreased arousal and fewer energy consuming movements improve weight gain for the premature infant (van Rooyen, Pullen, Pattinson & Delport, 2002).

Furthermore, infants sleep between 50% and 75% of the time during SSC and as such SSC can be considered a form of co-sleeping (McKenna, Thoman, Anders, Sadeh, Schnectman, & Glotzbach, 1993). Co-sleeping mothers and infants exhibit synchronous, partner induced physiological arousals and that co-sleeping infants

spend less time in deep stages of sleep and more in higher stages than infants sleeping alone (McKenna et al, 1993). They propose that solitary sleep environments may accelerate the maturation of deep sleep, possibly before arousal mechanisms are maximally efficient to achieve arousals during some physiological crisis. Co-sleeping therefore gives the infant practice in arousal. This practice may be needed if infants are to balance the tendency to fall into deep sleep from which it is difficult to awake. This may be relevant for understanding the decrease in apnea and bradycardia found in SSC preterm infants (Ludington, Irwin, Swinth, Rao & Hadeed, 1994).

Crying and the waste of energy

The amount of crying is clinically significant for infants and as it has been found that excessive crying wastes energy, it can be particularly harmful to LBW infants (Anderson et al., 2003; Ludington-Hoe, Cong & Hashemi, 2001). Maternal–infant separation is associated with excessive infant crying and can be harmful as the newborn infant is uniquely vulnerable during the intrauterine-extrauterine adaptation, which Anderson (1999, p.142) points out is the 'greatest physiological adaptation ever required of the human organism'. KMC requires that the mother and infant be separated as little as possible, thereby decreasing infant distress and crying. Crying is harmful because it causes increased and fluctuating cerebral blood flow, cerebral blood flow velocity, intracranial pressure, increased risk of intraventricular heamorrage in preterm infants, and wastes calories meant for growth (Anderson, 1999). Skin-to-skin holding reduces crying and respirations become remarkably regular thereby promoting growth and reducing waste of energy (Ludington-Hoe & Swinth, 1996; Anderson, 1999).

Skin-to-skin holding, thermal control and weight gain

Although there has been much controversy concerning the role of handling for preterm infants, skin-to-skin holding has been advocated because it is thought to be both pleasurable and beneficial (Mooncey, Giannakoulopoulous, Glover, Acolet, & Modi, 1997). The controversy exists due to concerns about increased energy consumption and thermal control in the preterm infant. However, studies have shown advantages for the maintenance of thermal regulation when skin-to-skin holding is

used (Mondlane, da Graca & Ebrahim, 1989; Johansen, Spencer, Rolfe, Jones & Malla, 1992. Ludington-Hoe & Golant, 1993). Moreover, premature infants seek out and benefit from physical containment like that experienced in the womb (Ludington-Hoe & Golant, 1993). When the infant is held against the mother's chest during KMC, covered by a blanket if necessary, it experiences the physiological and psychological reassurance of physical containment. This position is effective in preventing innapropriate sensory input and decreases perception of environmental events and startle responses, which burn precious calories. Airflow around the infant's body is reduced when it is physically contained in this way. This is important as a change in airflow or temperature can alter breathing rates and cause heat loss through convection or evaporation (Ludington-Hoe & Golant, 1993). The proven benefits of providing this containment through skin-to-skin holding provides an example of how the physiological and psychological components of KMC overlap and influence each other.

The positive and statistically significant effects of early SSC and KMC for LBW infants therefore include, amongst others, decreased morbidity, increased and maintained lactation; increased quiet sleep; maintenance of infant temperature in the neutral thermal range; decreased infant crying and improved weight gain.

5. THE PSYCHOLOGICAL IMPACT OF KMC

In early assessments of KMC, one of the main benefits it appeared to offer was that it facilitated an increase in the mother's commitment and concern for her preterm baby. The hypothesis was that she would be more involved with its care from earlier on, bonding would be better and the high number of abandoned preterm babies in Bogota, Colombia would decrease (Whitelaw & Sleath, 1985). In later KMC research the term 'bonding' is still often referred to but the exact theoretical underpinnings of this are not made explicit. Literature proposes that improved bonding and attachment through the skin-to-skin component of KMC lead to a number of positive gains for the infant (such as more direct contact and attention from the mother, more tactile stimulation leading to developmental benefits, and decreased rates of infant abandonment). For the mother literature proposes that the benefits include improved bonding, less anxiety and increased confidence in her abilities as a parent.

5.1 The psychological impact for the mother

This section considers published and unpublished research on the psychological impact of KMC for the mother. The acceptability of KMC to mothers is considered first, as this has an affect on whether or not the approach has a positive psychological impact. Predominantly research has found that KMC is acceptable, although there are some cultures within which it has been met with resistance for various reasons (Lincetto, Nazir & Cattaneo, 2000). Research findings on the psychological impact of KMC suggest that benefits include improved bonding and sensitivity to the infant; decreased anxiety and increased feelings of self-confidence and competence as a parent. KMC has also been found to increase a sense of social isolation in some mothers. The tension created between the demands and benefits of this approach for mothers are then discussed.

When considering the literature it becomes clear that much more research has investigated the psychological impact of SSC than KMC. This is also true for the amount of research on the physiological outcomes of the two approaches. It is likely that this imbalance is simply due to more funding being available for research in developed countries, which is where SSC is predominantly used.

In many cases it appears safe to relate the findings on the physiological impact of SSC to KMC programmes, because standardised physical measures of infant temperature, sleep, crying and so forth are assessed. However, when assessing the psychological impact of SSC, not all findings can safely be assumed to hold true for KMC. This is primarily because researchers are measuring variables that are context-dependent when they investigate the psychological impact of an approach.

The contexts in which SSC and KMC are utilised are usually very different. SSC is predominantly used and researched in developed countries with adequate resources and KMC in developing countries. Other differences include the difference in length of time spent doing skin-to-skin (this varies from 1 hour in SSC research to 24 hours in KMC). The sample size, amount of funding, resources available to researchers and support available to the mothers during the research may all have an effect on the psychological impact of the intervention. Findings on SSC and KMC are therefore not combined this section.

Acceptability of KMC to mothers

It is important to first consider the acceptability of KMC to mothers, before discussing its psychological impact. This, in turn, will have an impact on whether KMC has a positive or negative psychological impact on mothers. Prior to 1998 information was lacking about the acceptibility of KMC to mothers and staff in different cultures (Lincetto et al., 1998). KMC research has since explored whether KMC is acceptable to mothers and how their feelings of self-confidence and competence as parents are affected. Research findings seem very mixed, with KMC being highly acceptable to some mothers (Cattaneo, Davanzo, Worku et al., 1998; Lima et al., 2000), while other mothers declined the opportunity altogether (Cattaneo, Davanzo, Worku et al., 1998; Sloan et al., 1994) or expressed dissatisfaction with the approach (Djelantik, 2002; Lincetto et al., 2000). Research on feelings of self-confidence and perceived competence as a parent when practicing KMC, generally reflects a positive psychological influence (Lima et al., 2000; Martha et al., 2002; Tessier et al., 1998).

A randomised controlled study investigated, among other things, the acceptibility of KMC to mothers in cities in three developing countries: Ethiopia, Indonesia and Mexico (Cattaneo, Davanzo, Worku et al., 1998). Of the total number of LBW infants included in the study, 149 were randomised to KMC and 136 to TC (warm room or incubator care). KMC was found to be generally acceptable to the majority of mothers. Overall, 91% reported being 'happy with their assignment' to the KMC group - (78% were happy in the TC group); 87% found the KMC method 'convenient' - (75% in the TC group). It is interesting and somewhat suprising to note that 83% of the KMC mothers found the method convenient compared to 73% of the TC mothers, who presumably would have had less 'work' to do. The interviewing technique used to obtain these results is not described in detail. Based on these results, the general conclusion of this study is that KMC was safe, comfortable and acceptable to the majority of mothers who participated.

