

Course Title B.Sc. Children's and General Nursing

Module Title NU4S01 – Literature Review

Literature Review Title

Examining the barriers and enablers of the use of kangaroo care with pre-term infants within the Neonatal Intensive Care Unit (NICU).

Abstract

Background; It is estimated that up to 15 million preterm births occur globally each year (Seidman *et al.* 2015). Kangaroo Care (KC) is a popular practice with preterm infants, which places an infant on to their parent's bare chest (Wallin *et al.* 2005). KC has reported many benefits to both the infant and the parent, including enhanced physiological stability of the infant and increased bonding with parents (Chia *et al.* 2006, Valizadeh *et al.* 2013). The use of KC for all preterm infants is recommended by the World Health Organisation, as soon as the infant is clinically stable (WHO 2003).

Aim; The purpose of this literature review is to examine the barriers and enablers of the use of KC with pre-term infants, within the Neonatal Intensive Care Unit (NICU).

Search strategy; An extensive search of online databases including CINAHL, Pubmed, Academic Search complete and Stella was undertaken to source articles relating to barriers and facilitators of KC in the NICU. 2 articles were hand selected as they were commonly cited in the literature and 1 article was hand selected to give an Irish perspective. A total of 13 research studies and 3 literature reviews have been included in this literature review.

Key findings; Three main themes emerged, (1) the NICU environment, (2) NICU staff and (3) familial factors. The NICU environment has a huge impact on the use of KC. Lack of space and privacy hindered KC use from a parental perspective. While, the presence of guidelines and policies on KC influenced staff and impacted on the extent of KC use within the NICU. Infant assessment proved problematic, as staff varied in their assessment depending on their level of experience. Knowledge and attitudes of staff regarding KC were found to directly link to its practice. Parent's willingness to partake in KC and their ability to be present in the NICU with their infant had a major effect on KC practice.

Conclusion; The most commonly cited enablers and barriers to KC relate to the NICU environment, neonatal staff and the family unit. Space, furniture and privacy are issues within the NICU for facilitating KC. The presence or absence of written guidelines and policy on KC and infant assessment can influence KC levels. NICU staff are significant contributors to KC practices and their contribution relates to their level of training, education, competency, attitudes and beliefs, and also by the level of support which is available to them within the NICU. The family unit impacts KC, through their physical health, parental presence, emotional state and support received.

Recommendations; NICU's need to establish written policies for undertaking KC and guidelines for the assessment of readiness of infants. The NICU environment should support KC, with suitable furniture, privacy measures, adequate staffing levels and extension of visiting hours. Staff within the NICU should receive education on KC. Clinical training in KC should also be offered to staff, as this will increase competency in KC. Mentoring support for junior staff from more experienced staff members will increase confidence and ability in providing KC. In order to increase the awareness of KC, all pregnant mothers should be given verbal and written information about KC. While undertaking KC, parents should be supported physically and emotionally by NICU staff.

Further research into measuring the success of KC could be developed. This could include identifying parental satisfaction levels of KC holding experiences. Results from such a study could guide nursing practice to make KC a more positive experience for parents. Research into doctor's perspective on KC would also be beneficial, as research on staff perspectives tends to be from the nurses point of view.

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Introduction

The purpose of this literature review is to examine the factors which influence kangaroo care (KC) with pre-term infants within the Neonatal Intensive Care Unit (NICU). Premature births are a major paediatric nursing issue, with up to 15 million occurring globally each year (Seidman *et al.* 2015). KC is an evidence-based approach to caring for pre-term infants and has been shown to significantly reduce infant morbidity and mortality (Lawn *et al.* 2010).

KC is a technique where an infant is dressed only in a nappy and hat and is held skin to skin to its parent's chest and covered by a blanket (Wallin *et al.* 2005). There are many reported benefits of KC including reduced apnoea events, improved sleep, regulation of respiratory rate, stabilisation heart rate and enhanced thermoregulation (Ludington-Hoe *et al.* 2008, Lawn *et al.* 2010). The admission of an infant to a NICU is extremely stressful, causing disruption to the normal bonding process and altering the expected parenting role (Wigert *et al.* 2006, Kearvill and Grant 2008). KC benefits for parents include facilitating bonding, enhanced lactation, decreased depression, reduced anxiety, increased well-being and increased confidence in taking care of the infant (Chia *et al.* 2006, Valizadeh *et al.* 2013).

Kangaroo care is a relatively well researched topic. KC was first developed in Bogota, Columbia, in the early 1970's (Lawn *et al.* 2010) and first appeared in the literature in 1976 (Thomson *et al.* 1976). However, the barriers and enablers to KC are less well researched. The interest in this aspect of KC originated from the authors experience while on placement in a NICU. During this time, the author observed the use of KC with pre-term infants and concluded that KC facilitation was inconsistent. Thus, the author was keen to research what factors shaped the practice of kangaroo care. Research has shown that KC is relevant on a worldwide level, as KC is used in both developed and underdeveloped countries (Ruiz-Pelaez *et al.* 2004). Historically, its use

was greater in underdeveloped countries, where facilities to care for pre-term infants were limited (Lawn *et al.* 2010). However, owing to its evidence based benefits, KC is now also used in developed countries. This is an example of a south to north transfer of health interventions, which is infrequently seen (Ruiz-Pelaez *et al.* 2004).

Preterm infants, who require care within a NICU, often have complex care needs and, according to Chia *et al.* (2006), neonatal nurses' primary focus is on meeting the medical needs of the infant. This can result in the infant and parent experiencing reduced physical contact. Kangaroo care can decrease the level of separation felt between infant and parents (WHO 2003). Neonatal nurses have an important role in the care of premature infants and their families (Franklin 2006). Who (2003) stated that KC should be offered to parents, as soon as their infant is stable. Therefore, this topic is particularly relevant for neonatal nurses, as it explores the positive and negative factors which they may face on a day to day basis, while striving towards implementing best practice for the pre-term infants in their care.

Search Strategy

As a starting point, a basic scoping of the literature was undertaken, using Google Scholar. This allowed for the identification of various terms used worldwide for Kangaroo Care (KC), such as skin-to-skin, skin-to-skin care, skin to skin holding and kangaroo mother care. The discovery of the variety of terms used for KC practice was very useful, as it would enable a more comprehensive search of the literature to be undertaken.

The first search of the literature involved a search of the Cinhal database. The search terms "kangaroo care" OR "skin-to-skin" OR "skin-to-skin care" OR "skin to skin holding" OR "kangaroo mother care" were entered into the database and a total of 614 publications were produced. Combining this search with the terms "pre-term infant" OR "premature infant" AND "NICU" OR "special baby unit" OR "SCBU", resulted in 252 publications being identified. When searched further with the terms "nursing barriers" OR "obstacles" OR "difficulties" OR "prevent" OR "deter" AND "facilitate" OR "promote" OR "enable" OR "allow", 33 publications were identified. These 33 articles were reviewed. Limits placed on the searches included peer reviewed articles and links to full texts. No time limits were placed on the searches.

A second search of the literature was undertaken using database searches of PubMed, Academic Search complete and Stella. The search involved the search term which were used previously in the original Cinhal search. Again, peer reviewed articles and links to full texts were the limitations set. This search obtained in 42 articles. 26 articles were excluded, due to duplication. The remaining 16 articles were reviewed, alongside the 33 articles from the Cinhal search, giving a total of 49 articles to be reviewed.

2 further articles were identified through hand selecting commonly cited articles from reference lists from the PubMed database. 1 article was hand selected to give an Irish perspective. This gave a total of 52

articles. Of these 52, 16 were excluded as the full text was unavailable in English, leaving 36 publications.

From 36, 33 were deemed eligible based on a scan of the title and abstract. Of these 36, 20 were eliminated following a full-text screening due to their lack of relevant data (i.e. kangaroo care in the NICU but without barriers and promoters specific to KC). A total of 16 articles remained, of which 13 were research studies and 3 were literature reviews. They have been selected to be used in this literature review. Please see appendix (1) for a flow chart which represents this search of the literature.

Following the gathering of the literature, a thematic analysis was undertaken. The 16 publications were comprehensively read and similar ideas or consistent information was systematically grouped. As a result, several themes emerged from the literature, identifying barriers and facilitators of KC in the NICU. The themes which emerged were (1) the NICU environment, (2) NICU staff and (3) familial factors and these themes will form the structure to this literature review.

Theme 1; NICU Environment

The purpose of this theme is to identify aspects of the Neonatal Intensive Care Unit (NICU) environment which act as enablers and barriers to Kangaroo Care (KC). Privacy and space can have an impact on performing KC. From an institutional point of view, the presence or absence of guidelines, protocols and policies on KC can impact its use in the NICU, as can the culture that exists within the NICU.

