Review article

Effectiveness of Current Interventions to Alleviate Parental Distress in the NICU: A Rapid Review

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ABSTRACT

Background: The birth of a premature infant and admission to the NICU is often unexpected and traumatic for families, leading to increased distress and can negatively impact parental-infant attachment. Appropriate interventions can help to lessen the negative impact of a NICU admission on families, improving parental mental health, reducing distress, enhancing parent- infant relationships, and improving the long-term physical, cognitive, emotional, and social development of the infant.

Aims: The purpose of this study is to examine and evaluate research evidence on the effectiveness of current interventions for improving parental distress in the NICU.

Methods: A rapid review was conducted utilizing a protocol based on the Virginia Commonwealth University guidance. Keyword searches were conducted on CINAHL, MEDLINE, and PsychINFO, and studies were selected according to pre-defined eligibility criteria, published between January 2015 and January 2020. The literature search included primary studies of interventions with parental stress and/or anxiety reduction as outcomes.

Results: A total of 14 articles were included, evaluating the effectiveness of 13 different interventions, including narrative writing, art therapy, structured nursing interventions, anxiety counselling, spiritual care, organizational change, music therapy, relaxation, and mindfulness techniques. With the Pexception of three, all the studies found significant results in the reduction of stress and/or anxiety levels of the subjects, with mothers having overall higher levels of stress indicated by higher stress scores on standardized measurement tools.

Conclusion: There is a need for ongoing assessment of parental distress and integration of appropriate interventions within the NICU settings. In this review, both individualized and group interventions including narrative writing, art therapy, music therapy, spiritual care, activity-based group therapy, music therapy, audio-assisted relaxation techniques, mindfulness based neurodevelopmental care, cognitive behavioral based counselling, family nurture intervention and a structured nursing intervention were shown to be effective in reducing parental stress and/or anxiety in the NICU. The small scale of the studies included in this review impact generalizability to a broader audience and emphasizes the need for larger scope, multi-center studies at an international level to build on and broaden our level of knowledge on how to better support families and reduce parental distress in the NICU.

Key words: Parental stress, neonatal intensive care, interventions, review, premature, mental health

BACKGROUND

Premature birth (birth before 37 weeks gestation) is the leading cause of infant mortality and morbidity, and is associated with numerous complications, including brain injury, chronic lung disease, necrotizing enterocolitis, cerebral palsy, neurodevelopmental and academic impairments (Canadian Neonatal Follow-up Network [CNFUN], 2019; Johnston et al., 2014; McBryde et al., 2020; Polin & Yoder, 2020; Toral-Lopez et al., 2016). Advances in reproductive and healthcare knowledge and technologies have resulted in increased rates of prematurity and increased survival of those born at the extreme cusp of human viability, as early as 22 weeks gestation (Canadian Neonatal Network [CNN], 2017; Green et al., 2017; Lemyre & Moore, 2017).

The neonatal intensive care unit (NICU) is a fast paced, highly technical, and medically focused area specializing in the care of premature and critically ill infants. Admission into this foreign, intensive care environment is often an "unexpected and traumatic event for families" (Del Fabbo & Cain, 2016, p. 281). Parents often experience high levels of psychological distress, guilt, anxiety, fatigue, loss of control, sadness, feelings of helplessness, emotional distancing, uncertainty and worries about their infant's future, and these symptoms have been shown to still be present up to one year after the birth of their premature infant (Obeit et al., 2009; Petteys & Adoumie, 2018; Roque et al., 2017; Toral-Lopez et al., 2016; Treherne et al., 2017). The persistence of these symptoms and the physical, emotional, and psychological separation between infants and their parents within the NICU can lead to lack of bonding, parental self-confidence and parent-infant attachment, which has the potential to negatively impact the infants' cognitive, motor and social development during hospitalization and beyond (Del Fabbro & Cain, 2016; Jubinville et al., 2012; Makela et al., 2018; Obeidat et al., 2009; Petteys & Adoumie, 2018). Additional challenges include socioeconomic status, education, age, pregnancy factors (ex. fertility treatments), history of depression or high anxiety, financial concerns, juggling family responsibilities and life demands that carry on outside the NICU (Ayers et al., 2019; Carter et al., 2007). These challenges are further complicated by prognostic uncertainties and barriers of the NICU setting itself, including space, equipment, loud noises, lack of accommodations for family members, visiting restrictions, long hospital stays and lack of privacy, which can obstruct the emotional needs of parents to be close to their infants (Makela et al., 2018; Petteys & Adoumie, 2018; Treherne et al., 2017). Elevated stress levels in parents in the NICU are associated with higher levels of stress at three-months post discharge, which can adversely affect their ability to cope and care for their infant once at home (Fotiou et al., 2016). Appropriate interventions can help to lessen the negative impact of a NICU admission on families (Fotiou et al., 2016; Loewenstein et al., 2019). Although interventions have been studied, there is little literature comparing the effectiveness of different interventions.

The few published reviews on interventions focused almost exclusively on developmental care and family-centered care interventions and/or did not focus on parental stress, or anxiety as primary outcomes (Benzies et al., 2013; Ding et al., 2019; Lavalle et al., 2019; Vetcho et al., 2020). Other reviews were restrictive in the types of interventions evaluated. Dol et al. (2017) and Ebstein et al. (2016) performed reviews of eHealth

interventions and communication technology, respectively, finding mixed results on their effectiveness to reduce parental stress and/or anxiety within the NICU setting. Family centered care interventions and developmental care interventions have been extensively studied within the literature and have been shown to be effective at reducing parental stress and anxiety; however, despite the known benefits, implementation and utilization within the clinical setting has been lacking (Vetcho et al., 2020). There is a need to increase our awareness of the clinical utility of the different types of interventions to reduce parental stress and/or anxiety, including evaluating the current literature to inform healthcare professionals, guide practice and improve both parent and infant health and well-being.

PURPOSE OF RAPID REVIEW

The purpose review was to critically review and evaluate evidence on the effectiveness of different interventions for improving parental distress in the NICU, identifying any methodological limitations or biases, as well as potential gaps in the current literature regarding interventions for parental distress, to inform practice and guide future research. This review builds on and adds to a previous review and meta-analysis conducted by Sabnis et al. (2019) who evaluated interventions studied prior to 2016, and their impact on parental distress levels. This review found that with the exception of family centered care interventions, which are the most extensively studied and a target for ongoing implementation, that further study and evaluation of parental interventions is needed going forward.