In a descriptive study by Lima et al. (2000), feasibility, cost and the acceptability of KMC to mothers was investigated in Brazil. Acceptability of KMC to 106 mothers was explored through interviews just before discharge and.through two focus group discussions, each with five participants. The mean age of the mothers was 23 years, the mean parity was 1.7, 13% were single and 67% were unemployed. Eighty-five percent were reportedly happy with KMC and only one would have preferred TC. Overall, KMC was considered comfortable and convenient and 100% of mothers were confident about their ability to care for their baby at home, although 18% admitted feeling some fear when KMC was begun. Seventy-seven percent did not mention any disadvantages, although 43% complained about the long stay in hospital, 25% felt homesick and 12% stated that they were feeling locked up. Some mothers found the high temperature and lack of air conditioning difficult. One mother felt 'sad and tired and would have preferred to keep the baby in the incubator' (Lima et al., 2000, p. 25).

Researchers have noted some of the challenges of introducing KMC to mothers when it was not initially acceptable to them in Indonesia, Thailand and Mozambique (papers presented at the International KMC Conference, 2002). In Indonesia it was noted that some mothers refused to hold their LBW infants skin-to-skin, stating that there was no local practice similar to the method being proposed (Djelantik, 2002). Mothers in a KMC study in Thailand reported feeling too exposed and immodest

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when practising KMC. KMC requirements clashed with mothers' attitudes to LBW infants in a study in Mozambique. LBW infants were not readily accepted by the mothers as they were seen as 'not normal and 'ugly'; colostrum was seen as 'dirty' and the feeding tube 'hurt the baby' and 'made it cry' (Lincetto et al., 2000, p.295). Lincetto et al. (2000, p.295) note that these problems were overcome by talking to the mothers, individually and in groups, about their fears and beliefs, to 'help them accept the baby and trust in survival, to justify the requirements of KMC and to find solutions to their problems'. This was the only study that described how mothers were encouraged to express their concerns about practising KMC.

Further problems encountered by mothers that affected acceptability of care are noted in an earlier study by Lincetto et al. (1998). Mothers who participated in a KMC programme in Mocambique, but who had not attended follow-up assessments after discharge, were traced and asked what their reasons were. Only 13 of 42 could be traced and they gave the following reasons for not attending: lack of money to pay for transport (3); illness of the mother (2); change of residence and excessive distance (3); preference for traditional medicine (3); and they felt that the infant was healthy (2) (Lincetto et al., 1998). Reasons given, such as a lack of money for transport, excessive distance to the hospital and a preference for traditional medicine, reflect some problems with the acceptability of KMC for some mothers. The reality of practical problems such as transport difficulties limits the accessability of KMC for some mothers, even if the practice of KMC is acceptable to them.

Research reflects a range of maternal responses to KMC, with some mothers finding it highly acceptable and others finding it culturally inappropriate or prefering traditional medicine. Practical problems (such as not having money for transport to the hospital for example) were also found to impact on the acceptability of the approach for some mothers.

Bonding and sensitivity to the infant

KMC has been shown to reduce abandonment of LBW infants and is therefore undertstood to improve bonding (Whitelaw et al., 1985). Tessier et al.'s (1998) randomised controlled trial (RCT) is the only published study to look specifically at

measures of bonding and attachment, using KMC with LBW infants. The study was conducted on a set of 488 infants. Infants weighed less than 2001g; 246 were in a KMC group and 242 in a traditional care (TC) group. The design involved precise observation of the timing and duration of the mother-infant contact. It also took into account the infant's health status at birth and the socio-economic status of the parents.

Researchers considered two series of outcomes as manifestations of the mothers' sensitivity and attachment behaviour. The first outcome was the mother's feelings and perceptions of her premature birth experience, including her sense of competence, feelings of worry and stress, and perceptions of social support. The second outcome relates to attachment behaviour in the mother and was derived from observations made of the dyad's responsiveness to each other during breastfeeding, at gestational age of 41 weeks. It was hypothesised that the skin-to-skin holding would induce a positive perception and a state of readiness in the mother to detect and respond to infant cues (Tessier et al., 1998).

They found that mothers' sensitivity scores were not related directly to early skin-to-skin holding but rather to the infants' health status during the inpatient period (that mothers' sensitivity was higher when infants had spent time in the NICU). These mothers stimulated their infants more cognitively and socio-emotively. Observations of the mothers' sensitive behaviour did not show a definite 'bonding effect' rather, researchers found what they termed a 'resilience effect' due to KMC. By this they meant that 'mothers practicing KMC were more responsive to an at-risk infant whose development had been threatened by a longer hospital stay' (Tessier et al., 1998, p.2). They conclude that the infant's health status, rather than the skin-to-skin holding, is the more prominent factor in explaining mothers' more sensitive behaviour.

Bigalow, Littlejohn and Bergman's exploratory study (2002) hypothesised that early KMC (in the first 20 hours of life) would result in mothers' increased sensitivity for their infant. This they thought would be evident in mothers' interactive behaviours with their infants even after the newborn period. They assessed this by means of interviews regarding the infants' KMC history and videotapes of around half an hour of mother-infant interaction. The premature infants all ranged between 1 385g and 2 200g and their ages ranged from 3.1 to 11.9 months. Seven dyads had KMC from the

first hour and five had KMC after the first six hours. They were divided into two groups based on a median split of the number of hours the mothers did KMC with their infant on its first day of life: High KMC group (8 –20 hours) and Low KMC group (0-7 hours). The results indicate that KMC has an effect on mothering, specifically, that the amount of early KMC mothers give their infants, impacts on the mothers' sensitivity to their infant even months later (Bigalow et al., 2002).

The findings must be considered with caution. The mothers' decision to do more KMC on the first day was their own (for ethical reasons none were prevented from offering it after six hours). The long-term results showing increased sensitivity in the high KMC group may simply reflect pre-existing maternal sensitivity and attitudes. The extent of KMC in the first day was correlated to the amount these mothers gave their infants through the first month. The researchers note that 'it is possible that mother's who chose to KMC their infants more on day one may be women with higher maternal motivation than other mothers' (Bigalow et al., 2002).

Cattaneo and Scalembra (2002) state that literature on KMC suggests psychological and relational benefits for mothers and babies. The objectives of their study were a) to investigate differences in emotional responses of mothers using and not using KMC and b) differences in the interactive behaviour of mothers and infants. The possibility of KMC was offered to all 40 mothers enrolled; 19 chose KMC and 21 preferred traditional care (TC). Maternal stress was assessed and mother-infant interaction was measured using the Nursing Child Assessment Feeding Scale, which was applied once, before discharge (discussed below). The measurement of interactive behaviour showed an advantage of KMC over TC, particularly regarding communicative behaviour.

The researchers conclude that KMC, with its prolonged skin-to-skin holding, may lead to better emotional and relational bonds between mothers and infants, making the adaptation to preterm birth easier. It should be noted that as in Bigalow et al. (2002), mothers in the KMC group requested to offer their infants this mode of care. The possibility of a pre-existing condition of higher maternal 'motivation' cannot be disregarded.

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The one published paper on maternal-infant bonding and attachment in a KMC programme (Tessier et al., 1998) found that mothers' increased sensitivity scores were not directly related to the early skin-to-skin holding but rather to the infant's health status during the inpatient period. Unpublished research findings are that the amount of early KMC has an impact on the mother's sensitivity to her infant even months later, and that KMC may lead to better emotional and relational bonds.

Anxiety and mood

It is widely accepted that giving birth is a significant life event. Pregnancy and the act of giving birth are often accompanied by strong emotion and most women experience natural fluctuations in mood at these times. Much nursing research acknowledges the intense emotions, such as anxiety, that usually accompany the birth of a premature baby in particular (Maroney, 1994; Miles, Funk & Casper, 1993; Spear, Leaf, Epps & Locke, 2002). KMC and skin-to-skin holding is thought to provide a means to alleviate some of this anxiety. This is understood to occur through an increase in maternal confidence, as the mother becomes the primary caregiver while breastfeeding the infant and holding it skin-to-skin.