1.1 Privacy and Space

From their study of two NICU's in Sweden, Blomqvist *et al.* (2013) identified that parents felt safe to undertake KC in the NICU environment. It could be argued that these feelings of safety and security stem from parental anxiety and, thus, being in a highly medicalised area with highly trained staff reassured parents. This perception contrasts with the many negative features of the NICU which have been well documented in the literature (Chia *et al.* 2006, Kearville and Grant 2008, Olsson *et al.* 2012, Blomqvist *et al.* 2013, Stikes and Barbier 2013, Seidman *et al.* 2015).

The NICU environment by its very nature has a lack of privacy and, given its vast amount of equipment, the NICU often finds itself short of space. Both reduced privacy and lack of space influence KC use in a negative way (Engler *et al.* 2002, Chia *et al.* 2006, Kearville and Grant 2008, Olsson *et al.* 2012, Blomqvist *et al.* 2013, Stikes and Barbier 2013, Seidman *et al.* 2015). While some NICU's have screens within the unit or access to a private space with portable monitors, most NICU's perform KC in the open ward which can be uncomfortable for some parents (Olsson *et al.* 2012, Blomqvist *et al.* 2013). The lack of privacy made parents feel uneasy, as they had to undress in full view of staff and visitors (Chia *et al.* 2006, Blomqvist *et al.* 2013, Seidman *et al.* 2015). Noise levels within the NICU could be high at times which reduce the pleasure aspect of KC (Blomqvist *et al.* 2013, Seidman *et al.* 2015). The limited amount of specialised equipment for KC within the NICU

was also identified as a barrier to KC, as inappropriate furniture meant that KC was uncomfortable for parents (Chia *et al.* 2006, Blomqvist *et al.* 2013, Seidman *et al.* 2015).

In their comprehensive study making modifications to a NICU in the USA, Stikes and Barbier (2013) identified that introducing new KC friendly chairs and equipment into their NICU had a major positive effect on the use of KC. Therefore, the NICU environment should support KC by having suitable, comfortable furniture, adequate space and privacy screens. By contrast, Kymre and Bondas (2013) suggest that the NICU environment can be a hindrance to KC, but never a barrier. In their qualitative study of infants receiving KC while they are actively dying, the authors state that KC can be done, regardless of any environmental restrictions. Ideally the NICU should have portable monitors and a private room for use by infants and parents, to ensure privacy and dignity, especially when a child is actively dying.

1.2 Guidelines and Policies

The absence of guidelines and policies on KC has a negative effect on the facilitation of KC (Engler *et al.* 2002, Leonard and Mayers 2008, Stikes and Barbier 2013, Seidman *et al.* 2015). Olsson *et al.* (2012) in their study of 98 NICU's in Scandinavia identified that only 47% of the NICU's had guidelines for KC. A lack of clinical guidelines leaves the facilitation of KC open to individual clinical judgements, which inevitably leads to inconsistencies (Nagorski Johnson 2007, Mangan and Masher 2012). NICU nurses have identified that they would be more comfortable to facilitate KC in units where there were clinical guidelines present (Leonard and Mayers 2008, Mangan and Masher 2012, Stikes and Barbier 2013, Seidman *et al.* 2015). Stikes and Barbier (2013) found that introducing clinical guidelines in their NICU had a major positive effect on the use of KC.

NICU's where clinical guidelines on KC existed, did not have a consistent approach to KC. Lee *et al.* (2012) identified KC policies in some NICU's which allowed ventilated infants to be kangarooed, while other NICU's did not allow this practice. Lee *et al.* (2012) also identified that NICU's varied in policies regarding who was permitted to authorise KC. Some NICU's needed the medical team to authorise KC, while others simply undertook KC as part of daily nursing care routine, without any official permission needing to be granted.

Ludington-Hoe *et al.* (2008) set out a 10 steps to successful KC which highlighted the need for a written policy for undertaking KC. Some organisations have tried to promote the use of guidelines for KC, such as the World Health Organisation, who established practical guidelines for KC (WHO 2003). However, these guidelines were directed towards environments with reduced medical facilities and were not suitable for use in the NICU environment (WHO 2003). Clinical guidelines were also developed by the Kangaroo Foundation in Bogota in 2007 (Fundacion Canguro and Department of Clinical Epidemiology and Biostatistics 2007). More recently, the US National Association of Neonatal Nurses published clinical guidelines specifically for use within the NICU alongside a sample protocol (See Appendix 4) which can be adapted for use within any NICU (Ludington-Hoe *et al.* 2008).

1.3 NICU culture

There is some evidence to suggest that the culture within the NICU can have an effect on KC practice. According to several studies, NICU routines are a barrier to performing KC (Blomqvist *et al.* 2013, Kymre *et al.* 2014, Seidman *et al.* 2015). For example, some NICU's complain that KC interferes with cluster care for infants (Lee *et al.* 2012). Other NICU's required parents to leave the unit during ward rounds or admissions, due to concerns over breaches of confidentiality (Blomqvist *et al.* 2013). This leads to interruptions or shorter sessions of KC. The

existing NICU culture could be challenged to facilitate KC. Fears over breaches of confidentiality could be overcome by providing parents engaged in KC with headphones with music playing. This would reduce interruptions to KC sessions.

Visiting restrictions also impacted KC, as some NICU's required parents to leave at a specific times (Kymre *et al.* 2014). This can hinder the use of KC, especially at night time. Inconsistencies exist between NICU's and their visiting policies. Some NICU's allow parents to stay overnight, while others did not (Olssen *et al.* 2012, Blomqvist *et al.* 2013). NICU's, which allowed parents to stay overnight, were found to be more facilitating of KC (Blomqvist *et al.* 2013). NICU's could further promote KC by allowing unrestricted visiting hours for parents. Olssen *et al.* (2012) identified NICU's which extended KC practice to grandparents and siblings made KC more feasible for some families. In their literature review, Seidman *et al.* (2015) found that a lack of basic supplies in the NICU, such as food for mothers, impacted on the length of time which mothers could spend doing KC. This is another area which could be addressed by individual NICU's to further facilitate KC.

Theme 2; NICU Staff

The purpose of this theme is to discuss how Neonatal Intensive Care Unit (NICU) staff can be enablers and barriers to Kangaroo Care (KC). Personal beliefs regarding KC, the ability to accurately assess an infant's readiness and the level of clinical experience in facilitating KC all influence the level of KC undertaken in the NICU. Staffing levels and time can also have an impact on KC practice.

2.1 Infant Assessment and equipment

There is a general agreement in the literature that infants are required to be clinically stable to undertake KC (Engler *et al.* 2002, Chia *et al.* 2006, Lee *et al.* 2012, Stikes and Barbier 2013, Niela-Vilen *et al.* 2013, Seidman *et al.* 2015), with the exception of infants who are dying (Kymre and Bondas 2013). Clinical stability is the single most important factor which promotes the use of KC in the NICU (Nagorski Johnson 2007, Blomqvist *et al.* 2013). One major drawback of this approach is the inconsistent definition of infant clinical stability. Lee *et al.* (2012) identified that the main challenge in facilitating KC was the absence of a common, unanimous definition of what clinical stability entailed. NICU's should have a written policy on how to assess the readiness of an infant for KC (Ludington-Hoe *et al.* 2008). Where there are no clinical guidelines for assessment of readiness, it is then usually undertaken by individual nurses. This leads to assessments which can often be inconsistent and subjective (Engler *et al.* 2002).

Nagorski Johnson (2007) suggests that different nurses have different methods of assessing an infant's readiness for KC. Some nurses based their assessment on physiological measurements, such as episodes of apnoea, bradycardia and desaturation, while other nurses based their assessment on gestational age. Varying opinions on the readiness of infants for KC discouraged nurses from facilitating it. Some nurses believed that unstable infants were better cared for in an incubator while others believed KC was best. This situation resulted in performing

KC based on individual clinical judgement, in the absence of clinical guidelines and policies (Kymre 2014). Nurses with more than 5 years of experience in KC, were more liberal with their assessment of readiness and were more likely to undertake KC at an earlier stage than less experienced nurses (Nagorski Johnson 2007).

Lee *et al.* (2012) identified that certain equipment used by the infant posed a barrier to KC. Infants who were intubated or had umbilical lines were identified as being unsuitable for KC due to safety concerns (Chia *et al.* 2006, Nagorski Johnson 2007, Lee *et al.* 2012, Blomqvist *et al.* 2013). Confusion still exists in some NICU's regarding the eligibility of infants with ventilators to participate in KC (Flynn and Leahy-Warren 2010). This uncertainty stands as a barrier to facilitating KC and could be addressed through further education. Blomqvist *et al.* (2013) found that tangled wires made KC complicated and alarms from various machines caused stress to parents during KC. Infants who were nursed naked in an incubator were more likely to receive KC than those nursed clothed in a cot. Generally, KC was discontinued when the infant was clothed and nursed in a cot because parents viewed their infant as stable and no longer requiring KC (Olssen *et al.* 2012).