For this review, distress was defined as a negative emotional state or negative stress response that overwhelms one's ability to cope leading to physical and/or psychological maladaptation (American Psychological Association [APA], 2020). Stress was defined as a psychological or physiological response(s) to external or internal stressors (APA, 2020). Anxiety was defined as an emotion or emotional response manifesting as feelings of dread, marked apprehension, and somatic symptoms of tension in which the body mobilizes to meet the perceived threat (APA, 2020). The definition of stress and/or anxiety is based on standardized tools used in most of the included studies, each of which has different characteristics and definitions of what is normal versus abnormal. Although distress can encompass several physical and psychological constructs, within the scope of this review, the focus will be on evaluating the effectiveness of interventions on parental stress and/or anxiety within the NICU setting.

METHODS

Rapid Review Protocol

A rapid review was conducted utilizing a protocol outlined by Virginia Commonwealth University (2018). A rapid review follows the basic structure of a systematic review; however, it makes concessions in relation to methodology in order to be conducted in a more accelerated fashion and by a single reviewer. This review is less comprehensive than a full systematic review in that the literature search was restricted to the following three databases: CINAHL, MEDLINE, and PsychINFO. Grey literature was excluded from

the review. The literature search was completed in January 2020 and RefWorks Citation Manager ® was utilized to manage citations. A health sciences librarian was consulted to review the search strategy and to provide assistance and expertise with the literature search (see Appendix A for search summary). A PRISMA flow diagram (Figure 1) was utilized to increase transparency in the literature search and study selection (Higgins et al., 2019; Moher et al., 2009).

Inclusion Criteria

Primary published experimental and quasi-experimental studies taking place within the NICU setting were included in the review. Intervention studies focusing on parents of infants born prematurely (<35 weeks gestational age [GA]), with parental (maternal and/or paternal) stress and/or anxiety reduction as the primary outcome were included. No selection criteria with regards to the country of origin or level of NICU was used. As this review focuses on current trends in managing parental distress in the NICU, study inclusion was limited to English literature published between January 2015 and January 2020.

Exclusion Criteria

Review articles, dissertations, studies published in languages other than English and prior to 2015 were excluded from this review. Studies focusing on healthcare workers, grandparents and those that did not evaluate stress or anxiety reduction as the primary outcomes were also excluded. Articles which focused exclusively on parents of late preterm infants (35-37 weeks GA) were also excluded, as these infants often have short NICU admissions (Braun et al., 2020).

Screening and Study Selection

Search results were combined in RefWorks Citation Manager ® and duplicates were removed. Title and abstracts were screened by the investigator (DSS), and full text studies examined and evaluated based on the aforementioned criteria. Data were extracted from the studies, including: study design; subject characteristics and demographics; NICU and infant characteristics and demographics; outcome measures defined within the studies; study size; types and description of interventions; measurement tools; results of selected studies based on anxiety and/or stress scores of chosen measurement tools. This data is summarized in a rapid review matrix table, see Appendix C (Virginia Commonwealth University, 2018)

Risk of Bias

Critical appraisal of selected articles was carried out utilizing the Cochrane handbook for systematic reviews of interventions (Higgins et al., 2019). This tool was used to assess bias as a judgement of low, high, or unclear risk. This judgement was applied to individual elements within six domains (random sequence generation, allocation concealment, selective reporting, blinding, incomplete outcome data and other), appraising an overall risk of bias to the individual studies. When assessing risk of bias, an unclear risk was considered moderate

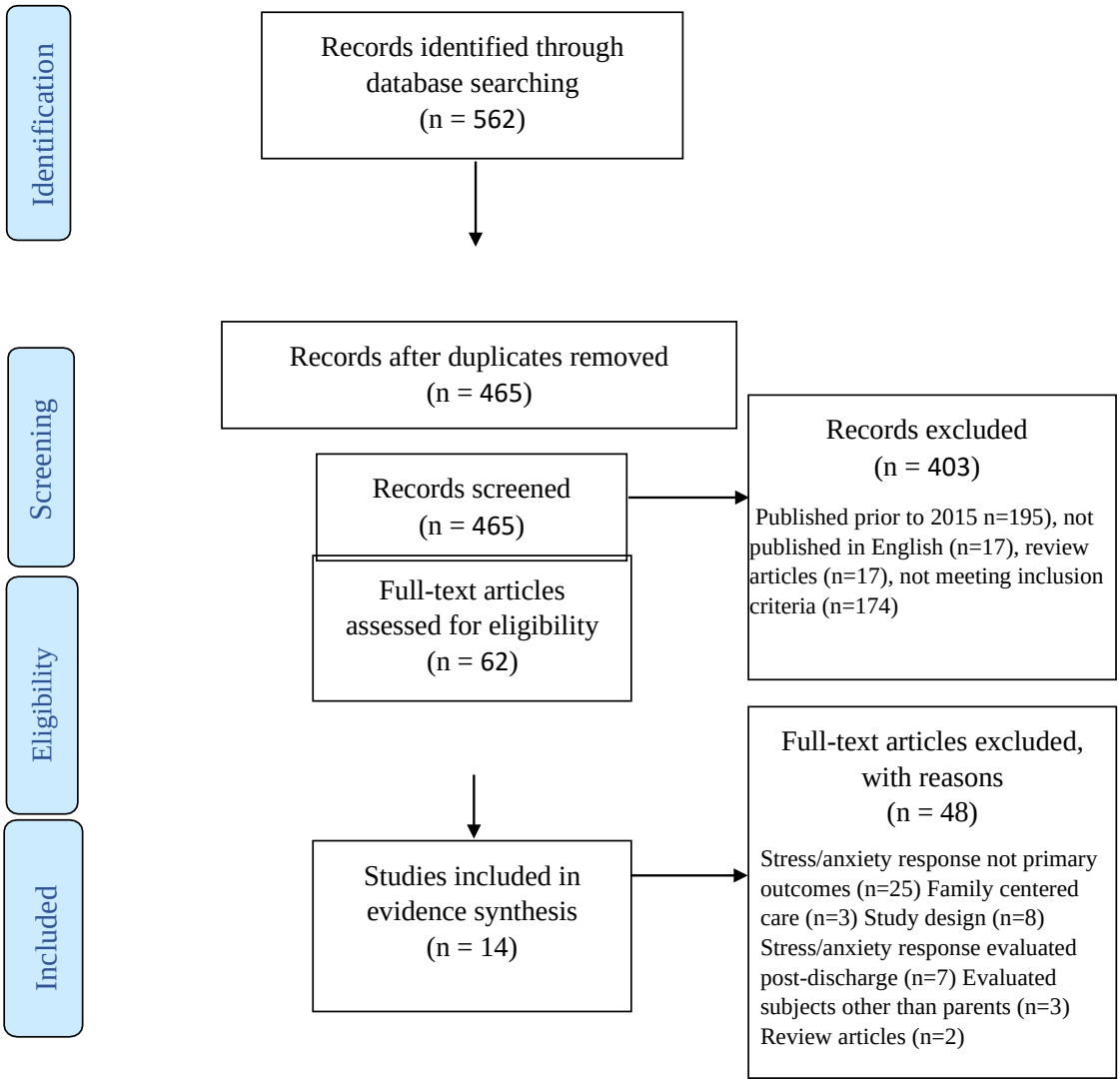
with an average of risk used to determine the overall risk of bias. Evaluation of publication bias, time-lag bias, language bias and location bias were not addressed in this review.