In Tessier et al.'s (1998) study mothers' feelings of anxiety and guilt were assessed by means of the Mother's Perception of Premature Birth questionnaire, a questionnaire based on interviews with mothers and published empirical research on the experience of prematurity. It addresses three aspects of the mother's life linked to experiencing a premature birth. These are (i) her social, family and institutional environment and her perception of the respective support received from these three environments; (ii) the mother's feelings and worries about her LBW infant (anxiety and guilt); and (iii) the mother's sense of competence and confidence in her ability to nurture her premature infant. The finding of the study was that 'in stressful situations when the infant has to remain in the hospital longer, mothers practising KMC felt more competent than mothers in the TC group' (Tessier et al., 1998, p.2). It was hypothesised that KMC gives the mother a feeling of control over her stress and worry about the infant's health, and that this experience acts in a protective manner, making her more stress resilient.

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Cattaneo and Scalembra (2002) measured the emotional response of 40 mothers of preterm infants who chose to use KMC and those who chose TC. They measured maternal stress soon after birth and just before discharge using the short form of the Parental Stress Index questionnaire. At baseline the scores of the two groups of mothers was the same; however at discharge KMC mothers showed a significant reduction of emotional stress compared to the TC group.

Apart from the studies mentioned, no other KMC research was found which explored the effect of KMC on mother's feelings of anxiety and stress in any detail. Both are common and significant psychological responses to the birth of a preterm infant (Doering, Moser & Dracup, 2000; Spear et al., 2002).

SSC research suggests that for some mothers anxiety and stress may be alleviated through this intervention, but as yet, this research has primarily been on stabilised infants, held skin-to-skin for only a few hours per day, without the early discharge and exclusive breastfeeding policy of KMC (Neu, 1999). It seems likely that in a suitably supportive environment KMC may alleviate conditions of stress and anxiety and contribute to experiences of healing for some mothers (Kirsten, Bergman & Hann, 2001). However, the question remains as to whether the demands of it may also, at times, exacerbate pre-existing conditions such as anxiety or depression in some mothers and how this may be assessed and screened for. This is a particular concern in developing countries where KMC mothers are often part of a high-risk category which includes a high percentage of primiparae and young mothers with a low literacy rate (Lincetto et al., 1998) as well as single parents with high rates of unemployment.

Even with minimal SSC some parents have reportedly felt overwhelmed and too anxious to continue. Two SSC studies note this. In the first study (on reconciliation and healing for mothers through SSC) the eight mothers participating described an emotional 'crisis' in the second week (Affonso, Bosque, Wahlberg & Brady, 1993). They had given SSC for a minimum of 4 hours per day, six days per week, for three weeks. Although this is substantially less time than most KMC mothers carry their infants skin-to-skin, the mothers requested a break from SSC with their infants, due to stress and tiredness. This SSC study more closely resembled KMC because of the

duration of SSC contact required of these mothers and because these mothers had experienced high-risk pregnancies and their infants were premature. The mothers later resumed SSC with their infants and reported important personal benefits from the experience, once they had been given the break they felt they needed.

A second study explored nine parents' experience of SSC (lasting one hour each session, on two consecutive days) with preterm infants that required additional oxygenation (Neu, 1999). Although responses were generally positive, some parents chose not to continue SSC due to their experience of extreme anxiety about their infant's health when they were holding them. The parents' perception of the environment was an important determinant in their decisions to continue or discontinue SSC (Neu, 1999).

Other factors may also affect anxiety and mood in KMC mothers. For example, there may be implications for mothers' levels of stress and anxiety if they cannot or do not replicate satisfactory KMC conditions for their infants once discharged home. As Lincetto et al. (1998) note, it is likely that once at home other household demands give mothers less opportunity to keep their baby in the kangaroo position throughout the day. Anxiety and stress may also increase if they cannot utilise the support and necessary follow-up component of KMC due to transport difficulties. Problems with transport are a contributing factor in neonatal mortality in South Africa (see Pattinson, 2003a).

Mothers have also reported feelings of anxiety and stress when concerned about other children at home while they are in hospital, although this is alleviated if family members are able to visit them regularly (Cattaneo, Davanzo, Worku et al., 1998). The most appropriate time for discharge of LBW infants in developing countries is still a matter of debate (Lincetto et al, 1998) and as such KMC mothers will be required to cope with their infant for varying lengths of time depending on the programme they have been part of. Lincetto et al. (1998, p.438) state that it can be 'difficult to communicate the importance of follow-up and thermal control for LBW infants to mothers who are very young, illiterate or worried with personal problems as a result of low income or single parenthood'. The follow-up and ambulatory care

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component of KMC is acknowledged to be a difficult aspect of the intervention to realise consistently and effectively (Charpak et al., 2000).

Feldman et al. (2002) did not research the psychological impact of a full KMC programme but their findings were extremely encouraging. With SSC they found that mothers showed more positive affect, touch and adaptation to infant cues, reported less depression and perceived infants as less abnormal. Both mothers and fathers were rated as more sensitive and as having provided a better home environment than the controls. They suggest that the intervention improves parental mood, perceptions and interactive behaviour (Feldman et al., 2002).

It seems then that research strongly suggests that KMC may, in certain circumstances have a positive impact on the mood and anxiety levels of the mother, but in other circumstances, it may actually lead to an increase in anxiety levels.

Self-confidence and perceived competence

Research investigating mothers' sense of confidence and competence when using KMC has been scarce – this despite the fact that this is claimed to be one of the major benefits of KMC. Many of the reports of increased confidence are derived from SSC research where mothers are well supported by staff and first world resources. SSC with this support may have a different impact to KMC. Further KMC research is therefore important in light of studies which have shown that some mothers feel overwhelmed by the increased responsibility of this kind of care for their newborn (Tessier et al., 1998). This may be exacerbated if the LBW infant is ill. The psychological impact of KMC with such an infant has not yet been investigated, partly due to it being a newer development to use it with babies who require assisted ventilation or who are still quite ill (Neu, 1999).

In a study by Martha et al. (2002), mothers' positive feelings of competence and acceptance were measured in 594 dyads. Infants were divided into two cohorts: one at term (N=73) and the other preterm. The preterm cohort was again divided into two randomly assigned groups: KMC preterm infants (N=278) versus no KMC preterm infants (N=251). KMC infants were discharged home as soon as they were

randomised regardless of weight or gestational age. KMC infants were kept skin-to-skin, 24 hours per day on the mother's chest until KMC was no longer tolerated. Preterm control babies were kept in incubators until they satisfied usual criteria for discharge. They were then followed up at the same follow-up clinic as the term babies cohort and the KMC infants.

In the preterm cohort, KMC was found to have an effect on the mother's positive feelings for her child, on her feelings of competence at 40 weeks postconceptional age, on her feeling of adaptation to her mothering role and on her acceptance of her infant at 15 months corrected age (Martha et al., 2002). These results are supported by findings in Tessier et al.'s (1998) study, which found that scores on mothers' sense of competence according to infant stay in hospital and admission to NICU were better in the KMC group than the control group.

Social support

The importance of support for mothers practising KMC at all stages and in various settings, has been emphasised by many (Bergman, 2004a; Cattaneo, Davanzo, Uxa et al., 1998; Lincetto et al., 2000; Tessier et al., 1998). As Cattaneo, Davanzo, Uxa et al. (1998, p. 443) state, 'a KMC programme should consider that mothers need psychological, social and educational support not only during hospitalisation, but also after discharge'. Although much of the literature recommends that social support should be an integral component of KMC, no research was found which explained how this had been provided for mothers. Some research reflects that mothers practicing KMC do feel socially supported, however there are instances where KMC mothers have felt less socially supported and more isolated than TC mothers.

In a cross-cultural KMC study by Cattaneo, Davanzo, Worku et al. (1998), 84% of the 149 women practicing KMC felt well supported by other mothers (compared with 90% of TC mothers). In the KMC group 69% reported that their family agreed with the KMC method (compared with 71% in the TC group); and of the fathers in the KMC group, 83% were reported to agree with the KMC method (compared with 81% in the TC group).

In contrast to these results, Tessier et al. (1998) found increased feelings of isolation and a sense of lowered social support in the KMC mothers versus the TC mothers. There appeared to be a gap between the KMC mothers' stronger needs to be helped and their feeling of received support. They warn that KMC mothers 'may feel burdened with too many responsibilities in taking care of the infant and, consequently, feel overwhelmed and that they are not getting sufficient help from the hospital staff and family' (Tessier et al., 1998, p.10). They therefore recommend that social support is included as an integral part of KMC.