2.2 Education and Knowledge

Nurses who are aware of the benefits of KC are more likely to undertake it (Chia *et al.* 2006, Nagorski Johnson 2007, Olssen *et al.* 2012, Lee *et al.* 2012, Kymre and Bondas 2013, Niela-Vilen *et al.* 2013). Understanding the positive physiological and psychological effects for both infants and parents became a motivator for NICU nurses to facilitate and encourage KC. Conversely, Lee *et al.* (2012) and Nagorski Johnson (2007) identified that a lack of staff education on the importance of KC and insufficient clinical education on techniques was a barrier to performing KC. This was especially a factor with new nurses who had no previous experience with KC. Chia *et al.* (2006) identified

that nurses were sometimes unsure when to initiate KC. This is an area which may require further education, alongside assessment of readiness.

2.3 Attitudes and Beliefs

A common enabler of KC in the NICU is nursing staff practices (Niela-Vilen *et al.* 2013). Nurses generally have positive beliefs for KC and this increased its use (Kearville and Grant 2008, Flynn and Leahy-Warren 2012, Seidman *et al.* 2015). Kymre and Bondas (2013) found that nurses beliefs about how the infant experiences KC encouraged them to facilitate it. Nurses were motivated by the belief that KC would make the infant feel more secure, more comfortable and reduce their suffering. Most nurses found facilitating KC professionally satisfying and either did not view it as an added burden or believed the extra work needed was worth it (Chia *et al.* 2006, Flynn and Leahy-Warren 2010). Lee *et al.* (2012) connected staff buy-in and motivation to the level of KC undertaken.

Seidman *et al.* (2015) hypothesised that staff who don't believe in the benefits of KC were more reluctant to facilitate it. It was also noted that motivation to facilitate KC reduced over time. Methods identified by Lee *et al.* (2012) to increase motivation for KC included improving camaraderie, having team slogans, discussing KC at handover and wearing KC t-shirts. Another key aspect of motivation was having the support of the medical team. Staff, who felt uncomfortable facilitating KC for whatever reason, were identified as a barrier to KC (Engler *et al.* 2002).

2.4 Experience and support

Nurses with a greater level of experience in facilitating KC were much more likely to initiate it within the NICU, especially nurses who had over 5 years of experience (Engler *et al.* 2002, Nagorski Johnson 2007, Olsson *et al.* 2012). Junior staff, that had limited experience of

implementing KC, should have mentoring support to increase their ability and confidence in providing KC. Strategies to increase the competencies of junior staff can include pairing staff with different skill mix, to help in building confidence in assessing an infant's readiness for KC and in undertaking KC (Nagorski Johnson 2007). Mangan and Masher (2012) agree that having hands on clinical training on KC is a positive measure to build staff competence.

Support and approval from the medical team greatly encouraged nurses to facilitate KC (Engler *et al.* 2002, Niela-Vilen *et al.* 2013). Olssen *et al.* (2012) identified that nurses are more comfortable in facilitating KC than doctors. However, nurses expressed a desire for the medical team to engage more with KC in order to emphasise it as a necessary treatment for the benefit of the infant (Kymre 2014). According to Nagorski Johnson (2007), having the support of managers within the NICU is also an essential factor in promoting the facilitation of KC.

2.5 Staffing level and time

Several reports have shown that adequate staffing levels and adequate time are important driving factors for the use of KC (Engler *et al.* 2002, Chia *et al.* 2006, Lee *et al.* 2012, Seidman *et al.* 2015). These results support the idea that time constraints have a negative impact on KC (Engler *et al.* 2002, Chia *et al.* 2006, Kearville and Grant 2008, Stikes and Barbier 2013). Sometimes nursing staff were under time pressure because of their own work load or required assistance from another staff member to assist with KC. Therefore, delays in positioning the infant occurred and this resulted in shorter KC sessions (Blomqvist *et al.* 2013). A study by Nagorski Johnson (2007) highlighted that nurses required time and assistance from other nurses to facilitate KC and this can be hindered by staff shortages. Motivation to undertake KC decreased during times of staff shortages (Kearville and Grant 2008, Lee *et al.* 2012, Seidman *et al.* 2015). Time becomes a major issue in facilitating KC with infants who are actively dying (Kymre and Bondas

2013). Nurses feel a sense of urgency to transfer the infant, before they pass away. During this urgency, nurses express their difficulty in maintaining the dignity and comfort of the infant.

Theme 3; Familial Factors

3.1 Presence in the NICU

Parental presence in the Neonatal Intensive Care Unit (NICU) forms a main basis for the enactment of Kangaroo Care (KC) (Leonard and Mayers 2008, Kymre 2014). Maternal illness and their subsequent absence from the bedside will automatically halt KC with the mother (Lee *et al.* 2012, Niela-Vilen *et al.* 2013, Kymre and Bondas 2013, Kymre 2014). Although KC is mainly provided by parents, Olssen *et al.* (2012) identified that some units in their study allowed grandparents and siblings to also participate. Fathers identified that they often felt useless after the birth of their preterm infant and KC gave them a role and a chance to do something practical to help their child (Leonard and Mayers 2008).

Lee *et al.* (2012) suggests that some familial barriers to KC are outside the scope of practice of the nurse, such as maternal illness, lack of visitation, transport difficulties and parental need to be at home with other children. Several studies identifies that practical support at home from family members was a key factor in enabling parental presence in the NICU and the facilitation of KC (Blomqvist *et al.* 2013, Seidman *et al.* 2015).

3.2 Fear and motivation

Parental reluctance and unwillingness to participate in KC has a huge impact on the facilitation of KC (Engler *et al.* 2002, Leonard and Mayers 2008, Stikes and Barbier 2013, Kymre and Bondas 2013, Kymre 2014). There are many reasons why parents do not wish to participate in KC. For example, Leonard and Mayers (2008) identified that in the first few days of life, some parents do not want to bond with their infant as they fear that the infant will not survive. Seidman *et al.* (2015) found that KC rates increased when the mother had formed a strong attachment to her infant.

Parents can often feel incompetent in undertaking the task of KC (Leonard and Mayers 2008, Seidman *et al.* 2015). Parents can be fearful of the medical equipment and feel unsettled in the unfamiliar NICU environment. Parents also fear that they will unintentionally hurt their preterm infant (Leonard and Mayers 2008, Kearvell and Grant 2008, Seidman *et al.* 2015). On the contrary, KC rates tend to increase as parental confidence and feelings of empowerment increase (Seidman *et al.* 2015).

Motivation to perform KC was reduced when breastfeeding was not practiced by the mother (Lee *et al.* 2012). In contrast, KC was often encouraged by nurses in the knowledge that it would have a positive effect on breastfeeding (Niela-Vilen *et al.* 2013). Nurses felt that facilitating KC increased parental confidence with their infant (Leonard and Mayers 2008, Kearville and Grant 2008, Flynn and Leahy-Warren 2010, Seidman *et al.* 2015). Handling and positioning the infant at first was awkward for parents, but with increased time and experience they soon became proficient at handling their infant. KC had a positive effect on the role of the parent in caring for the infant (Mangan and Masher 2012). Engler *et al.* (2002) identified that KC activity increased after requests by the mother to participate.

Cultural norms also influence the use of KC. For example, Hispanic and Asia cultures express fears over unwrapping the infant, for fear that he/she will become cold (Lee *et al.* 2012). Blomqvist *et al.* (2013) found that parents tend to discontinue KC when they feel the infant is stable.

3.3 Support

A barrier to performing KC as identified by parents was a lack of knowledge on KC. Most had never been told about it prenatally and therefore, did not know what to expect when asked to undertake it (Leonard and Mayers 2008). KC can be more successful if preceeded by

the education of the parents on the benefits of KC and continued reinforcement of the benefits (Chia *et al.* 2006, Lee *et al.* 2012, Kymre 2014). Blomqvist *et al.* (2013) found that parental knowledge of the benefits of KC increased parental motivation to undertake it. Researched based evidence of benefits and clinically evident benefits are both used to encourage parents to participate (Kymre 2014). Introducing KC verbally and having written information to give to parents about KC is beneficial for parents (Stikes and Barbier 2013). However, the key problem with this is that nurses often lack time to educate parents and offer support, which then becomes a barrier (Kearville and Grant 2008).

Support of parents from nurses is a significant factor in parental motivation to participate in KC (Chia *et al.* 2006, Blomqvist *et al.* 2013, Seidman *et al.* 2015). Parents appreciated staff who encouraged them to undertake KC and offered reassurance about the infant position and clinical stability during the KC session (Chia *et al.* 2006, Blomqvist *et al.* 2013, Seidman *et al.* 2015). Conversely, unsupportive staff made parents feel uncomfortable and diminished the use of KC. Parents sometimes felt judged by nurses when they undertook KC incorrectly. Parents felt that for KC to be successful, the support of NICU staff was vital (Leonard and Mayers 2008, Seidman *et al.* 2015).