RESULTS

Study Selection

Of the 562 articles retrieved in the database searches, a total of 62 full articles were screened for eligibility and based on the selection criteria, 14 studies were included in this review (Figure 1).

Figure 1: PRISMA Flow Diagram (Modified from Moher et al., 2009)



Study design

Selected studies included seven randomized controlled trials (RCTs) (Dabas et al., 2019; Jouybari et al., 2018; Koochaki et al., 2017; Kucuk Alemdar et al., 2018; Petteys & Adoumie., 2018; Ribeiro et al., 2018; Welch et al., 2016) and seven quasi-experimental designs (Akbari et al., 2019; Gustafson et al., 2016; John et al., 2018; Kadivar et al., 2016; Mansson et al., 2019; Noergaard et al., 2018; Ong et al., 2018). One of the RCT studies was blinded (Jouybari et al., 2018). The majority of studies were single centered, with the exception of Jouybari et al. (2020) and Kadivar et al. (2017). Six of the quasi-experimental studies utilized sequential pretest post-test designs (Akbari et al., 2019; Gustafson et al., 2016; John et al., 2018; Kadivar et al., 2017; Ong et al., 2018) and one a prospective longitudinal study design (Mansson et al., 2019). Five of the RCT studies utilized a pretest post-test design, with control and intervention arms occurring concurrently (Dabas et al., 2019; Jouybari et al., 2020; Koochaki et al., 2017; Kucuk Alemdar et al. 2018; Petteys & Adoumie, 2018). One of these studies had three arms occurring concurrently (Jouybari et al., 2020)

Subject Characteristics

The chosen studies evaluated the effectiveness of the various interventions on stress and/or anxiety levels on mothers and/or fathers. In total, 1,335 parent participants were involved in the identified studies. The majority of studies looked exclusively at mothers (Dabas et al., 2019; John et al., 2018; Jouybari et al., 2018; Kadivar et al., 2016; Koochaki et al., 2017; Kucuk Alemdar et al., 2018; Ong et al., 2018; Ribeiro et al., 2018; Welch et al., 2016). Two of the studies evaluated the effects on fathers only (Akbari et al., 2016; Noergaard et al., 2018), and five recruited both mothers and fathers as subjects (Gustafson et al., 2016; Mansson et al., 2019; Petteys & Adoumie, 2018). Gustafson et al. (2016) evaluated the effects on mothers and fathers as a parental group, as well as differences between mothers and fathers within both control and experimental groups. The total number of subjects (control and intervention) in the studies varied between 34 and 231, with control groups between 17 and 130 subjects and intervention groups between 17 and 101 subjects.

NICU and Infant Characteristics

Study locations included NICUs in hospitals in India (Dabas et al., 2019; John et al., 2018), Iran (Akbari et al., 2019; Jouybari et al., 2018; Kadivar et al., 2016; Koochaki et al, 2017), United States (Gustafson et al., 2016; Petteys & Adoumie, 2018; Welch et al. 2015), Turkey (Kucuk Alemdar et al., 2018), Sweden (Mansson et al., 2019), Denmark (Noergaard et al., 2018), Malaysia (Ong et al., 2018) and Brazil (Ribeiro et al., 2018)

This review includes studies carried out in Level II, III and IV NICUs. This classification is based on the gestational ages of the infants and the level of intensive care that can be provided, including surgical care (Phibbs, et al., 1996). Two studies were carried out in a Level II NICU (Kucuk Alemdar, 2018; Noergaard et al., 2018), five in a Level III NICU (Dabas et al., 2019; John et al., 2018; Ong et al., 2018; Petteys & Adoumie, 2018; Ribeiro et al., 2018) and one in a Level IV NICU (Welch et al., 2016). Six studies did not specify the level of designation (Akbari et al., 2019; Gustafson et al., 2016; Jouybari et al., 2018; Kadivar et al, 2016; Koochaki

et al., 2017; Mansson et al, 2019).

There was some variability in the parameters in the specific studies as it related to infant characteristics and demographics. All the studies included parents of infants born prematurely, or less than 37 weeks GA (Akbari et al., 2019; Kadivar et al., 2017; Koochaki et al., 2017), although some studies were more specific with their parameters. Dabas et al. (2019) and Welch et al. (2016) included infants born at <34-weeks GA. Kucuk Alemdar et al. (2018) and Pettey & Adoumie (2018) included infants born at <30 weeks and <35 weeks GA, respectively. Two of the studies included parents of infants born at > 28 weeks GA (Gustafson et al, 2016; Noergaard et al., 2018). Two studies included infants born at 27 weeks up to 34 (Ong et al., 2018), 37 (Manson et al., 2019) or 38 weeks (Jouybari et al., 2018) GA. One study did not specify a GA, but rather included parents of infants born at very low birth weight or <1500g (John et al., 2018).

Outcome Measures

Outcome measures included stress and/or anxiety reduction as the primary outcomes. The chosen studies utilized variable measurement tools to evaluate the impact of the intervention(s) on stress, anxiety, or both. Eight studies evaluated stress only (Akbari et al.,2019; Jouybari et al., 2018; Kadivar et al., 2017; Kucuk Alemdar et al., 2018; Mansson et al., 2019; Noergaard et al., 2018; Ong et al., 2018; Petteys & Adoumie, 2018). Four studies examined anxiety only (John et al., 2016; Koochaki et al., 2017; Ribeiro et al., 2018; Welch et al., 2016). Dabas et al. (2019) evaluated both stress and anxiety levels. Gustafson et al. (2016) evaluated stress as the primary outcome, but also evaluated pre-intervention anxiety and coping processes and their relationship to parental stress.

Other outcome measures evaluated in various studies included: milk output (Dabas et al., 2019); paternal participation in childcare (Noergaard et al., 2018); maternal ability (Ong et al., 2018); bonding, parent satisfaction and infant length of stay (Petteys & Adoumie, 2018); maternal depression and cardiac autonomic modulation (Ribeiro et al., 2018). These outcome measures will not be discussed within the context of this review.