Results about social support are therefore not conclusive, as they appear to vary between studies. These results alert us to the fact that for KMC to be beneficial to the mother, social and family support for mothers is important. KMC mothers may require more support then usual from staff, family and their extended support network. Social support is an essential requirement for KMC to be sustainable for mothers who may perceive themselves as having increased responsibility for their infant's care.

Concluding remarks

From the research it seems clear that KMC offers important benefits for the mother-infant dyad. The fact that 24 hour KMC is also extremely demanding for the mother cannot be denied. This tension between the benefits and demands of KMC highlights the psychosocial context of mothers in developing countries such as South Africa. For many of these mothers the number of hours doing KMC is not a matter of choice, as it is for mothers in much of the SSC research, because incubators are simply not available. These mothers may then carry their preterm infants skin-to-skin, sleeping with them on their chest, 24 hours per day, for a number of weeks at a time. It seems that the following issues should be considered before recommending KMC for mothers.

'A good mother'

The tension between the benefits and demands of KMC highlights culture-bound constructs of what it is to be a 'good mother'. Women may feel pressurised to do

KMC by their partner, family, doctor or nursing sister, in order to be seen to be a 'good mother' and/or 'good patient'. Although not always possible, ideally the choice to do KMC should always rest with the mother, after she has been fully informed of benefits and demands of the approach (Cattaneo, Davanzo, Uxa et al., 1998). As Littlejohn (2002) suggests, many people believe that women have an innate ability to adopt the role of mothers and that 'instinctive' behaviour will enable them to be mothers. She argues that selfless devotion is portrayed as the ultimate ideal and women who experience negative feelings are seen as not living up to this ideal (Littlejohn, 2002). This is further supported by Eyer (1992).

'A context of multiple stressors'

Mothers in developing countries are also likely to be coping with stressors such as abuse, unemployment, responsibility for large families and single parenthood, all of which can exacerbate common experiences of anxiety, ambivalence and depression. In South Africa stressors such as those named are a reality for many women (see Mbokota & Moodley, 2003, on abuse of pregnant women). In the light of these stressors the importance of research into the psychological benefits and drawbacks of KMC is highlighted. Not everyone may be suited to offering KMC and some form of enquiry is necessary to distinguish those who may not be suited to manage the demands of KMC and why. If mothers chose this form of care for their infant, research needs to explore how they are best supported and prepared for demands of the experience (Anderson, 1999). As Anderson (1999, p.151) states, 'even given unlimited resources [ ] the tolerance for individual mothers must be considered'. By the same token, within the context of multiple stressors for so many women in South Africa, the benefits and possible healing and ameliorating benefits of KMC need to be fully explored and utilised wherever possible.

' Responses to premature & LBW infants'

Experiences of anxiety, depression, ambivalence and hostility in mothers of preterm infants are recognised and acknowledged in much nursing research (see Brooten, 1988; Doering et al., 2000; Gennaro, 1998; Maroney, 1994). These experiences have also been touched on in some SSC research (see Affonso et al., 1993; Feldman,

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Weller, Leckman, Kuint & Eidelman, 1999; Neu, 1999). These experiences have not yet been explored in KMC research where they may be very relevant as mothers in developing countries are often at risk due to a multitude of stressors. Klaus and Kennell (1976) suggest that many pregnant women have fears of producing a baby that may not be normal or may reveal some of their own 'secret inner weaknesses'. The goal of producing a normal baby is likely to be connected to mental images of healthy newborns. These images are often difficult for parents to reconcile with the reality of their premature babies who are smaller than normal and may be sick or in need of medical assistance (Klaus & Kennell, 1976). A sense of loss and despair is often described following the birth experience and this may be heightened with additional feelings of guilt and disappointment if the baby is premature (Affonso et al., 1993). Affonso et al. (1993) propose that skin-to-skin contact provides an opportunity for healing, acceptance and reconciliation for mothers of premature infants.

'Depression and loss'

No research has looked at the psychological impact of full KMC programmes for mothers with pre-existing clinical depression or post-natal depression. Epperson (1999) states that, if left untreated, Postpartum Depression can have serious adverse effects on the mother and her relationship with significant others, as well as on the child's emotional and psychological development.

Like with mothers' experiences of anxiety and stress, the SSC research suggests that the close contact may help alleviate depression for some mothers (Feldman et al. 2002; Dombrowski, Anderson, Santori & Burkhammer, 2001). It may also facilitate mothers' awareness and expression of their emotional reactions associated with having a premature infant (Affonso et al., 1993; Schmidt & Wittreich, 1986). This is significant as some mothers of premature infants describe multiple losses associated with premature birth. These losses include the lack of a normal course of pregnancy and the absence of a desired or expected labour and delivery (Affonso et al., 1993). Mothers may also experience feelings of guilt about being responsible for the hardships of a preterm birth on the infant; feelings of victimisation and a general sense of loss of control over childbearing events and life in general (Affonso et al.,

1993). It is therefore plausible that with adequate psychosocial and nursing support for the mothers, KMC may facilitate the same process that has been identified as healing for mothers using SSC.

Having said this, it is again important to consider that SSC and KMC are not the same intervention. Logsden et al. (2000) found that women with inadequate social support are some of those at highest risk for developing Postpartum Depression. KMC may alleviate depression for some mothers but it is also conceivable that feelings of isolation and decreased social support (Tessier et al., 1998), tiredness and depression may be increased for some mothers participating in 24 hour inpatient holding and breastfeeding of their infants. It is important that mothers should be screened and monitored for depression and supported psychologically (Epperson, 1999).

'Ambivalence'

Although resistance and ambivalence to KMC has been reported no research has specifically looked at KMC mothers' feelings of ambivalence about KMC, their premature infant, birth experience or new role as 'mother'. Apart from a few studies (Lima et al., 2000; Lincetto et al., 2000) the reasons mothers give for preferring traditional care over KMC or for actively refusing to be part of a KMC study are often not discussed or explored in any detail in the literature. These mothers' feelings of possible ambivalence and/or anxiety, due to cross-cultural, individual or contextual reasons, could provide important information for improving and implementing future KMC programmes (Lincetto et al., 2000).

'Guilt'

When one considers the responsibility of a newborn baby, 'motherhood' can seem very daunting, yet mothers often feel ashamed and too guilty to admit their feelings of anger, bewilderment and confusion (Eyer, 1992; Klaus & Kennell, 1982; Littlejohn, 2002). Other stressors may well combine with these feelings to compromise both a mother's wellbeing and that of her baby. These may include events such as abandonment by the father of the child; childhood neglect or abuse; a traumatic birth experience, maternal-infant separation after birth, the isolation of domestic life and

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lack of social support systems (Littlejohn, 2002). These stressors may have an enormous impact on a woman's ability to cope with the demands of being a mother. Feelings of ambivalence, shame and guilt may make it difficult for her to speak out about her experience and request assistance. This is particularly problematic in settings where the mother's voice will receive minimal attention because of higher demands on limited resources.

In this section research on the psychological impact of KMC on mothers was considered. It was reported that research has found that KMC can impact on bonding and sensitivity to the infant; on anxiety levels and mood; on feelings of confidence and competence and on feelings of social support. The impact, is, however not always positive. In considering the e tension between the benefits and challenges of KMC a few important issues should always be considered. These issues include the culture-bound construct of what it is to be a 'good mother' and the pressure this may exert on women; the context of multiple stressors in a developing country and common maternal experiences of anxiety, depression, ambivalence and guilt.

5.2 The psychological impact of KMC on the infant

Very little research could be found on the psychological impact of full KMC programmes on the premature infant. This may be because infant outcomes have been investigated in a number of SSC studies and their results seem to indicate that the skin-to-skin holding is safe and beneficial. KMC literature has relied on these SSC findings, prioritising important research questions around morbidity and other physiological outcomes of KMC. Apart from one published KMC article on the psychological impact of KMC (Tessier et al., 1998), the rest is unpublished work that was presented at the International KMC Conference (2002). These papers indicate the increasing interest and attention that is being paid to psychological outcomes of KMC within the research community. The research considers the effect of KMC on infants' cues and responsiveness, developmental outcomes and attachment.