Positioning the infant was sometimes difficult for parents and some parent felt nervous about not being able to see the infants face during KC. Supportive staff offered mirrors and photographs to be a used as a resource to increase the comfort level of the parent (Lee *et al.* 2012). Language barriers are often a barrier to KC as this hinders discussion, explanation, direction and support (Lee *et al.* 2012, Stikes and Barbier 2013). Using nurses who speak the same language and / or interpreters can help to overcome this (Lee *et al.* 2012). Ludington-Hoe *et al.* (2008) suggests that parents should be assessed for their readiness to participate in KC by ensuring they have sufficient knowledge, they are in a stable emotional state and they are in good physical health.

Conclusion

The aim of this literature review was to examine the barriers and enablers of kangaroo care (KC) with pre-term infants within the Neonatal Intensive Care Unit (NICU). The literature has identified that the most commonly cited enablers and barriers to KC relate to the NICU environment, neonatal staff and the family unit. The physical environment of the NICU can either support or hinder KC practices, through their use of space, furniture and privacy (Chia *et al.* 2006). The presence of written guidelines and policy on KC and infant assessment can encourage NICU staff to facilitate KC in a strategic fashion, eliminating a subjective and inconsistent approach (Ludington-Hoe *et al.* 2008). NICU staff are perceived as significant contributors to KC practices and their individual contribution can be founded on their level of training, education, competency, attitudes and beliefs, and also by the level of support which is available to them within the NICU (Flynn and Leahy-Warren 2010). The family unit has an important role in KC practices. Maternal health, parental presence in the NICU, emotional state and support offered to parents are critical components for KC enactment (Leonard and Mayers 2008). The findings of this study have a number of practical implications for the implementation for KC. NICU's should provide a supportive environment, written guidelines, well trained staff and supports for the family unit. In order to increase the awareness of KC, all pregnant mothers should be given verbal and written information about KC during their pregnancy (Kymre 2014).

The literature available largely has a focus on the benefits of KC to both infants and the family unit. Further research into the parental aspect of KC and measuring the success of KC could be developed. This could include identifying parental satisfaction levels of undertaking KC in the NICU. A limited amount of literature exists on enablers and barriers to KC. However, this type of research generally has a focus on the parents and the NICU nurse. Therefore, it would be interesting to research

the neonatal doctor's perspective on KC with pre-term infants in the NICU.

The findings of this study have a number of important implications for future practice and there are a number of important changes which need to be made, in particular regarding NICU policy on KC. Greater efforts from NICU management are needed to ensure the development of such policies. This could be a relatively straightforward task, given the sample KC protocol developed by Ludington-Hoe *et al.* (2008), which can be adapted for use within any NICU. The findings of this literature review can also be used to understand the problems which are faced by NICU nurses as they try to implement KC and guide the NICU in their efforts to update the implementation of KC in a safe and effective manner.

References

- Blomqvist Y. T., RN, Frolund L., Rubertsson C. and Hedberg Nyqvist K. (2013) Provision of kangaroo mother care: supportive factors and barriers perceived by parents. *Scandinavian Journal of Caring Sciences* **27**, 345-353.
- Chia P., Sellick K. and Gan S. (2006) The attitudes and practices of neonatal nurses in the use of kangaroo care. *Australian Journal of Advanced Nursing* **23**(4), 20-26.
- Davanzo R., Brovedani P., Travan L., Kennedy J., Crocetta A., Sanesi C., Strajn T., and De Cunto A. (2013) Intermittent kangaroo mother Care: a NICU protocol. *Journal of Human Lactation* **29**(3), 332-338.
- Engler A., Ludington-Hoe S., Cusson R., Adams R., Bahnsen M., Brumbaugh E., Coates P., Grieb J., McHargue L., Ryan D., Settle M. and Williams D. (2002) Kangaroo care. National survey of practice, knowledge, barriers and perceptions. *The American Journal of Maternal/Child Nursing* **27**(3), 146-153.
- Franklin C. (2006) The neonatal nurse's role in parental attachment in the NICU. *Critical Care Nursing Quarterly* **29**(1), 81-85.
- Fundacion Canguro and Department of Clinical Epidemiology and Biostatistics (2007) Evidence-based clinical practice guidelines for an optimal use of the Kangaroo Mother method in preterm and / or low birth weight infants. Pontificia Universidad Javeriana, Bogota.
- Kearvell H. and Grant H (2008) Getting connected: how nurses can support mother/infant attachment in the neonatal intensive care unit. *Australian Journal of Advanced Nursing* **27**(3), 75-82.
- Kymre I.G. and Bondas T. (2013) Skin-to-skin care for dying preterm newborns and their parents – a phenomenological study from the perspective of NICU nurses. *Scandinavian Journal of Caring Sciences* **27**, 69-676.
- Kymre I.G. (2014) NICU nurses' ambivalent attitudes in skin-to-skin care practice. *International Journal of Qualitative Studies on Health and Well-Being* **9**, 23297-23305.
- Lawn E.J., Mwansa-Kambafwile J., Horta B.L., Barros F.C. and Cousens S. (2010) Kangaroo mother care' to prevent neonatal deaths due to preterm birth complications. *International Journal of Epidemiology* **39**, 144-155.
- Lee H. C., Martin-Anderson S., and Adams Dudley R. (2012) Clinician perspectives on barriers to and opportunities for skin-to-skin contact for

premature infants in neonatal intensive care units. *Breastfeeding Medicine* **7**(2), 79-85.

Ludington-Hoe S.M., Morgan K. & Abouelfettoh A. (2008) A clinical guideline for implementation of kangaroo care with premature infants of 30 or more weeks' postmenstrual age. *Advances in Neonatal Care* **8**(3S), S3-S23

Mefford, L. (2004). A theory of health promotion for preterm infants based on Levine's conservation model of nursing. *Nursing Science Quarterly* **17**(3), 260-266.

Nagorski Johnson A. (2007) Factors influencing implementation of Kangaroo Holding in a Special Care Nursery. *The American Journal of Maternal/Child Nursing* **32**(1), 25-29.

Niela-Vilen H., Axelin A., Salanter S., Lehtonen L., Tammela O., Salmelin S. and Latva R (2013) Early physical contact between a mother and her NICU-infant in two university hospitals in Finland. *Journal of Midwifery* **29**, 1321-1330.

Olsson E., Anderson R.D., Axelin A., Jonsdottir R.B., Maastrup R. and Eriksson M. (2012) Skin-to-skin care in neonatal intensive care units in the Nordic countries: a survey of attitudes and practices. *Foundation Acta Paediatrica* **101**, 1140-1146.

Ruiz-Pelaez J.G., Charpak N. and Cuervo L.G. (2004) Kangaroo mother care, an example to follow from developing countries. *British Medical Journal* **329**, 1179-1181

Seidman G., Unnikrishnan S, Kenny E., Myslinski S., Cairns- Smith S., Mulligan B. and Engmann C. (2015) Barriers and enablers of kangaroo mother care practice: A systematic reAview. *PLoS ONE* **10**(5); e0125643. Published online 2015 May 20. doi: 10.1371 / journal.pone.0125643 PMID: PMC4439040

Stikes R. and Barbier D. (2013) Applying the plan-do-study-act model to increase the use of kangaroo care. *Journal of Nursing Management*, **21**, 70-78.

Thomson M.E., Hartsock TG. and Larson C. (1976) The importance of immediate postnatal contact: its effect on breastfeeding. *Canadian Family Physician* **25**, 1374-8.