Quality Appraisal

Table 2: Risk of Bias Assessment (Cochrane Risk of Bias Tool, Higgins et al., 2019)

Studies	Random sequence generation	Allocation concealment	Selective reporting	Blinding: Participants, personnel, & outcome assessment	Incomplete outcome data	Other sources of bias	Overall risk of bias
Akbari et al. (2019)	-	?	?	-	+	?	moderate
Dabas et al. (2018)	+	+	+	?	+	?	low
Gustafson et al. (2016)	?	?	+	?	+	-	moderate

John et al. (2018)	+	-	?	+	?	-	moderate
Jouybari et al. (2020)	+	+	?	+	?	?	moderate
Kadivar et al. (2017)	-	?	?	+	?	+	moderate
Koochaki et al. (2017)	+	?	?	?	?	+	moderate
Kucuk Alemdar et al. (2018)	+	-	?	?	?	+	moderate
Mansson et al. (2019)	-	-	?	+	?	-	high
Noergaard et al. (2018)	-	-	?	+	?	-	high
Ong et al. (2018)	-	-	?	+	+	-	high
Petteys & doumie (2018)	+	+	?	-	?	-	moderate
Ribeiro et al. (2018)	+	+	?	?	-	-	moderate
Welch et al. (2016)	?	?	?	?	?	-	moderate

'+' = low risk of bias; '-' = high risk of bias; '?' = unclear risk of bias

Results of the quality appraisal are summarized in Table 2. Of the 14 studies included in this review, one appeared to have an overall low risk of bias (Dabas et al., 2019) , three studies have an overall high risk of bias (Mannson, 2019; Noergaard, 2018; Ong, 2018), while the remainder had a moderate unclear risk of bias. Eight of the studies had sample sizes less than 100 subjects, which may limit the statistical power. Although RCTs are considered to be the highest level of evidence, the parallel arms necessary in this design and study setting creates a risk for interference and spillover effect between the two study groups. It is difficult to completely eliminate this risk related to frequent contact and interaction between families in the NICU environment. The sequential design utilized by most of the quasi-experimental studies addresses this risk by evaluating the control and intervention groups at different points in time.

When evaluating the parental stressor scale: neonatal intensive care unit (PSS: NICU) within the Turkish context, Kucuk Alemdar et al. (2018) excluded items on measurement tool if they were experienced by less than 1/3 of the subjects, which, subsequently, were not used for statistical analysis. A total of five items were removed from the measurement tool which may have introduced a selective reporting bias. Additional weaknesses in the quality of evidence included lack of a priori power analyses, low response rates that may account for selection bias, missing data (incomplete surveys) and high attrition rates (Noergaard et al., 2018; Petteys & Adoumie, 2018; Ribeiro et al., 2018).

Measurement Tools

Nine of the studies utilized the PSS:NICU to evaluate the impact of the studied intervention of self-reported levels of parental stress (Dubas et al., 2019; Gustafson et al., 2016, Jouybari et al., 2018; Kadivar et al., 2017; Kucuk Alemdar et al., 2018; Mansson et al., 2019; Noergaard et al., 2018; Ong et al., 2018, Petteys et al., 2018).The PSS: NICU is a 34-item scale with three dimensions – sights and sounds (6 items), infant behaviour and appearance (17 items) and parental role alteration (11 items) This tool is well utilized in the literature as an instrument to evaluate parents' perceptions of stressors in the NICU produced by the physical, social and psychological environments (Akbari et al., 2016).

Three studies used the state-trait anxiety inventory (STAI) to evaluate anxiety levels of study participants in the NICU (Gustafson et al., 2016; John et al., 2018; Welch et al., 2016). This instrument has been successfully utilized in studies involving mothers of both term and preterm infants (Welch et al., 2016). Two studies used the Beck Anxiety Inventory (BAI) (Koochaki et al., 2017; Ribeiro et al., 2018). One study utilized the Perinatal Anxiety Screening Scale (PASS) developed by Somerville et al. (2014) (Dubas et al., 2019). This self-administered scale was developed to evaluate a range of problematic anxiety symptoms in perinatal women, including general worries and specific fears; control, perfectionisms, and trauma; social anxiety; and acute anxiety and adjustment (Somerville et al., 2014; Somerville et al., 2015). Welch et al. (2016) utilized the Behavioral Inhibition System and Behavioral Activation System (BISBAS) tool to assess maternal motivation at enrollment. The personality traits measured by the BISBAS have been shown to correlate with anxiety and are potential predictors of maternal adaptation and capacity to withstand stresses associated with having a premature infant (Welch et al., 2016). Two studies utilized the Ways of Coping (WOC) questionnaire to evaluate how parents cope in stressful situations (Gustafson et al., 2016; Ribeiro et al., 2018). This tool is used to describe coping processes within clinical settings and is based on "Lazarus and Folkman's theory that people use two types of coping strategies in response to stressful situations: problem and emotion focused" (Gustafson et al., 2016, pp. 663).

Interventions

Complimentary or Alternative Medicine Interventions

Three studies evaluated narrative writing, or journaling (Akbari et al., 2019; Jouybari et al., 2018; Kadivar et al., 2017), one of which also assessed an art therapy intervention (Jouybari et al., 2018). One study evaluated the impact of an individually tailored music therapy intervention (Riberio et al., 2018), and another a tailored spiritual intervention, assessing spiritual needs and providing one-on-one spiritual care (Kucuk Alemdar et al., 2018). Welch et al. (2016) implemented and evaluated the family nurture intervention (FNI). FNI is based on the hypothesis that adverse consequences of maternal-infant separation following preterm birth can be reduced with repeated calming activities, including physical, emotional, and sensory experiences (Welch et al., 2016). One study evaluated the effect of an activity-based group therapy intervention on maternal anxiety levels (John et al., 2018). Participation in creative activities has been shown to provide opportunities for sublimation

and increased emotional resilience, and activity groups create a setting for social interactions, increased support, and bonding (John et al., 2018). Another study evaluated the effectiveness of an audio assisted relaxation technique (Dabas et al., 2019), consisting of deep breathing, controlled breathing techniques, yoga postures and progressive muscle relaxation.

Educational Interventions

Gustafson et al. (2016) evaluated the effect of facilitated parental presence during rounds. Parental presence during rounds can help empower families with information, inclusion in the decision-making process and having a facilitator present early in the NICU journey may help improve communication, and reduce any additional stressors (Gustafson et al., 2016). Ong et al. (2018) studied a structural nursing intervention program (SNI) aimed to provide education about prematurity, address expectations related to infant's hospitalization, assist mothers in navigating the NICU environment, provide interpersonal interaction and psychosocial support. Petteys & Adoumie (2018) evaluated the impact of parent education and participation in mindfulness-based neurodevelopmental care. Educational material, education sessions teaching structured neurodevelopmental care activities and mindfulness techniques and ongoing support were provided to parents.