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Infants' cues and responsiveness

Tessier et al. (1998) found that KMC infants gave clearer cues and were more responsive to their mothers at 41 weeks gestational age than the control group. They suggest that this result is due to the skin-to-skin holding which induces a state of readiness in the mother to respond to infant cues, thus encouraging the infant to, in turn, be more responsive and communicative. This hypothesis highlights the interactional nature of the mother-infant relationship, which Martha et al. (2002), are in agreement with. They suggest that the significant effect of KMC on mothers' feelings of confidence, acceptance, and adaptation may have to do with the way KMC might favour the child's capacity to emit cues and to respond to the mother's requests during the first year of life (Martha et al., 2002).

The infant's ability to emit clear cues is crucial for eliciting the response it needs at any given time. This influences the responsiveness of the mother, which may have implications for attachment. Based on the infant's behavioural message, caregivers through observation interpret the behaviours and come to an awareness of the infant's needs. Skin-to-skin contact supports the infant's development by facilitating parent-infant co-regulation (Gale & Vandenberg, 1998). The closeness of the skin-to-skin holding facilitates a sensory dialogue between infant and mother. This becomes an important mode of communication between the two, creating a sense of security and trust (Lally & Phelps, 1994).

Developmental outcomes

No long-term follow-up of developmental outcomes of KMC infants has been conducted. Martha et al. (2002) compared cognitive development at 12 months and attachment between mother and infant at 15 months in term infants as well as preterm infants, some of which received KMC and some TC. In this study all the children were evaluated with the Griffiths test at six and twelve months corrected age, the HOME inventory before twelve months, the INFANIB test (neurological scale at 3, 6, 9 and 12 months of corrected age). At twelve months they assessed the general and sub-scale 'cognitive development' or IQ of the infants. They looked at the motor ability, personal-social, audition and language, execution and eye-hand co-ordination

of the infants. They found no significant difference in the total IQ score between the term and preterm children at 12 months of corrected age, but preterm infants showed a significantly lower score in the personal-social subscale, than term infants. In the preterm cohort, the KMC infants had better results than the control preterm group for general IQ score, motor and personal-social subscales (Martha et al., 2002). This effect was more significant in the groups of higher risk infants at six months corrected age.

The conclusions they drew were that the KMC intervention has a positive effect on the general intellectual growing rhythm (catch-up effect) and on the motor and person-social scales during the first year of life, and has an effect of 'resiliency' in the socio-emotional development of the infant. The authors say that KMC provides 'brain care' during a highly sensitive period of a preterm infant's neurological development, especially for the high-risk infant group (Martha et al., 2002). They suggest that KMC can be viewed as 'developmentally supportive care, in which parents are guided in managing their biological parenting abilities' (Martha et al., 2002).

SSC research also suggests positive developmental outcomes for KMC infants (Ludington-Hoe & Swinth, 1996). These include less gaze aversion and more alertness at 37 weeks and a positive impact on the infant's perceptual-cognitive and motor-development subscales (using the Bayley Scales of Infant Development) at six months (Glozheni, Moisiu, Tushe & Kati, 2002). SSC is viewed as an intervention that meets the developmental care criteria fostering neurobehavioral development. The primary goal of developmental care is the support of the infant, to facilitate neurobehavioural organization, in the face of necessary medical interventions (Gale & VandenBerg, 1998; Ludington-Hoe & Swinth, 1996).

Attachment

Literature on KMC refers to improved attachment as an outcome of the approach but the research does not reflect this. The term 'attachment' is used interchangeably with mother-infant 'bonding'. This leads to a lack of clarity in the literature.

Martha et al. (2002) found no difference between the term and the preterm infant's results using the Strange Situation Assessment (SSA) to measure attachment. No other studies were found that investigated attachment outcomes of KMC infants.

Legault and Goulet (1995) recommend that research needs to evaluate the attachment process between parents and preterm infants by comparing SSC and TC. They also suggest that research should compare the psychological impact of each method with different sample groups such as fathers, single mothers and teenage parents.

Conclusion

Although current research demonstrates benefits primarily in the domain of the physiological improvements in LBW infants, research into the psychological domain has begun to increase (Gale & VandenBerg, 1998). Positive results have been found mainly in relation to developmental outcomes but also in relation to the clarity of the infant's cues, responsiveness and socio-emotional development. No difference in attachment was found between KMC and control infants

5.3 The psychological impact of KMC for support personnel: a paradigm shift

In this section first the acceptability of KMC to support personnel and then the psychological impact of the approach is considered. Many suggest that a 'change in the mindset' of support personnel is necessary when KMC is first introduced (Bergh, Pullen & van Rooyen, 2002; Protchnik, 2002; van Rooyen, Pullen, Pattinson et al., 2002). Changes in the staff's job descriptions and a natural resistance to change make the transition to KMC challenging at times. As the aim of KMC is to empower the mother in becoming the primary care giver, whilst providing support in a safe environment, they point out that KMC requires a paradigm shift from conventional nursing practices to a more supportive role including psychosocial and educational support for mothers. This focus on empowering the mother changes the traditional power balance of the maternity ward somewhat, with the premature baby being 'given back' to the mother and the family. Research reflects that KMC is acceptable to support personnel but that some have experienced difficulty in relinquishing power when adapting to this new approach. Literature also describes a possible increase in

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workload and an increase in support personnel's emotional involvement with the family of the KMC infant.

Acceptability of care

As in the case of the impact on mothers, it is important to consider how health care workers perceive KMC and whether they accept it before looking at how it impacts on them.

A descriptive study by Lima et al. (2000) investigated, among other things, the acceptability of KMC to staff involved in a KMC programme in Recife, Brazil. They used (i) a questionnaire administered to 16 staff members (four doctors, three nurses and nine auxilliaries) and (ii) two focus group discussions with one nurse and five auxilliaries each. They found that staff found KMC acceptable, humane and safe and regarded the presence of the mothers as a positive thing (Lima et al., 2000).

Staff reportedly felt that KMC had more advantages than disadvantages for both babies and mothers. Staff felt that advantages included early stimulation of bonding and breastfeeding and the self-confidence and progressive empowerment of mothers. Disadvantages were that the ward was too crowded and some mothers too tired. This was especially true for mothers who had to express breastmilk every three hours. The need for some recreational activities for the mothers ranked first among suggestions for improvement. It is interesting to note that staff reported disadvantages of KMC for mothers that the mothers did not report themselves (such as being too tired). Generally, staff seemed to view the intervention very favourably.

Strong resistance to KMC by some pediatricians has been noted, although literature indicates that it is generally well accepted. In the Ukraine this resistance was due to the early discharge policy of KMC requiring a major change in the traditional methods of caring for LBW infants (Znamenskaya, Palshin & Kurilina, 2002). A study of a KMC programme in France reported that the doctors resistance was due to the fact that KMC not considered a 'technological advance' (Prevost, Janaud, Cortey, Huraux-Rendu & Ummenhover, 2002).

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Implications for staff

Also important in considering the psychological impact of KMC on staff is to determine whether KMC changes their workload and their job description. In a study conducted in Brazil, KMC care is described as having caused a 'revolution' in the care that nursing staff provided and that it posed major challenges for them (Protchnik, 2002). The opening of maternity wards to the families called for significant behavioural change from the staff and as a first reaction it was noted that personnel tried not to share caring and responsibility with the mothers. As a second reaction, the opposite happened and mothers were left to take care of everything. As a third stage however, care procedures and responsibility were shared and a balance emerged (Protchnik, 2002). Staff's resistance to change in other KMC programmes has also been documented (Lincetto et al., 2000).