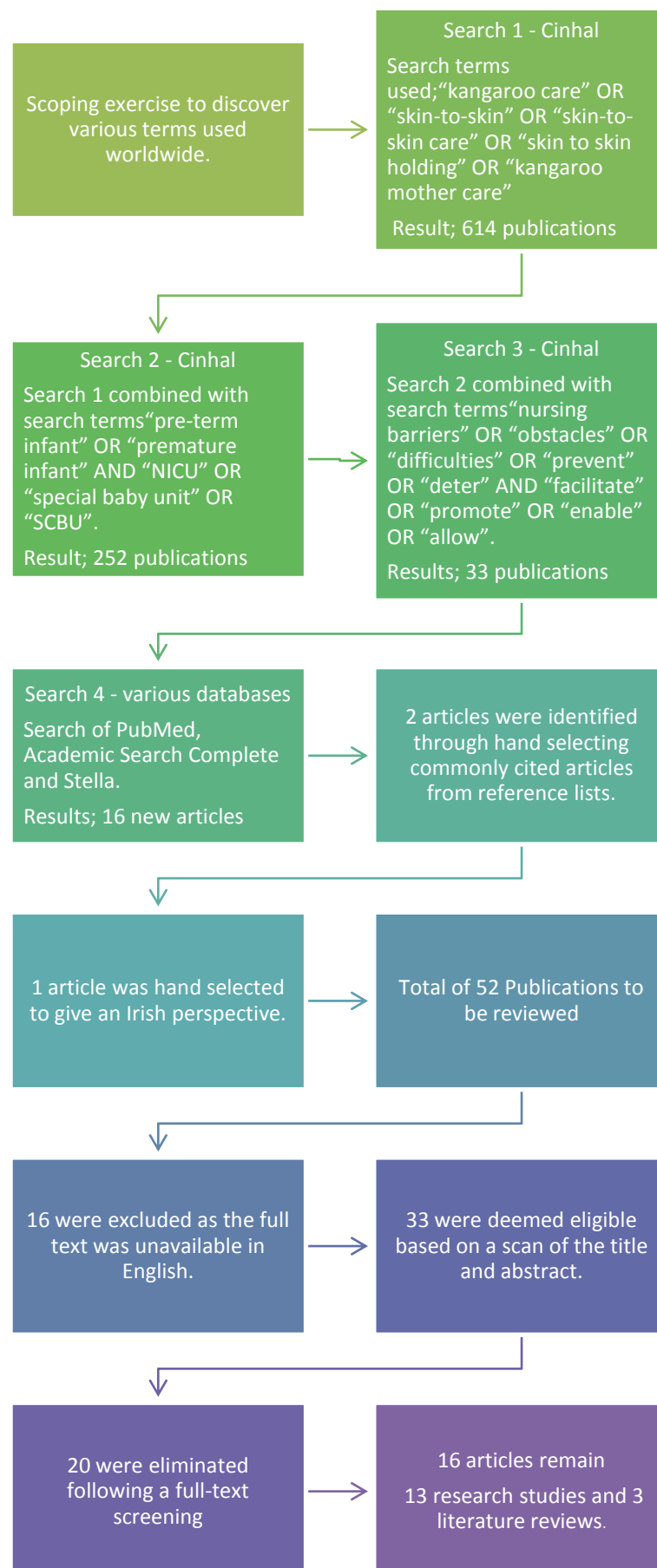
Valizadeh L., Ajoodaniyan N., Namnabati M., Zamanzadeh V. and Layegh V. (2013) Nurses' viewpoint about the impact of kangaroo mother care on the mother-infant attachment. *Journal of Neonatal Nursing* **19**, 38-43.

Wallin L., Rudberg A. and Gunningberg L. (2005) Staff experiences in implementing guidelines for Kangaroo Mother Care—a qualitative study. *International Journal of Nursing Studies* **42**, 61–73.

WHO (2003) Kangaroo mother care: a practical guide. World Health Organisation, Geneva.

Wigert H., Johansson R., Berg M. and Hellstro A.L. (2006) Mothers' experiences of having their newborn child in a neonatal intensive care unit. *Scandinavian Journal of caring Sciences* **20**, 35-41.

Appendix 1; Flow Chart of Search Strategy



Appendix 2. Summary Table for Research Studies

Author(s) and Title	Study Aims & Objectives	Research Design	Sample	Data collection methods	Data Analysis Method	Findings relevant to the review.
Lee H. C., Martin-Anderson S., and Adams Dudley R. (2012) Clinician Perspectives on barriers to and opportunities for skin-to-skin contact for premature infants in neonatal intensive care units. <i>Breastfeeding Medicine</i> 7(2), 79-85.	To explore the primary factors in promoting skin-to-skin contact in the neonatal intensive care unit (NICU).	Qualitative	11 NICU's (5 regional and 6 community) in California, USA.	Group discussion involving multidisciplinary team members, which was transcribed.	All data was transcribed verbatim and any identifying information was deleted for confidentiality purposes. A thematic analysis was then conducted.	<p>Infants need to be clinically stable for skin to skin, but confusion existed as to what constitutes as being clinically stable. Different NICU's had different definitions as to what clinical stability meant.</p> <p>The type of equipment used by the infant could be a barrier to skin to skin, such as ventilators and umbilical catheters. Variations in policies regarding ventilated infants and skin to skin existed across NICU's.</p> <p>Variations in policies as to who granted permission for Kangaroo care existed across NICU's. Some NICU's needed the doctor to order kangaroo care as part of treatment, while others performed it as routine care.</p> <p>Institutional factors which influenced kangaroo care included documentation, staff education, staff buy in, interfering with cluster care, staff shortages, staff motivation, staff burnout, doctor</p>

						<p>support, leadership.</p> <p>Staff buy-in is associated with motivation to undertake KC. Motivation for KC can be increased within the NICU, through team slogans, increased team work and discussing KC at handover. Motivation to do KC decreases during times of staff shortage.</p> <p>Familial factors included level of visitation, maternal illness, parental motivation, cultural preferences, language barriers and parental discomfort / insecurity.</p> <p>Staff can take measures to increase the comfort levels of parents by providing mirrors to see the infants face during KC.</p>
<p>Nagorski Johnson A. (2007) Factors influencing implementation of kangaroo holding in a special care nursery. <i>American Journal of Maternal/Child Nursing</i> 32(1), 25-29.</p>	<p>To inspect key factors which nurses identify as Promoting kangaroo holding in the Special Care Nursery environment.</p>	<p>Mixed methods</p>	<p>67 nurses working in a 70-bed tertiary care, Level III Special Care Nursery in a community hospital in South Atlantic State, USA.</p>	<p>Firstly, a 12 item questionnaire was used to identify demographic information, such as age, clinical experience and education.</p>	<p>A descriptive analysis was used to analyse the data. Descriptive statistics were developed to summarize the data.</p>	<p>Principle factor promoting kangaroo care is clinical stability of the infant. Infants who had equipment, such as umbilical lines, were deemed unsuitable to participate in KC.</p> <p>Nurses with 5 years or more experience were more likely to undertake kangaroo care. These nurses were more liberal in the assessment of readiness of the infant. Nurses had different ways of</p>

				<p>Secondly, a 30 item questionnaire was used to identify factors which promote KC.</p> <p>Finally there was a comment section where nurses were encouraged to add any information they deemed relevant.</p>		<p>assessing an infant for readiness for KC. Some used physiological measurements, while others used gestational age. This lead to inconsistent assessments. Junior nurses need mentors to assist them in gaining competency in facilitating KC.</p> <p>Knowledge of the benefits of kangaroo care positively influenced its uptake.</p> <p>Leadership and support from management in kangaroo care was identifies as an essential factor in implementing kangaroo care.</p> <p>Time and assistance from other staff members is essential to provide KC. Therefore, KC levels decreased during times of staff shortage.</p>
Blomqvist Y. T., Frolund L., Rubertsson C. and Hedberg Nyqvist K. (2013) Provision of kangaroo mother care: supportive factors and barriers perceived by parents. <i>Scandinavian Journal of Caring Sciences</i> 27 , 345-353.	Firstly, to identify barriers and enablers of kangaroo care from the perspective of parents. Secondly, to identify timing and reasons for the	Qualitative study	Two NICUs in Sweden with 104 participants, of which 76 were mothers and 74 were fathers of preterm infants born at gestational	<p>Questionnaire with 4 open ended questions.</p> <p>The data was analysed with qualitative content analysis and descriptive statistic.</p>	Data from mothers and fathers was analysed as one data group, accept in circumstances where the information given in their answer was specific to their mother or father role.	<p>Enablers of KC included support from partners and assistance at home, obliging and encouraging from NICU staff, no interruptions, over-night visiting, parents and staff knowledge and awareness of the benefits, feeling safe to undertake KC in the environment and having a private space.</p> <p>Barriers to KC identified included infant medical instability, infant equipment</p>

	discontinuation of kangaroo care.		ages ranging from 28 to 33 weeks.		Information was analysed by qualitative content analysis.	<p>(e.g. umbilical lines), NICU routines (e.g. parents required to leave the NICU during ward rounds), staff attitudes, time constraints, maternal pain, parental restrictions (eg sibling needs at home), interruptions (eg breastmilk expression), fear of medical equipment, tangled wires, noise levels, dislodgement, limited facilities (eg. Chairs, privacy, no overnight facilities, lack of privacy and limited space).</p> <p>Reduced time and a lack of staff assistance leads to decreased level of KC and shorter KC sessions.</p> <p>The most common reason for discontinuing kangaroo care was parental perception of the infant as stable and no longer premature, thus, feeling awkward to hold the infant without clothes. Some parents reported they stopped with KMC because the infant did not want it any more.</p>
Chia P., Sellick K. and Gan S. (2006) The attitudes and practices of neonatal nurses in the use of kangaroo care. <i>Australian Journal of</i>	Firstly, to identify the attitudes of neonatal nurses on the use of Kangaroo care and, secondly, to	Qualitative study	34 nurses working in a 48 bed NICU in Melbourne, Australia.	34 completed Questionnaire and 4 completed an in-depth interview also.	Part one of the questionnaire established demographic data, such as age, education and	All nurses were aware of the benefits of KC and this knowledge increased the use of KC. All nurses identified that it was essential to inform parents of KC and to assist, support and encourage them to practice KC.