Psychological Interventions

Mansson et al. (2019) investigated the impact of an individualized neonatal parent support program. Developed in collaboration with child psychologist and modelled on principles of family centred care, research on parent experiences, and person-centred communication, the program focused on four different dialogues – prematurity, interpreting and interacting with infants, future discharge, and summary of experience.

Operational Changes

Noergaard et al. (2018) developed and implemented a NICU model designed to be more father friendly. The authors obtained increased knowledge and understanding of paternal needs and wishes to create a father friendly NICU, with activities tailored to be more inclusion of paternal needs and evaluated the impact on paternal stress.

Effects of Interventions on Parental Distress

The results of the individual studies in this review are summarized in a rapid review matrix table in Table 1. Most of the interventions evaluated demonstrated significant results related to the reduction of stress and/or anxiety levels of the subjects' post intervention. In studies evaluating both parents, mothers were found to have overall higher levels of stress, which was especially evident in the 'infant's behaviour and appearance' and 'parental role alteration' subscales of the PSS: NICU tool (Gustafson et al., 2016; Mansson et al., 2019). All the studies evaluating anxiety as an outcome measure showed significant findings related to reduced anxiety levels in mothers post intervention.

The studies performed by Akbari et al. (2019) (n=70), Kadivar et al. (2017) (n=70),

Kucuk Alemdar et al. (2018) (n=62), Dabas et al. (2018) (n=50), John et al. (2018) (n=34), Ribeiro et al. (2018) (n=21), and Welch et al. (2016) (n=115) showed significant reduction in parental stress and/or anxiety measurements post intervention, suggestive that contemporary and alternative medicine interventions, including narrative writing, spiritual care, audio-assisted relaxation, activity-based group therapy, music therapy and FNI may be effective in decreasing NICU related stress and anxiety levels. In their tailored spiritual care intervention, Kucuk Alemdar et al. (2018) found that this reduction was especially evident within the 'Infant's Appearance and Behaviours' subscale of the PSS: NICU tool Dabas et al. (2019) found that higher PSS: NICU scores (subscales and overall scores) were "directly correlated with higher S-anxiety and T-anxiety scores" (p. 664), emphasizing the relationship between stress and anxiety levels. This group of authors also found a significant reduction in stress scores in the control group within the domain of parent role alteration, which "might be due to adaptation and some kind of coping strategies used by the postpartum mothers in the control group as well" (Dabas et al., 2019, pp. 202-203).

The music therapy intervention applied by Ribeiro et al. (2018) allowed mothers an outlet to express their thoughts and feelings related to the birth of their preterm infant, their NICU experiences, as well as any other issues causing them distress. Jouybari et al (2018) (n=105) failed to produce the same findings in their narrative writing and art therapy intervention. The educational interventions carried out by Ong et al. (2018), Petteys and Adoumie (2018) and Gustafson (2016) showed mixed results with their respective studies. With their SNI (n=216), Ong et al. (2018) only obtained significant results in one of the subscales post intervention ('parental role alteration'), however, the education provided and activities in this intervention facilitated opportunities for mothers to connect emotionally and psychologically with their premature infant and allowed mothers to feel less detached and more connected with their infants within the context of the NICU setting. It also cannot be ruled out that mothers in the control group did not independently seek out information and support contributing to the lack of significant findings overall (Ong et al., 2018). In evaluating the effectiveness of their mindfulness-based neurodevelopmental care intervention, the RCT by Petteys & Adoumie (2018) with 55 parent dyads reported mixed results. There were no significant differences between groups from enrollment to discharge; however, they found that within the intervention group there was a significant reduction in post-test stress scores in all three subscales of the PSS: NICU tool. The educational study by Gustafson et al. (2016) (n=134) facilitating parental presence during multidisciplinary rounds did not show a significant impact of NICU-related parental stress. The RCT (n=81) by Koochaki et al. (2017) found that both routine counselling and behavioural counselling can reduce the anxiety levels of mothers in the NICU. However, the combination of routine and cognitive behavioural based counselling showed a greater reduction and may have a longer lasting impact on maternal anxiety levels (Koochaki et al.). Mansson et al. (2019) (n=241) also showed significant reduction in maternal and parental stress measurements post intervention, suggestive that a neonatal support program may be effective in decreasing NICU related stress levels. Mansson et al. (2019) found that although the total overall stress measurements did not differ significantly between the control and intervention group, that there were significant

differences found within specific items on the PSS: NICU subscales. There was no significant difference between the control and intervention group in fathers included in the study. In their quasi-experimental study with 109 fathers looking at an organizational change, Noergaard et al. (2018) found that although overall stress scores (control and intervention) decreased significantly by the time of discharge, that the creation of a more father friendly NICU was associated with higher level of post-test stress as compared to the control group. This increase in paternal stress paralleled the increased involvement of father in infant care and information sharing. The higher expectations placed on these fathers, on top of their other economic and social obligations likely contributed to the increased stress levels in the intervention group, as compared to the control group. However, the long duration of this study and the complexity of the intervention and difficultly evaluating the extent of paternal involvement, make it difficult to completely interpret the results.

Table 1: Rapid Review Matrix Table: Study characteristics and main results. (Modified from Virginia Commonwealth University, 2018)

Author, year. country	Purpose	Sample size and characteristics	Study design Measurement tool(s)	Main variables	Control Intervention(s)	Results
Akbari et al. (2019) Iran	Does narra-tive writing reduce stress levels of fathers in the NICU?	n=35 (control group) n=35 (intervention group) Fathers of infants in the NICU; similar baseline demographics	Quasi-experimental 2 group pre-test post-test design Parental stressor scale: neonatal intensive care unit (PSS: NICU)	Stress	Routine care Routine care PLUS narrative writing with a minimum of three narratives between the 3rd day (pretest) and 10th day (post-test) post NICU admission	No significant difference between the control group (x=74.05 + 17.39) and Interven-tion group (x=80.11 + 15.82) in pretest stress scores (p=0.13, t=1.52). Significantly lower post-test stress scores in the intervention group (x=48,00 + 10.49) vs. the control group (x=85.45 + 16.91) suggesting that narrative

						writing may be effective at decreasing paternal stress levels in the NICU (p=0.001; t=-11.01)
Dabas et al. (2018) India	What is the impact of an audio assisted relaxa-tion techni-que on maternal stress, anxiety, and milk output in the NICU?	N=25 (control group) n=25 (Intervention group)	Non-blinded RCT PSS: NICU, Perinatal Anxiety Screening Scale (PASS)	Stress & Anxiety	Routine care Audio-assisted relaxation technique (30 minutes). Techniques were demonstrated on day one by a yoga therapist and researcher one in small group setting consisting of: deep breathing; controlled breathing techniques (Anulom-Vilom, Brahmari), yoga postures (Suksham-Vyayam) and progressive muscle relaxation. Performed daily x 10 days	Similar pre-test maternal stress (x=3.9 + 0.5 vs. 3.8 + 0.5; p=0.34 and anxiety scores (x=31.12 + 11.4 vs. x=31.08 + 12; p=0.99 between interven-tion and control groups There was a significant reduction in maternal stress (x=2.9 + 0.5 vs. 3.6 + 0.6; p=0.003) and anxiety scores (x=19.8 + 6.7 vs. 28.18 + 11.7; p=0.003) in the interven-tion group vs. the control group suggesting that the use of audio assisted