Lincetto et al. (2000) note that KMC may result in an increased rather than a decreased workload for staff. This may cause feelings of resentment and increase resistance to the approach if not dealt with openly and empathically. This increase of workload is initially due to the introduction of new routines, later by the improved survival of infants and then the consequent increase of referrals from other maternity units (Lincetto et al., 2000). As KMC requires increased support of mothers and involvement by committed staff members, careful selection of nurses who are willing and interested is essential. The nurses themselves are likely to require increased support as they make the transition to the new method of care.

Increased emotional involvement

Through KMC new relationships become established between professionals with complementary visions, such as neonatologists, psychologists and social workers, who did not previously work together (Protchnik, 2002). The impact of this humanisation of care leads health professionals to become better prepared because they now have to engage with the psycho-affective problems of the babies' families, with the country's social, economic and cultural reality and with the reality of mourning. Protchnik (2002) suggests that now, when a KMC baby dies, it leaves behind it a family to which the staff has become attached. This information may be

useful in motivating for change in maternity wards and for informing decisions about staff training and support programmes, particularly for the experience of mourning and loss, given the depleted emotional reserve described by nursing staff in South Africa.

The psychological impact of KMC for support personnel requires a paradigm shift away from traditional nursing practices to a more psychosocial approach to nursing care. The importance of understanding cultural norms is highlighted with the aim of offering appropriate KMC care that is acceptable to patients. Nursing staff's initial resistance to this is noted in the literature, as is their increased emotional involvement with the families of KMC babies. This may have implications for training and the improvement of staff support programmes.

5.4 Other caretakers

This section considers the possible implications of KMC for family members, as well as the involvement of various professionals needed to support and empower the mothers of LBW infants and their families. The socio-economic conditions in which a family lives can affect the success of KMC programmes. This is illustrated by a study on absenteeism at follow-up clinics in Brazil and may have implications for South Africa.

Implications for the family

KMC has implications for the families of LBW infants. If required to stay in hospital, KMC mothers may be away from home for a few weeks. However, KMC also provides an unusual opportunity for fathers, grandparents and other members of the family to provide care and support in hospital. Once the infant has achieved adequate positive weight gain and is discharged, they can also be involved in the skin-to-skin component of KMC at home.

The early discharge and ambulatory care component of KMC has implications for the family of the mother and premature infant. Exactly what these are requires further research but mothers carrying their infant 24 hours per day at home may experience it

as limiting their mobility, accessability to their other children and their ability to work. The participation of the family in supporting the mother and understanding the requirements of KMC seems crucial if KMC is to be effective in developing countries.

This was found to be the case in a study in Brazil which investigated the main reasons for the absence of preterm children from their follow-up consultations during the first 3 months after discharge (Lima & Nascimento, 2002). The standard practice after discharge for their programme includes follow-up during the first year of life by an interdisciplinary team at the Kangaroo Unit and after that by a paediatrician, up to five years of age. A home-visit is considered important as part of the social support offered the family and to assess the risk factors for disease and death for the baby. The primary reasons found for absence at follow-up related to the socio-economic conditions of the family and what researchers termed 'the recklessness' of the caregivers. This finding indicates how KMC programmes rely on the participation of the family in order to be successful and how important it is that the family is well informed about the importance of follow-up consultations. The study has significance for South Africa as similar challenges will have to be faced in providing ambulatory and follow-up care to families in poor socio-economic conditions in a large, developing country.

Training and education

Some researchers suggest that educational activities can be undertaken during the time the mother is in the hospital, as many KMC mothers are unemployed (Protchnik, 2002, van Rooyen, Pullen, Pattinson et al., 2002). Protchnik (2002) suggests that as a great proportion of mothers and families in the KMC programmes are of a low educational level and receive low wages, the activities in the unit should widen their knowledge and understanding of issues regarding health, nutrition, child-rearing and family relationships. This knowledge should not be adopted only as regards the baby - it should benefit the whole family. Educational therapists and even volunteers could introduce and teach manual crafts that can become an additional source of income for the family.

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6. SUMMARY

In the current paper the literature on the psychological impact of KMC was discussed. The possible psychological benefits and the psychological challenges of KMC for for the mother, the infant, support personnel and other caretakers were considered. The research seems to suggest that although research results on the psychological impact of KMC seem promising, they are not yet conclusive. In particular, it appears that certain mechanisms of KMC offer important benefits for humanising neonatal care of LBW infants. However, most of the published research on psychological outcomes has been carried out in SSC programmes in developed countries and it is not clear whether these results can be generalized to KMC.

6.1 Findings

6.1.1 The research is not conclusive

The literature suggests that KMC impact on the bonding of mothers with infants and on mothers' anxiety levels and mood: it seems clear however that the impact can be positve or negative. Improved mother-infant bonding is named as an important outcome of KMC and qualitatively KMC appears to have a positive effect on improved bonding and sensitivity (for example, decreased rates of abandonment of LBW infants). However, the one published study on bonding in KMC did not reflect a definite 'bonding effect'. Mothers' increased sensitivity scores were related to the infants' health status. Findings of improved communicative behaviour, sensitivity to infants' cues and relational benefits are noted with caution, as RCTs were not used in these studies. This suggests the possibility of a pre-existing condition of higher maternal motivation in these mothers, which would confound results. Some research indicates a reduction in stress using KMC and other findings indicate increased feelings of social isolation and decreased support. Mothers' sense of increased competence seems to be reflected in most of the published research, specifically with regard to breastfeeding. Acceptability of care appears to vary from findings that mothers found it highly acceptable, while other research reflects mothers' refusal to

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use KMC and their feeling that it is not acceptable as it differs from their local practices.

KMC infants were found to be clearer in giving cues to caregivers, were more responsive to caregivers and preliminary results even suggest that their may be positive developmental and attachment outcomes. However, almost no long-term research has been conducted on the psychological benefits for infants and KMC research on the infants' psychological outcomes was extremely limited, which affects the reliability of findings. However, SSC research on developmental outcomes lends support to findings that KMC can improve clarity of infant cues, cognitive development in LBW infants and that it has a positive effect on motor and socio-emotional development. Although much of the literature refers to improved bonding and attachment as a positive outcome of KMC, research did not reflect a clear influence on infant attachment.

In terms of health care workers, research seems to suggest that attitudes about KMC are determined by how workload and job descriptions are impacted upon. Research also suggests that families involved in KMC can be more or less stressed because of KMC. Literature on the psychological impact of KMC for nursing staff indicates relative consistency in responses. The initial response is mainly one of resistance to change and a relinquishing of power, which changes with time to an acceptance of KMC and a preference for it over TC. Strong resistance to KMC by doctors is noted in some of the literature. This resistance is due to KMC requiring major changes in traditional methods of care and it not being considered a 'technological advance'.

Both the importance of the family in KMC and questions about the impact of KMC on the family are raised in the literature. However, almost no investigation has been conducted on the psychological impact of KMC on families. Investment in evaluative research of ongoing programmes has been recommended (E Melo & Hutley, 2002). This would assist in research that is more conclusive.

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6.1.2 Mechanisms of KMC that work well

In many ways KMC assists in humanising neonatal care, especially for preterm infants that have been in a NICU. When properly supported emotionally and psychologically, parents using skin-to-skin holding have reported psychological benefits. Increased involvement with the infant may promote attachment and bonding, aid exclusive breastfeeding and improve parent-infant interaction and sensitivity. KMC also assists in heightening parental awareness through increased exposure to premature infant care. It may also improve attention to the home environment provided for the infant and result in parents becoming more assertive in their use of medical services. Certain aspects of the KMC approach appear to offer great benefits for the dyad and these include supportive care, advice and attention to the mother, the physiological and psychological benefits of skin-to-skin holding, and the promotion of breastfeeding. If done sensitively and within reason, KMC's emphasis on helping the mother to become responsible and competent to care for her premature infant, is also a benefit of the approach.

6.1.3 Paucity of research into the psychological impact of KMC

There is a significant absence of research literature on the psychological impact of KMC. Only one published paper was found that had this as its focus (Tessier et al., 1998). However, as noted, some recent (as yet unpublished) papers indicate a growing interest in this area (Bigalow et al., 2002; Catteneo & Scalembra, 2002; Martha et al., 2002). Some KMC research has investigated bonding, the acceptability of KMC to mothers and the impact of it on their feelings of competence and self-confidence. The majority of research that has been done on the psychological demands and benefits is almost all on small, short-term, SSC studies in developed countries (Neu, 1999; Tessier et al., 1998). Not all of the SSC findings can be safely or convincingly transferred to KMC programmes in a developing country such as South Africa.