<p><i>Advanced Nursing</i> 23(4), 20-26.</p>	<p>identify their concerns about implementing kangaroo care in the NICU.</p>				<p>nursing / neonatal experience. Part two of the questionnaire established attitudes and practices to kangaroo, using statements and a 5 point Likert scale, ranging from strongly disagree to strongly agree.</p> <p>The interview was based on 4 open ended questions based on opinions on KC, facilitating KC, experiences of KC and supports needed for KC.</p> <p>Interviews were transcribed verbatim. Data was analysed with content and thematic analysis.</p>	<p>Some nurses were uncertain when to begin KC, especially within hours of birth.</p> <p>Most nurses found facilitating KC professionally satisfying and did not view it as an added burden.</p> <p>Half the nurses had received supervised instruction on KC in the clinical environment and one third had undertaken education on KC.</p> <p>Barriers to Kc were identified by nurses and included;</p> <ul style="list-style-type: none"> • Time required to prepare for and support KC • Infant equipment, such as intubated infants and those with umbilical lines • Staff shortages • Unsuitable environment due to lack of space and/or privacy • Clinical instability of the infant • Reduced staff and parental education
<p>Engler A., Ludington-Hoe S., Cusson R., Adams R., Bahnsen M., Brumbaugh</p>	<p>To assess practice, knowledge,</p>	<p>Mixed methods</p>	<p>One nurse from 537 NICU's across</p>	<p>102-item questionnaire which consisted</p>	<p>Descriptive statistics were used to summarize the data.</p>	<p>KC was facilitated generally after a request by parents. A clinically stable infant was essential to provide KC.</p>

E., Coates P., Grieb J., McHargue L., Ryan D., Settle M. and Williams D. (2002) Kangaroo care; national survey of practice, knowledge, barriers and perceptions. <i>The American Journal of Maternal/Child Nursing</i> 27 (3), 146-153.	barriers, and perceptions regarding Kangaroo Care across the USA.		the USA. It was requested that the nurse most familiar with the practice of KC in that unit complete the questionnaire. NICUs involved consisted of 330 Level III NICU's, 198 Level II NICU's and 3 Level I NICU's.	of 100 quantitative items and 2 qualitative items.		64% of respondents had experienced difficulties implementing KC. Nurses who had greater experience in facilitating KC, generally provided it more often than inexperienced nurses. Barriers identified included; <ul style="list-style-type: none"> • Safety concerns • Clinical stability of infant • Difficulty assessing readiness leading to assessment which is subjective and inconsistent. • Parents providing too much stimulation to the infant • Lack of guidelines • Lack of experience • Time constraints • Lack of physician support • Staff discomfort in facilitation • Unsuitable environment due to lack of space and privacy • Parental reluctance
Niela-Vilen H., Axelin A., Salanter S., Lehtonen L., Tammela O., Salmelin S. and Latva R. (2013) Early physical contact between a mother and	The aim of this study was threefold. Firstly, to examine the early physical contact of	Quantitative and qualitative	Labour ward staff that looked after 178 babies in hospital A and 203 in hospital	Structured questionnaire	Descriptive analysis with frequency and percentages were used to summarize the data.	The most common facilitator for KC was nursing staff practices (86% and 79%). Secondly, was the clinical stability of the infant (75%). Facilitation of KC was influenced by the knowledge that it would have a positive effect on

her NICU-infant in two university hospitals in Finland. <i>Journal of Midwifery</i> 29 , 1321-1330.	mothers and their preterm or sick newborn infants immediately after delivery. Secondly, to understand factors facilitating and promoting KC from the NICU staff's point of view. Thirdly, to examine the association between early physical contact and breast feeding.		B were involved in the study. Secondly, 76 mothers from hospital A and 94 mothers from hospital B completed questionnaires.			breastfeeding (50%). 13% of nurses recognised that practices of the medical team encouraged early KC. A request by mothers for KC was rarely mentioned as an influencing factor. Obstacles for KC reported by 70% nurses were the infant's unstable condition and Caesarean section. Other obstacles included were the mother's unstable condition and medical/nursing staff practices.
Olsson E., Anderson R.D., Axelin A., Jonsdottir R.B., Maastrup R. and Eriksson M. (2012) Skin-to-skin care in neonatal intensive care units in the Nordic countries: a survey of attitudes and practices. <i>Foundation Acta Paediatrica</i> 101 , 1140–1146.	Firstly, to investigate KC practice in the Nordic countries. Secondly, to identify the existence of guidelines for KC in NICU's in the Nordic countries and, thirdly, to examine the attitudes of	Mixed methods	1446 staff members from 95 NICU's in Denmark, Norway, Sweden, Finland and Iceland.	2 Questionnaires were used. Firstly, demographical information was sought from each NICU which detailed the type of NICU, the number of beds and any	Data were entered into an MS Excel spreadsheet and analysed with SPSS version.	47% of units had guidelines for KC. 50% had written information for parents on KC. KC tended to be longer for infants nursed in an incubator than in a cot. Generally, parents stopped KC when the infant was transferred to a cot and put clothes on. Iceland was the only exception, where KC time increased after transfer to a cot. KC was mainly provided by parents but 32% of units allowed grandparents and

	neonatal staff towards KC.			guidelines which were present on KC. Secondly, staff were asked to identify their attitudes towards KC and identify any barriers which they face in implementing KC.		<p>28% of units allowed siblings to participate.</p> <p>Nurses with more than 5 years experience were more comfortable providing KC. Nurses were more comfortable than physicians.</p> <p>Main barrier was infant instability, followed by environmental factors (space and privacy). Parents identified that a lack of privacy resulted in them undressing in the open NICU and this was expressed as being uncomfortable.</p> <p>Knowledge of benefits was evident as the nurses quoted early interaction (51%), attachment (50%) and bonding (49%) as reasons to undertake KC. Knowledge of KC benefits influenced the use of KC in a positive way.</p>
Kymre I.G. (2014) NICU nurses' ambivalent attitudes in skin-to-skin care practice. <i>International. Journal of Qualitative Studies on Health and Well-Being</i> 9, 23297-23305.	To investigate NICU nurses' attitudes in KC practice for preterm infants and their parents.	Qualitative study	A purposive sample of 18 nurses, who had more than 5 years NICU experience, were selected from from three NICUs in Sweden,	Nurses were interviewed at their workplace.	A descriptive phenomenological analysis was undertaken.	<p>Nurses try to do KC as much as possible, as they consider it to be the optimal caring conditions for preterm infant and their parents.</p> <p>Parents presence in the NICU is the main basis of enactment of KC. Parental education on KC benefits and practice is essential prior to facilitating it.</p>

			<p>Norway, and Denmark, (six from each)</p> <p>All participants were female, but this was not a criterion.</p>			<p>Confusion exists over whether KC is a nursing care practice or a medical treatment.</p> <p>Assessment for readiness was generally done by the nurse and supported by the medical doctor. However, nurses expressed a wish for doctors to engage with KC to legitimise it as a treatment infants need for medical purposes.</p> <p>Facilitators of KC include research based evidence of its benefits, as well as benefits seen in the clinical area. Both were used as examples to encourage parents to participate.</p> <p>The nurses were discouraged by varying attitudes within the NICU to the impact of KC amongst physicians and nurses when infants are unstable. Some believed instable infants were better cared for in an incubator while others believed KC was best. This made the enactment of KC based on individual clinical judgement.</p> <p>Parental absence from the NICU was identified as a barrier to KC and the inability for parents to stay overnight in the NICU was highlighted as a factor in</p>
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						reduced KC. Another cause identified was parental unwillingness to undertake KC.
<p>Kymre I.G. and Bondas T. (2013) Skin-to-skin care for dying preterm newborns and their parents – a phenomenological study from the perspective of NICU nurses. <i>Scandinavian Journal of Caring Sciences</i> 27 669–676.</p>	<p>To describe how NICU nurses undertake Kangaroo Care with parents and infants who are actively dying.</p>	<p>Qualitative study</p>	<p>18 NICU nurses from 3 NICU's in Sweden, Denmark and Norway.</p> <p>The purposeful sample of 3 NICU's were selected based on their expressed commitment to KC. The purposeful sample of 18 nurses were selected based on having over 5 years' experience in the NICU.</p>	<p>Interview at their workplace</p>	<p>In accordance with Dahlberg's reflective lifeworld research interviews were read and the information was divided into clusters for analysis.</p>	<p>Nurses had very strong beliefs that KC was essential for caring for a dying infant. Things that encouraged the use of KC with a dying infant were the expected sense of loss of the parents and the belief that a dying infant should not be alone.</p> <p>Timing was an issue for KC with a dying infant. Nurses felt that all infants should get time with their parents before they pass away. This at times created a sense of urgency to perform KC and to ensure the moment of passing was in the parents' arms. Holding the infant while it was still warm was identified by the nurses as a goal, to allow a better experience for the parents.</p> <p>A challenge for the nurses in performing KC was maintaining the dignity and comfort of the infant during the transfer from incubator to chest.</p> <p>Beliefs about how the infant experiences KC encouraged some nurses to facilitate it. Imagining that the infant will feel</p>