						relaxation techniques may be effective in reducing maternal stress and anxiety
Gustafson et al. (2016) United States	Does the presence of parents during multi disci-plinary rounds reduce parental stress in the NICU?	n=46 (control group; 20 fathers, 26 mothers) n=86 (Intervention group; 34 fathers, 52 mothers) Mothers and fathers of 90 infants in the NICU; similar baseline demographics	Quasi-experimental study, 2 group sequential pre- test post-test design PSS: NICU (pre & post) State-Trait Anxiety Inventory (STAI) & Ways of Coping WOC Question-naire (pre-test only)	Stress & Anxiety	Routine family communica-tion per unit routine - informal daily updates with more formal multidisci-plinary meetings as required based on infant's condition and/or parental request Facilitated parental presence during daily multidisci-plinary rounds – prior to participation in rounds parents participated in min. one bedside medical update or family meeting and received an orientation to the rounds process by a clinical nurse specialist (CNS) facilitator (description of the rounding process, roles	Similar pretest parental stress scores were found in the control vs. interven-tion groups (x=3.17 + 0.13 vs. 3.11 + 0.08; p=0.25. Facilitating parental presence during multi-disciplin-ary rounds did not show at significant difference on NICU-related parental stress between control and interven-tion groups (x=3.04 + 0.14 vs. 2.86 + 0.10; p=0.11); however, a significant reduction in parental stress scores was found within the interven-tion group (x=3.11 +

					of the rounding participants, and plan to address questions during or after rounds. CNS facilitator was present to maintain flow of rounds and to answer questions. Parents were encouraged to write down questions to be discussed and probed prior to rounds completion to allow for any additional questions. Parents were debriefed by the bedside nurse and CNS facilitator to ensure all questions were answered and to provide any needed clarification to families.	0.08 pretest vs. 2.86 + 0.10. p=<0.001. Mothers reported higher levels of stress than fathers (x=3.4 + 0.81 vs. 2.7 + 0.67; p=<0.001). Pretest STAI scores showed similar trait-anxiety scores between mothers and fathers (x= 39.7 + 8.7 vs. 36.7 + 8.7; p=0.06) but significant-ly higher state anxiety scores in mothers vs. fathers (x=54 + 13 vs. 48.8 + 12.3; p=0.01) suggestive of greater levels of anxiety in mothers associated with a stressful event (infant hospital-ized in NICU)
John et al. (2018) India	Does activity-based group therapy	n=17 (control) n=17 (intervention)	Prospective 2 group phase lag cohort study, pre-	Anxiety	Routine care Routine care PLUS weekly activity-	The authors found similar pre-test

	reduce maternal anxiety in the NICU?	Mothers in the NICU: similar baseline demographics	test- post-test design STAI-S	based group therapy (x 4 weeks) – small group sessions (n= 5-6 mothers) led by an occupational therapy (OT) student and experienced medical social worker. Variable group activities chosen to be interesting and useful and have a material and/or emotional impact (ex. rattle and footprint card).	anxiety scores between the control and interven-tion group (x=49.94 + 11.28 vs. 47.58 + 12.85; p=0.575). There was a significant reduction in post-test anxiety scores compared to pre-test with the first (p=0.005), third (p=0.07) and forth (p=0.009) activity-based session. A significant reduction in anxiety scores was found in the interven-tion group vs. control (36.58 + 11.16 vs. 46.14 + 9.45; p=0.009) suggestive that activity-based group therapy may be effective in reducing state anxiety levels of

						mothers in the NICU
Jouybari et al. (2020) Iran	Does art therapy and/or narra-tive writing reduce maternal stress in the NICU?	N=35 (control group) n=35 (narrative writing group) n=35 (art therapy group) Mothers in the NICU; similar baseline characteristics	RCT with three parallel arms; pre-test post-test design (single blinded study analyst blinded) PSS: NICU	Stress	Routine care Routine care PLUS narrative writing OR art therapy with minimum of 3 narratives or drawings between 2nd day (pre-test) and 6th day (post-test) post NICU admission	Similar mean baseline stress scores between control, narrative writing, and art therapy groups (n=47.57 + 21.26 vs. 47.08 + 21.05 vs. 54.94 + 26.33; p=0.28). There was no significant difference in post-test stress scores between groups (x=60.20 + 20.62 vs. 58.60 + 25.56 vs. 57.88 + 27.31; p=0.92), suggestive that narrative writing and art therapy may not be effective at reducing maternal stress in the NICU.
Kadivar et al. (2017) Iran	Does narra-tive writing reduces the stress levels	N=37 (control group) n=33 (Intervention group) Mothers in the NICU; similar baseline	Quasi-experiment-al phase lag pretest post-test design PSS: NICU	Stress	Routine care Routine care PLUS narrative writing with a minimum of 3	Similar pre-test stress scores were found in all three subscales of the PSS: NICU

	of mothers in the NICU?	characteristics		narratives between third day (pre-test) and 10th day (post- test) post NICU admission	between the control and interven-tion group: "Infant behaviour and appearance " (x=31.54 + 7.467 vs. 34.182 + 7.108; p=0.922); "Sights and sounds" (x=17.649 + 6.969 vs. 22.061 + 5.35; p=0.153); "parental role and the parents' relationshi p" (x=24.973 + 7.697 vs. 22.667 + 7.896; p=0.999). In evaluating the difference in stress scores in all three subscales utilizing multivar-iate analysis, the authors found that the interven-tion had a significant effect in all three domains (Roys' largest root=2.141, F=47.11,

						p<0.001) suggesting that narrative writing may be effective at reducing maternal stress in the NICU
Koochaki et al. (2017) Iran	What effect does cognitive behavioural counselling have on the anxiety levels of mothers in the NICU?	n=39 (control group) n=42 (intervention group) Mothers in the NICU; similar baseline characteristics	Parallel RCT Beck's Anxiety Inventory (BAI)	Anxiety	Routine care counselling sessions (2 session/week x 4 weeks): providing information re: hospitalized infant, such as disease, diagnostic and therapeutic modalities (Session 1), disease symptoms & consequences (Session 2); obtaining knowledge and skills re: nutrition (Session 3), movement and positioning (Session 4), hygiene and infection control (Session 5), temperature regulation and clothing infant (Session 6), infant's behaviour (Session 7), and interacting with infant (Session 8)	Similar baseline anxiety scores present in mothers in control and intervention groups (x=20.67 + 6.791 vs. 19.45 + 6.345; p=0.408). Both the intervention and control groups showed a significant difference in maternal anxiety scores immediately following (x=9.7 + 3.645 vs. 8.95 + 3.72) and three weeks after intervention (x=11.52 + 4.528 vs. 15.4 +5.062) between groups (p=0.026) and within each group (p=<0.001). Results