In the right setting, KMC appears to have the potential to offer invaluable opportunities for healing, bonding, attachment, increased parental sensitivity and improved emotional outcomes for the mother and infant and developmental outcomes for the infant. It also offers opportunities for the inclusion of fathers and family in

supporting the dyad and involvement with care of the LBW infant, which was previously not encouraged. It may also have a role to play as a preventative infant mental health measure. However, studies in SSC indicate that extensive research into the psychological impact of KMC is necessary if its benefits are to be realised. Maternal depression, anxiety, ambivalence and grief experiences need to be included in the full picture of the demands and possible benefits of KMC, as do the socio-economic stressors that affect women in developing countries.

6.2 Problems within KMC research

Problems with funding, limited resources and the challenges of high patient to staff ratios make KMC research difficult and challenging in developing countries. Nevertheless, identifying problem in research may clarify what is needed to substantiate claims for the psychological benefits of KMC. This is necessary in order to motivate for the use of it in South Africa. Five problem areas emerged when the research literature was considered. These included some methodological, ethical, conceptual and theoretical problems. At times there was also difficulty accessing research material.

6.2.1 Methodological problems

As developing countries are often struggling with the challenges of lowering high infant mortality rates and managing with limited facilities, it is not surprising that the psychological benefits of KMC have, until recently, primarily been researched by developed countries which usually have better funding and resources (Tessier et al., 1998). This has meant that conclusions about the psychological benefits of KMC have sometimes been based on studies that have reported on the benefits of relatively limited SSC of preterm infants in developed countries (see Kirsten et al., 2001).

These SSC programmes can often provide extensive support to the mothers and do not include an early discharge component. In these settings, research into psychological outcomes has predominantly focused on parents' experiences of very limited skin-to-skin holding, (sometimes as little as one hour per day for two consecutive days); the assessment of increased bonding and attachment behaviour and

the importance of the first few hours post-partum. Conde-Agudelo et al. (2003) state that much of the KMC research is not methodologically sound and that this has limited applicability and replicability of findings. Sample groups are often small and research is often descriptive in nature with mainly short-term studies.

When reading the literatureit is important to differentiate whether or not studies implemented a full KMC programme or if they report only on the SSC and whether SSC was combined with exclusive breast-feeding or not. As noted earlier, the number of SSC hours varies drastically, as do the number of days or weeks in various studies (Conde-Agudelo et al., 2003). Also noteworthy is what relevant information is included and excluded from the studies. For example it is important to note whether the premature infants were fully stabilised and healthy or not and if the mothers in the study were single, married, unemployed or not and financially stable or not. Often this relevant information for understanding the psychological impact of KMC and SSC, within a meaningful context, is not included.

Ideally researcher should note whether there was an option of early discharge or not. Early discharge may not always be possible due to financial constraints, limited ambulatory care, transport and the distance to the nearest clinic. The mother may then give 'Hospital KMC' for many weeks. These limited options are likely to affect the mother's experience of her time in hospital, the care of her infant, her right and ability to make an informed choice about what type of care to give and her anxiety about her other children, partner, work and family. These variables will impact on the research findings about the psychological benefits and drawbacks of KMC.

As discussed in a previous section, research on 'bonding' and 'attachment' appears to form the theoretical foundation for understanding the psychological benefits of KMC. However, in a review on maternal attachment and mother-neonate bonding research, Lamb and Hwang (1982) name a number of methodological problems with this research. Due to space constraints, some of these problems are named but not discussed in detail here. They include the insufficient number of replicated studies on bonding; findings vary when studies are replicated and they question the relevance of the behavioural differences chosen as measures of maternal attachment. Furthermore, they note the problem of researchers knowing what the effects of the intervention

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should be attributable to (a halo effect for experimental group) and the fact that in much research, pre-existing group differences confound the effects of the experimental treatment.

A further methodological problem arises for researchers who wish to compare outcomes of mother-infant dyads that do and do not use KMC in RCTs. Randomised controlled trials are ethically unacceptable if the same researchers believe there are significant benefits from SSC and KMC. If researchers instead offer mothers a choice of whether to do KMC or not, there is the concern that results measuring the benefits of KMC are actually reflecting pre-existing behavioural or emotional factors such as high maternal 'motivation' (Bigalow et al., 2002).

6.2.2 Ethical problems

This section attepts to simply name and problematise the following ethical issues. These are (i) whether KMC literature is influenced by skepticism in the medical and private sector and (ii) whether the emotional appeal of the approach or the need to 'defend' it leads to a reluctance to explore the aspects of KMC.

KMC encourages decreased use of specialised technology, such as incubators, which are a valuable source of revenue in the private sector. This reduced revenue may impact on the willingness of the private sector to offer KMC and SSC as an option to parents. As noted in one or two studies there also appears to be resistance to KMC by some people in the medical profession for various reasons. This resistance was noted in various settings, which included both a developed and a developing country. Whether KMC literature is influenced by the pressure to 'defend' and motivate for a 'new' approach in the face of some medical scepticism and possible economic pressures on the private sector to ignore the value of KMC, is not yet known.

A further question is whether the emotional appeal of the approach (or other factors) leads to an over-simplification of our understanding and exploration of the negative aspects of KMC. An imbalanced description of KMC, which highlights the benefits and not the challenges of the approach must be guarded against. A possible example of this may be found in a discussion of a study by Affonso et al. (1993) of unusually

extensive SSC, which required a minimum of 4 hours per day, 6 days per week, for 3 weeks. Affonso et al. (1993) reported that the mothers experienced an 'emotional crisis' while participating in SSC. Mothers expressed strong ambivalence about continuing with SSC in the second week of the study as they felt too tired and stressed. After the break they chose to resume SSC.

In a discussion of this study Anderson (1991, p.151) suggests that the emotional crisis the mothers experienced may be a 'beneficial part of the process of attachment' for mothers. She proposes that, 'this experience of emotional crisis may be seen as a limitation but instead, it probably represents a necessary growth step for the mother, resulting from increasing feelings of love for her infant (Anderson, 1991, p.151). This leads to the mother's 'acceptance of the reality of the preterm birth and its risks, as well as the responsibility she must assume for her infant. The development of a healthy attachment can then follow' (Anderson, 1999, p.151).

With this explanation, although clearly not the author's intention, the mothers' distress and the demands of the skin-to-skin holding seem to have been explained away as a 'beneficial' and 'necessary growth step', the result of 'increased feelings of love for the infant' (Anderson, 1999, p.151). It appears important to more fully acknowledge the complexity of mothers' experiences of KMC and that they may feel ambivalence towards their infant and about their role as 'mother'. At times this may even be heightened for mothers who are participating in SSC and KMC and that these approaches can be very emotionally and physically demanding.

Although only a promotional comment, the quote below photos on the website for the International Network of KMC (INK, 2004) indicates an emotive tendency to generalise responses to KMC stating, 'all mothers are proud and happy to be a kangaroo mother'. Few researchers relate the reasons why mothers decline the KMC opportunity. Reports that have included the reasons mothers have given seem to have found differences in cross-cultural perspectives and experiences indicating that responses should not be generalised. For example, some Thai mothers were concerned with modesty, some Indonesian mothers found skin-to-skin holding very foreign and some Mocambique mothers who considered the LBW baby as abnormal.

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6.2.3 Conceptual problems

In reviewing the research on KMC it seemed that there were many conceptual problems: researchers often did not clarify their concepts. Standard tables and definitions would improve clarity and possibly the replicability of studies. Literature refers to various combinations of the three components of Kangaroo Mother Care, using a mix of terms that can lead to confusion when comparing studies. These include, amongst others, Kangaroo Care, Skin-to-Skin Care, Kangaroo Mother Intervention, Kangaroo Baby Care and Kangaroo Mother Method/ Technique/ Programme. At times, studies refer to SSC as KMC, despite clear distinctions. Some blend the two in discussions of previous literature (Roberts, Paynter & McEwan, 2000).