						<p>more secure and comfortable in their parents' arms, during the experience of dying motivated nurses to encourage KC. They expressed that KC was the best way to tell the infant that they were not alone and to prevent suffering.</p> <p>Beliefs about the parents experience of KC encouraged the use of it. Nurses believed that holding their baby will allow parents to put meaning into their child's life, no matter how short. It will also provide memories of caring for their infant closely. Nurses also took photographs of KC for the parents, to give them physical memories also.</p> <p>Barriers to performing KC with a dying infant were the parents not being present at the time. Another barrier was parental reluctance. Nurses described how they try to persuade reluctant parents to perform KC, with nurses feeling a sense of achievement when it was successful.</p> <p>The environment was identified as a hindrance but not a barrier. Kc was done regardless of the environment in a dying infant. However, nurses expressed a desire for more space and privacy during</p>
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						this time.
Flynn A. and Leahy-Warren P. (2010) Neonatal nurses' knowledge and beliefs regarding kangaroo care with preterm infants in an Irish neonatal unit. <i>Journal of Neonatal Nursing</i> 16 , 221-228	To examine the level of Irish neonatal nurses' knowledge and their beliefs on the use of Kangaroo care in the NICU.	Mixed methods	A pilot study of 5 participants was undertaken. Then, 62 nurses working in a 37-bedded regional Level III neonatal unit in Ireland participated in the study.	A 47 item questionnaire was used, and had been adapted from a previous study by Engler et al. (2002). A Likert scale was used in the questionnaire to analyse the opinions of nurses.	Descriptive statistics were analysed and included frequency and percentages. Data was analysed using a SPSS (2006) computer software package.	<p>Irish nurses had positive beliefs regarding KC and this encouraged its use. 98% of nurses believed it had positive effects on the infant.</p> <p>Beliefs regarding KC and its positive effect on parental confidence were an enabler of its use. 80% of nurses believed KC should be offered to all parents and infants, regardless of gestational age or weight.</p> <p>80% of nurses felt KC and working with parents added to their workload, but that the extra work was worth the effort. 70% of nurses find KC fulfilling and look forward to introducing it to parents.</p> <p>Confusion existed regarding intubated infants' suitability to participate in KC and this uncertainty acted as a barrier to performing KC. 58% of nurses agreed that KC is simply not feasible with some infants. 74% thought that intubated infants should not be allowed participate in KC, while 17% thought that infants with umbilical lines should not be allowed to participate.</p>

Leonard A. and Mayers P. (2008) Parents lived experience of providing kangaroo care to their preterm infants. <i>Journal of Interdisciplinary Health Sciences</i> 13 (4), 16-30.	To explore the lived experience of parents who have provided KC to their preterm infants.	Qualitative study	6 parents took part in this study, 4 mothers and 2 fathers. Parents had provided KC to their preterm infant in a tertiary level NICU in Cape Town, South Africa.	Interview were conducted at the neonatal unit.	Interviews were transcribed verbatim. Data analysis was undertaken by adapting stages developed by Hycner (1985) and Colaizzi (1978).	<p>Barriers to initiating KC by parents were identified. Parents described reluctance to undertake KC and feeling incompetent to undertake such a task and feared the environment, the unfamiliar medical equipment and hurting their infant. Some parents did not want to bond with their baby at first as they feared they would not live. This feeling generally passed after a few days, when most began to want to bond.</p> <p>KC felt awkward at first for parents and positioning was a challenge. However, as they increased KC time, their confidence also increased. KC enabled parents to become proficient in handling their infant.</p> <p>Another barrier identified by parents was a lack of knowledge on KC. Most had never been told about it prenatally and therefore, did not know what to expect when asked to undertake it.</p> <p>Parental presence in the NICU was a barrier to KC. Parents felt tension between the want to be with their</p>

						<p>preterm infants in the NICU and the need to attend to other commitments at home.</p> <p>Parents sometimes felt judged by nurses when they undertook KC incorrectly. Parents felt that for KC to be successful, the support of NICU staff was vital. Support also came from other parents in the NICU, especially parents of older/more stable infants and on “bad days”.</p> <p>Parents enjoyed participating in KC because of the special connection they establish with their infant. KC assists to develop an attachment that a preterm birth can hinder developing.</p> <p>Fathers identified that they often felt useless following the birth of their preterm infant. KC gave them a role and sense of purpose in the care of their child.</p>
Stikes R. and Barbier D. (2013) Applying the plan-do-study-act model to increase the use of kangaroo care. <i>Journal of Nursing Management</i>	To apply the plan-do-study-act model to increase the use of kangaroo Care within a		50 nurses in a 24-bed level III NICU within an academic medical centre in Kentucky,	Questionnaire	“The Plan-Do-Study-Act Model was used as a framework for this project. Plan-Do-Study-Act Model uses four	The most common barriers for undertaking KC were identified by the nurses as clinical concerns about the infant, the size of the infant, lack of Time or time constraints, inadequate equipment and lack of parent education.

21, 70–78.	level III neonatal intensive care unit in the USA, through the identification of barriers to KC, the provision of education and the development of guidelines.		USA.		cyclical steps for continuous quality improvement. Based upon Plan-Do-Study-Act Model, education was planned, surveys were developed and strategies implemented to overcome barriers”.	<p>Less frequent concerns were feeling uncomfortable doing KC during feeding, lack of privacy, unsuitable chairs, language barriers between parents and staff and parental unwillingness to undertake KC.</p> <p>Nurses were asked under what circumstances would they be most happy to facilitate KC. Nurses identified that they would be most happy if the infant was clinically stable ventilating either on room air, ventilator or CPAP. Other situations identified were having suitable equipment available, having written information to give to parents and having clinical guidelines within the unit.</p> <p>Pre-intervention, staff education, lack of clinical guidelines and equipment were seen as major factors in hindering the use of KC within the unit. Post-intervention, staff found that having clinical guidelines had a positive effect on their KC practice, as did new suitable equipment. KC guidelines will be reviewed annually and will be influenced by feedback from parents and staff. This NICU has now committed to ongoing staff education to support KC practice.</p>
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						Post-intervention, all barriers were reduced, except parents not wanting to participate in KC. In 4 months, KC increased by 31%
Mangan S. and Masher S. (2012) Challenges to skin-to-skin kangaroo care; caesarean delivery and critically ill NICU patients. Neonatal Network. 31 (4) 259-261.	To discuss clinical challenges which face kangaroo care use following caesarean section and critically ill NICU patients.	Qualitative	?	?	?	<p>Benefits of KC include improved infant thermoregulation, decreased pain responses in infants, positive influence on breastfeeding and reduced maternal anxiety. KC also has a positive affect on the role of the parents in caring for their infant.</p> <p>KC is a safe way of caring for high risk neonates and will not de-stabilise a clinically stable infant. However, a lack of written clinical guidelines results in KC being provided in an inconsistent way. Despite knowledge on the benefits of KC, NICU nurses are still reluctant to implement KC with infants who are critically ill. Knowledge that nappy changing and suctioning can be over stimulating for some infants, leads nurses to believe that KC may also be over stimulating for some infants.</p> <p>Promotion of KC within the NICU can include ensuring staff buy in, providing written protocols, building up staff</p>

						<p>confidence through hands on training, providing written and verbal information on KC to parents and providing further education for staff.</p> <p>Staff anxiety and inexperience can lead to reduced KC</p>
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Appendix 3. Summary Table for Literature Reviews and Systematic Reviews

Author(s) & Title	Research Question/ Purpose	Search Strategy/ Inclusion/ Exclusion Criteria	Search Terms	Detail of Literature /Study Selection	Quality Assessment (where applicable)	Data Synthesis (where applicable)	Findings/ Conclusions relevant to the review
Seidman G., Unnikrishnan S, Kenny E., Myslinski S., Cairns- Smith S., Mulligan B. and Engmann C. (2015) Barriers and enablers of kangaroo mother care practice: A systematic review. PLoS ONE 10 (5); e0125643. Published online 2015 May 20. doi: 10.1371 / journal.pone.0125643 PMID: PMC4439040	To synthesise existing literature on the most common barriers and enablers to kangaroo care for parents and health care professionals.	The authors searched nine electronic databases: PubMed, EMBASE, Scopus, Web of Science, and the WHO Regional Databases (AIM, LILACS, IMEMR, IMSEAR, and WPRIM). The authors developed a review protocol with methods and eligibility criteria that were specified in advance. Publications were included	"Kangaroo Mother Care" OR "Kangaroo Care" OR "Skin to skin care"	1,264 publications were retrieved on the initial search. After reviewing the titles and abstracts 103 were included based on pre-specified criteria. Publications were scanned in detail for all barriers and enablers and 96 articles were selected to be included in the review.		A data extraction sheet was piloted and tested. Data from each article was transferred to the extraction sheet by two reviewers. Focus was placed on the frequency which a barrier or enabler was mentioned across publications.	<p>Infants need to be clinically stable to participate in KC.</p> <p>The most frequently cited barriers to KC were resource related. They included lack of appropriate facilities for KC, lack of privacy, crowdedness, noise levels, lack of food or basic supplies for mothers and negative staff attitudes. Familial barriers included other obligations at home, fear of hurting the infant, feeling incompetent, pain or fatigue in the mother and lack of help from staff.</p> <p>Enablers of KC included the formation of an attachment between the mother and the infant, parental confidence, feelings of empowerment, parental preference to do KC, support from family at home, staff practices and</p>