				Routine care counselling sessions followed by anxiety counselling with a cognitive behavioural approach (2 sessions/week x 4 weeks): establishing relationships, learning group rules, determining group goals and getting feedback (Session 1); psychological recount of thoughts and feelings related to birth of infant, emotional adjustment and release in supportive group environment (Session 2); review of signs of stress, introduce concept of stress relief (Session 3); evaluating the effect of thoughts and cognition on stress response, recognizing negative self-talk, assessing how individuals cope with stress and importance of coping skills	suggest that both routine counselling & Behaviour-al counselling can reduce maternal anxiety in the NICU with CBT- based counselling showing a greater reduction and may have a longer lasting impact on maternal anxiety.

					for stress management (Session 4); review previous stress relief exercises, review of stressful self-talk, encouragement how to turn self- talk into effective coping (Session 5); problem-solving training, extracting problem description from each group member (Session 6); providing and discussing alternate solutions and using the best one (Session 7); assessing effectiveness of solution (Session 8) The researcher had previous training on cognitive behavioural therapy counselling; intervention supervised by clinical psychologist.	
Kucuk Alemdar et al. (2018) Turkey	What effect does spiritual care have on the stress levels of	n=32 (control group) n=30 (Intervention group)	RCT, pre-test post-test design PSS: NICU	Stress	Routine care Routine care PLUS 1:1 spiritual care based on individual spiritual needs. A	Similar pre-test stress scores were found in control vs. intervention groups

	mothers in the NICU?	Mothers in the NICU; similar baseline characteristics			questionnaire was utilized to determine spiritual requirements and mothers were given a choice of four spiritual practices that could be performed on their second visit to the NICU: prayer (n=9); reading the Quaran (n=9); placing the cevsen-muska on infant's incubator (n=8); or placing a clipped evil-eye talisman on infant's incubator (n=4).	(x=3.70 + 0.53 vs. 3.97 + 0.65; p=0.08). A significant reduction in post-test stress scores was seen in the Interven-tion vs. control group (x=3.56 + 0.56 vs. 3.89 + 0.70; p=0.04), suggestive that a tailored spiritual care may be effective at reducing stress levels of mothers in the NICU
Mansson et al. (2019) Sweden	What impact does an individu alized neonatal parent support program have on parental stress levels in the NICU?	n=118 control group (n=60 mothers. n=58 fathers) n=98 intervention group (n=49 mothers; n=49 fathers) Mothers and fathers in the NICU; similar baseline characteristics (exception: infant gender)	Prospective longitudinal quasi experimenta l one group pre- test post-test design PSS: NICU	Stress	Standard family centred care Standard family centered care PLUS participation in neonatal parent support program. The program was provided by primary nurses as an adjunct to standard care. It focused on parent-centred communicatio n involving four different dialogues – preterm delivery, interpreting and	This study evaluated parents' experience of stress before (control) and after (interven-tion) introduct-ion of a neonatal parent support pro-gramme. No significant differences in stress scores were found between control and interventio n groups in

					interacting with infants, future discharge, and summary of experience in the hospital.	mothers (x=1.98 + 0.68 vs. 1.80 + 0.52; p=0.306) and fathers (x=1.73 + 0.62 vs. 1.75 + 0.63; p=0.509). Mothers had significantly higher levels of baseline stress compared to fathers (x=1.98 + 0.68 vs. 1.73 + 0.62; p=<0.005).
Noergaard et al. (2018) Denmark	What is the impact of a more father friendly NICU on paternal stress levels?	n=55 control group N=54 intervention group Fathers in the NICU; similar baseline characteristics (except more employed fathers in intervention vs. control groups	Quasi-experimental 2 group pre-test post-test design PSS: NICU	Paternal Stress	Standard care "Father-friendly NICU": The intervention was designed & implemented following control Researchers collaborated with fathers and other stakeholders to increase knowledge and understanding or paternal needs and wishes in order to create the father friendly NICU. Activities were tailored to be more inclusion of paternal needs and included: participation in important	Significant differences in stress scores between control and interven-tion groups on admission to NICU (x=1.71 + 0.46 vs. 2.02 + 0.55; p=0.0014) and time of discharge (x=1.43 + 0.44 vs. 1.84 + 0.59; p=0.001); with significant differences in the mean change of stress scores from admission to discharge in control and interven-tion

					"firsts" (ex. first bath); skin to skin contact; information and guidance from healthcare professionals; inclusion in important conversation re: growth and development; social work support, including info re: paternity leave, social and economic issues or concerns; participation in father support groups	groups (p=0.004). Results suggest that the "father friendly NICU" design failed to show reduction in paternal stress levels with authors reporting higher mean stress levels in the interven-tion group.
Ong et al. (2018) Malaysia	What is the effect of a structure-ed nursing interven tion program on maternal stress and ability levels in the NICU?	n=108 control group n=108 intervention group Mothers with infants in NICU. similar baseline characteristics (exceptions: maternal age, birth weight and birth order)	Quasi-experimenta l pre-test post-test design PSS: NICU Maternal abilities checklist	Stress Maternal ability	Standard care: orientation to NICU layout and equipment; routine activities; education re: handwashing breastfeeding support; answering questions and providing support as needed Standard care PLUS structured nursing intervention (SNI) program. The 14-day intervention focussed on education, psychosocial support,	Similar pre-test stress scores were found in the control and interventio n groups (x=3.67 + 0.87 vs. 3.75 + 0.82; p=0.90). Similar baseline scores were also found in relation to maternal ability in control and interven-tion groups (x=3.09 + 0.75 vs. 2.89 + 0.75; p=0.109).