Important terms such as bonding and attachment need to be more clearly defined in the research. For example, there is a need to standardise what are referred to as 'attachment variables' as there seem to be many different ways of conceptualising attachment behaviour (Anderson et al., 2003). To improve generalisibility, replicability of studies and the promotion and accurate evaluation of KMC and SSC, researchers could use a standard descriptive framework for the approaches and how they may be used in different settings (Bergman, 2004a). Bergman (2004a) suggests that the adoption of a single descriptive framework will speed universal implementation of KMC.

6.2.4 Theoretical problems

Controversy exists around important theoretical concepts used in KMC and SSC literature such as maternal attachment, a 'sensitive' or 'critical period' and mother-infant 'bonding' (see Curry, 1982; Eyer, 1992; and Lamb & Hwang, 1982 for critical reviews). KMC literature refers to the concepts of 'bonding' and 'attachment' but does not always state clearly how they are used and understood theoretically.

Curry (1982) offers a critique of the concept of a 'sensitive period', arguing that it seems unlikely given the number and complexity of variables that could influence attachment. She argues that the idea that an irreversible, critical period exists for

human mothers immediately after birth, as it does for selected animals, seems improbable. She makes the point that such an idea minimises the importance of other important variables. These variables may include the mother's own experience as a child, the influence of present cultural values, the infant's individual differences and the clarity of his cues, the mother's physical recovery from birth, and the impact of the infant on the family unit (Curry, 1982). Research measures of attachment and bonding have also been strongly criticised (Eyer, 1992; Lamb & Hwang, 1982).

In a feminist critique of the research on mother-infant bonding Eyer (1992) argues that it is a scientific fiction or myth: constructions of 'bonding', 'attachment' and 'motherhood' have been created and influenced by political struggles for power through history and these struggles have been aimed at maintaining the status quo. Eyer (1992) argues that the research on bonding was inspired by the popular belief that women are all inherently suited to motherhood. This belief coincided with a number of institutional goals, including the needs of the psychological and medical professions to secure women and infants as patients and to find pathology in this clientele, which could then be treated. Eyer (1992, p.198) further argues that through history 'standards of femininity, motherliness, virtue and mental health often have been unrealistic projections that attempt to redress social and professional problems by redefining women instead of taking the problems head on'.

Theoretical controversy exists around certain concepts that are used in research on the psychological impact of KMC. However, explaining and standardising the use of these concepts in KMC literature would help to clarify the theoretical underpinnings of the research.

6.3 Recommendations for further research

The need for further research into the short and long-term psychological impact of complete KMC programmes in developing countries seems clear - for mothers and infants as well as partners and families as a whole. The effects of KMC on infant development and attachment in both the short and long term are under-researched.

If a psychological benefit of KMC is considered to be the significant improvement in the quality of mother-infant attachment there are important implications for both parent and child. The quality of attachment has been shown to have various influences on the child's later peer, romantic and parental relationships, as well as influencing parents' positive experiences of themselves, each other and their child (Bowlby, 1977; Simpson & Rholes, 1998).

Further cross-cultural studies are necessary in order to understand different experiences of the intervention (van Rooyen, Pullen, Zondo et al., 2002). These are also necessary in order to promote KMC effectively and to encourage and inform an empathic and constructive understanding of the reluctance of some health care providers, and the refusal of some mothers, to utilise the KMC technique. The benefits (and possible drawbacks) of KMC with regard to Postnatal Depression also need further investigation.

To more fully assess the psychological benefits and challenges of KMC, research must remain attentive to the voice and experience of KMC mothers. In considering the 'emotional crisis' experienced by some SSC mothers, Anderson (1999, p.151) points out that 'a question not yet answered is whether the mother can be helped, through anticipatory guidance, by explaining what may happen or has begun to happen to her'. She further asks whether the mother 'needs to work through the entire experience on her own in order to achieve optimal benefit' from the experience, and whether this phenomenon occurs in all mothers or just in certain subgroups (Anderson, 1999, p.151). Important questions such as these clearly indicate the need for further research into the psychological impact of SSC and KMC from an ethical point of view, as well as a more clinical, research oriented view.

Further research also needs to include a focus on the mother's context and her empowerment in a hospital setting. Understanding KMC mothers' experience is surely vital for the approach to be sucessful. For example, the functional role of the mother in KMC is highlighted in the literature through the metaphor of mothers as 'human incubators'. Although innocently used to describe the containing, physically warming environment the KMC mother provides for her infant, if internalised and reflected by nursing staff, this functional view may be distressing and offensive. If the

mothers' experience remains unexplored and unexamined the result may be that KMC is dropped soon after discharge.

Almost no research has yet focused on the long-term psychological impact KMC has on the quality of the mother-infant relationship or on how the family's experience may be positively or negatively affected by KMC. In part, this may be due to the many difficulties inherent in long-term follow up studies, funding for research in developing counries and the challenges of accurately measuring the 'quality' of relationships.

Further research also needs to explore the impact KMC has on the parents' relationship, as well as the impact it has on families as a whole. The long-term effect of KMC on parenting styles and the impact of KMC provided by a combination of people, may be a further meaningful area of research. Assessment techniques to identify when KMC may or may not be an appropriate approach for a mother or family need to be explored.

Ideally, ambulatory care of infants discharged early under KMC provides close monitoring by qualified health personnel such as neonatologists and registered nurses and an efficient follow-up system including home-visits and the capability to readmit sick infants to a tertiary care hospital (Charpak, Ruiz-Palaez, Figueroa de Calume & Charpak, 1997). Although this is the ideal, the reality in developing countries may present to challenges to the provision of the quality of ambulatory care. The psychological impact of this therefore requires further research to establish whether outcomes such as maternal-infant bonding, maternal competence, feelings of anxiety and possible social isolation are affected. A comparison to assess whether it is more or less stressful for mothers and their families than 'hospital KMC' and whether this affects compliance to KMC requirements could provide valuable information for future programmes.

Relevant in many developing countries may be research into the possible healing and preventative mental health benefits of KMC (Schore, 2001). Also relevant may be the benefits of providing KMC (by someone other than the mother) for infants orphaned early by AIDS. Furthermore, skin-to-skin holding in KMC may encourage mothers

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with HIV to be in close physical contact with an infant that they have been discouraged from breast-feeding, due to concerns about infection. This close physical holding may have a positive impact on maternal-infant bonding and experiences of healing.

7. CONCLUSION

The benefits of skin-to-skin holding, exclusive breastfeeding and early discharge, viewed in the context of limited social and economic support for mothers in developing countries, highlights the value of an approach such as KMC. At the same time, more rigorous research into the psychological demands and benefits of KMC on low-income women in developing countries is required. Researchers should also look at the possibility that KMC might be disempowering for already disempowered groups – a possibility that is often overlooked because the emotional and economic appeal of the approach. It seems clear that components of KMC have some wonderful benefits. In order to fully utilise these benefits responsibly, it is necessary to focus research on the psychological impact of the full KMC approach. This is necessary in order to establish when KMC may or may not be appropriate, given that women differ in their psychological, emotional and physical needs, context, history and experience.

Bergman (2004a) and Bergh and Pattinson (2003) discuss how the KMC approach requires people to 'reorient health services', stating that this responsibility is shared between individuals, community groups, health professionals, health service institutions and governments. These are the stakeholders to consider when attempting to implement KMC and to do this it is suggested that behavioural change is necessary (Bergman, 2004a; Pattinson, 2003b). If behavioural change is to occur the psychological effects of the approach need to be researched in order to effectively implement and promote it, as well as to understand the impact KMC has on the mother-infant relationship, bonding, attachment and on the experience of the mother and the family.

As Tessier et al. (1998, p.9) note, the psychological impact of KMC seems 'obvious' but it is 'also far more complex' than it was initially thought to be. Adding to this complexity are the numerous ways in which mother and infant influence each other through interactions that we do not always understand. Notwithstanding the complexity and many challenges of KMC it seems we may yet discover many physiological, psychological and developmental benefits of KMC.

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