		<p>which met the following criteria: 1) the aim of the study was to document experiences implementing Kangaroo care; 2) the study was published in a peer-reviewed journal; 3) the study included data on the sample population, sample size, and location of implementation; 4) the study was original research; and 5) the study was published in English. Any publication published before August 13, 2013 (the date of the final</p>					<p>support /encouragement from staff.</p> <p>Support at home included not only assisting with practical tasks, such as childminding and housekeeping. It also included emotional support and encouragement to partake in KC.</p> <p>Barriers for nurses highlighted staff shortages, absence of clear guidelines and lack of training as the primary obstacles. Other barriers included a general lack of buy in, the routine within the NICU, and concerns over the infants' condition.</p>
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		database search) was eligible for inclusion. The authors excluded literature reviews, conference proceedings, letters to the editor, and abstracts in order to prevent double counting of data and to ensure that all barriers were understood in the context of the entire study.					
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<p>Ludington-Hoe S.M., Morgan K. & Abouelfetoh A. (2008) A clinical guideline for implementation of kangaroo care with premature infants of 30 or more weeks' postmenstrual age. <i>Advances in Neonatal Care</i> 8(3S), S3–S23.</p>	<p>To review the evidence based benefits of Kangaroo Care including physiological, behavioural and psychosocial benefits. To identify an assessment criteria for the readiness for KC for the infant, the parents and the institution and to make recommendations for monitoring the infant during KC. To establish a sample protocol which can be adapted for the use of Kangaroo Care in any NICU. To reiterate the <i>The Ten Steps for Successful Kangaroo Care</i>.</p>	<p>Sources of literature were not specified, but the literature which was reviewed included randomized clinical trials, quasi-experimental designs and meta-analyses, based on premature infants greater than 30 weeks. Descriptive studies such as case studies and qualitative studies were also included in the review. However, the authors identified that most of their focus was on the randomized clinical trials and</p>	<p>Not specified</p>				<p>KC readiness can be divided into 3 sections – infant readiness, parental readiness and institutional readiness.</p> <p>Infants should be assessed using written clinical guidelines which use their heart rate, respiration rate, skin perfusion, oxygen saturations, temperature and activity level.</p> <p>Parents should be assessed by taking into account their knowledge of KC, their emotional state, their feeding intention and their own physical health.</p> <p>Institutional readiness is assessed by looking at staff education level, staff experience, availability of suitable equipment, availability of policies and protocols and other activities nearby (such as major procedures being undertaken on infants nearby).</p> <p>KC should not be undertaken if vital signs are unstable, sepsis is suspected, serum bilirubin levels are rising and when blood gases</p>
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		meta-analyses.					<p>are unstable. Also infants with an arterial line, chest drain, ventilated infants or those on vasopressor medications should not undertake KC.</p> <p>During a KC session, vital signs should be recorded every 5 minutes for the first 15 minutes as this is a critical period for discomfort and physiological compromise. Thereafter, vital signs should be recorded every 15-30 minutes as the individual patients' condition dictates. The nurse should also observe the parent to ensure they are tolerating KC.</p>
Kearvell H. and Grant J. (2008) Getting connected: How nurses can support mother/infant attachment in the neonatal intensive care unit. Australian Journal of Advanced Nursing, 27(3)	To investigate how NICU nurses can support the mother-infant relationship within the neonatal intensive care unit.	CINAHL, PubMed and Web of Knowledge electronic databases were searched for this literature review.	<p>"Neonatal intensive care unit"</p> <p>OR "NICU"</p> <p>OR "neonatal nursing"</p> <p>AND "mother-infant attachment"</p> <p>OR "mother-infant dyad"</p>	Selection criteria were applied and 15 articles were reviewed, of which 13 were qualitative and 2 were of mixed methods.	The qualitative studies were appraised using the Critical Appraisal Skills Programme (CASP 2006). The quantitative studies were appraised	Thematic analysis was used to identify themes and sub-themes.	<p>Kc is seen as a method to help to develop bonding and attachment between the parent and the preterm infant. It helps to increase maternal confidence in caring for their infant and increases the clinical stability of the infant. Nurses' knowledge of the benefits of KC greatly improved its facilitation.</p> <p>Barriers to provide KC included inadequate space, fear of dislodging equipment, staff</p>

75-84.			AND OR “breastfeeding” AND OR “kangaroo Care” AND OR “nursing support” AND “premature infant”		using the University of Salford (2001) evaluation tool for mixed studies.		shortages and minimal time to educate the parents and prepare the infant. KC has been shown to decrease when the NICU is short staffed.
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Appendix 4; Sample protocol for Kangaroo Care

Title: Guideline for Kangaroo Care with Premature Infants

Outcome goal: To provide guidelines for nurses in the NICU who wish to provide skin-to-skin holding (KC) to infants/families who would derive physiologic/psychologic benefits from this method of care.

Desired patient outcomes;

1. Maintain neurobehavioral organization and physiologic stability (oxygenation, heart rate, thermoregulation) during transfers and holding.
2. Remain free from any adverse effects associated with transfer or skin-to-skin holding of infant, such as extubation and thermal instability.
3. Begin a bonding process.
4. Improve breastfeeding outcomes.
5. Promote sleep and brain development

Policy: Infants who meet the criteria below can do Kangaroo Care.

Equipment:

1. Blankets
2. Recliner (recliner or chair/rocker with footstool)
3. Privacy screen

Eligibility criteria:

1. Stable neonates are eligible. Stable means no deterioration of condition within 24 hours before KC.
2. All neonatal lines and tubes must be well secured
3. Neonatal respiratory support in the form of oxygen supplementation or nasal CPAP is not a contraindication.
4. Mothers and fathers should be willing to give KC.

Infants not eligible for KC/exempt infants:

1. Any infant with a chest (thoracostomy) tube.
2. Any infant with an intracardiac line (right atrium, left atrium).
3. Any infant with an arterial line.
4. Any infant who is being actively weaned from a ventilator.
5. Any infant having apnoeas and/or bradycardias that require stimulation.
6. Any infant who has had an acute or sudden deterioration in condition within the past 24 hours. Also consider intubated infants and infants on oscillating and jet ventilation.
7. Parents with rashes, open skin lesions, and active colds should abstain from KC.

Taken from; Ludington-Hoe S.M., Morgan K. & Abouelfettoh A. (2008) A clinical guideline for implementation of kangaroo care with premature infants of 30 or more weeks' postmenstrual age. *Advances in Neonatal Care*, **8**(3S), S3–S23.

Appendix 5; Ten Steps to Successful Kangaroo Care

Every facility providing services and care for newborns and infants up to 3 months' age should:

1. Have written KC policies (for very sick and very low-birth-weight neonates, for relatively stable preterm neonates [such as the one provided within this review], for healthy term infants within 2 hours of birth, and for healthy term infants until discharge) that are routinely communicated to all healthcare staff.
2. Train all healthcare staff in skills necessary to implement the policy pertaining to their area of care.
3. Inform all pregnant women about the benefits and management of KC.
4. Help mothers of healthy term infants initiate KC within a few minutes of birth. Help mothers of cesarean infants and premature or sick infants initiate KC as soon as possible (able to tolerate transfer and skin contact without physiologic or behavioural compromise), and monitor infant to ensure tolerance without physiologic and behavioural compromise.
5. Show mothers how to position the infant for both safe transfer and safe KC (head sustained in midline, not flexed or hyperextended, and infant secured so that infant cannot fall down or out of KC position).
6. Practice 24/7 KC, allowing mothers and infants to remain in skin-to-skin contact 24 hours a day, 7 days a week until discharge.
7. Give newborns and infants at least 1 hour of KC per session, if not continuous 24/7 KC.
8. Encourage KC for all warming and comforting needs of infants.
9. Give adequate thermal insulation (head cap, warm blankets, insulating cover as needed) to the infant throughout KC.

10. Foster the establishment of KC support for mothers through posters, patient scrapbooks, patient record of KC, and support groups that may assist even after discharge

Taken from; Ludington-Hoe S.M., Morgan K. & Abouelfettoh A. (2008) A clinical guideline for implementation of kangaroo care with premature infants of 30 or more weeks' postmenstrual age. *Advances in Neonatal Care* **8**(3S), S3–S23.