				and interpersonal interaction. SNI consisted of two in person meetings, in addition to SMS and telephone support. 1st Meeting: an educational booklet provided and reviewed with mothers (information re: premature infants; NICU environment and equipment; growth and development; developmental care; nutrition; how parents can support infant; relaxation tips for parents); orientation to NICU layout and equipment 2nd Meeting (4th day after NICU admission): education re: equipment used in NICU; update re: infant's condition; teaching and reinforcement of relaxation techniques for parents; addressing mothers	A significant reduction in total stress scores was found both between (p=0.04) and within the control (p=0.007) and intervention groups (p<0.001) (x=3.50 + 0.83 vs. 3.26 + 0.83) A significant improvement in maternal ability scores was found both between and within the control and intervention groups (x=3.67 + 0.64 vs. 4.04 + 0.64; p values <0.001) Results suggest that both standard care and a SNI are effective at reducing maternal stress and improving maternal abilities; with more marked findings with the SNI.

					psychological concerns and concerns about infant; address any additional maternal questions/concerns Additional support and education were provided via telephone calls (6th and 10th day post NICU admission) and online messaging (3rd and 8th day post NICU admission)	
Petteys & Adoumie (2018) United States	What is the effect of a mindfulness-based neuro developmental care intervention on parental stress levels, bonding, parent satisfaction and infant length of stay in the NICU?	n=27 control group n= 28 intervention group Parents dyads with infants in NICU; similar baseline demographics (exception: birth weight, mental health history)	Non-blinded RCT pilot study, pre-test-post-test design PSS: NICU Mother-to-Infant Bonding Scale (MIBS) Parent Satisfaction Score	Stress	Standard care (contact with SW, chaplain, OT/PT, unstructured developmental care training) Standard care PLUS 1:1 educational training on mindfulness techniques & structured neurodevelopmental care training activities (within 10 days of enrollment), including provision and review of educational package to families Mindfulness techniques education:	No significant differences were found in pre-test (x=2.4 + 1.7 vs. 2.9 + 1.4; p=0.214) and post-test (x=2.0 + 1.6 vs. 1.8 + 1.6; p=0.648) parental stress scores between control and Interven-tion group. The interven-tion group showed significant reduction in post-test stress scores (p=0.012).

					focused breathing; principles of attunement and types of touch and non-touch interactions; personal awareness and nonjudge-ment; nonjudge-ment and awareness of infant Neurodevel-opmental care training: observation and recognition of infant cues; signs of organized vs. disorganized physiological states; motor and families with verbal support (min. biweekly) throughout the duration of their NICU stay.	This was not seen in the control group (p=0.285) No significant differences were found in bonding scores (x=1.68 + 2.87 vs. 1.81 + 2.46; p=0.462) or parent satisfaction (p=0.287) between control and interventio n groups There was a significant difference in infant LOS between control and interven-tion group (x=67.2 + 37.7 vs. 48.7 + 30.1; p=0.047).
Ribeiro et al. (2018) Brazil	What is the impact of a music therapy inter-vention on maternal anxiety in the NICU?	n=11 control group n=10 intervention group Mothers in the NICU; similar baseline characteristics	RCT, pre-test-post-test design BAI	Anxiety	Routine care Routine care PLUS tailored music therapy intervention – a music therapy questionnaire was utilized to collect data regarding subjects' experiences with music and list their favorite songs to individualize	Pre-test anxiety scores showed no significant differences in intervention and control groups prior to the intervention (x=15.10 + 10.25 vs. 10.70 + 8.54). Significant findings were found in post-test anxiety scores

				the intervention. Individual music sessions (30-45 min.) were conducted weekly by a professional music therapist and consisted of: Reception Type 1 music listening: listening to instrumental piece (2-4 min.) allowing time for mother to reflect on current life circumstances and hospitaliza-tion of infant Therapeutic music listening songs selected by participant Verbal processing: mother shares experience of therapeutic listening Type II music listening instrumental, faster, more densely textured pieces (vs. type I) Conclusion: brief comment re: issues approached during session and plan for subsequent session	between the interven-tion and control groups (x= 5.40 + 4.72 vs. 6.00 + 4.94; p<0.05) and within the interven-tion group interven-tion (p<0.05). Results suggest that music therapy may be effective at reducing maternal anxiety levels in the NICU

					The number of music therapy was variable based on overall length of stay (x= 7 + 2 sessions)	
Welch et al. (2016) United States	What is the effect of the Family Nurture Intervention (FNI) on maternal depression and anxiety symptoms of mothers in the NICU?	n=56 control group n=59 intervention group Mothers of infants in NICU; similar baseline characteristics	RCT, 2 group pre-test-post-test design STAI Behavioral Inhibition System and Behavioral Activation System (BISBAS)	Anxiety	Standard care Family Nurture Intervention (FNI) – researchers facilitated calming sessions to engage mothers and infants in physical emotional and sensory experiences. Activities included: Calming touch sessions: firm sustained touch over torso or cupping of hands around legs/feet and abdomen; communication of thoughts and feelings with infant; seek and maintain eye contact with infant as able Holding sessions (minimum 4 times per week): skin to skin or clothed holds; encouraged to feed or bathe infants as able Daily scent cloth exchange:	Similar baseline trait anxiety and BISBAS scores were found between control and intervention groups: STAI (x=33.2 + 8.81 vs. 32.8 +n7.47; p=0.775); BISBAS: drive (x=12.3 +2.69 vs. 12.0 + 2.28; p=0.577); BISBAS: fun seeking (x=11.0 + 2.14 vs. 10.8 + 1.94; p=0.578); BISBAS: reward responsiveness (x=17.1 + 1.82 vs. 17.5 + 1.75; p=0.311; BISBAS: behavioural inhibition (x=18.7 + 2.68 vs. 18.7 + 3.10; p=0.937). These

				scent cloths kept in close contact to infant and mother and exchanged daily FNI sessions were facilitated by a FNI nurture specialist (previous NICU nurses trained in implementing FNI protocol) and activities were encouraged at any time even when not facilitated by FNI specialist.	results suggest that both groups were similar in baseline psycholog-ical characterist ics Mean state anxiety scores were significant-ly lower in FNI mothers vs. control group at 4-month corrected age (p=0.004) Anxiety symptoms at 4 months were significant-ly correlated with baseline STAI scores in the control group (p<0.001) but the interven-tion group (p=0.19) Based on anxiety scores, FNI may be an effective interven-tion in reducing anxiety symptoms while in the NICU and after discharge

DISCUSSION

This literature review evaluated the effectiveness of interventions for parental distress within the NICU setting. Most of the studies showed favorable results in relation to reduction in the outcome measures utilizing a variety of objective measurement tools. There was great heterogeneity across studies regarding the interventions employed. The PSS: NICU and STAI were the most common tools utilized to evaluate parental stress and anxiety levels in the NICU, although, there was more variability with anxiety measurement tools. This was a similar finding within the literature and previous review articles (Sabnis et al., 2019).

Narrative writing, occupational-based art therapy, mindfulness and relaxation techniques are relatively simple interventions and have been found to reduce maternal, paternal, and/or parental distress in the NICU. The findings of this review are consistent with findings in the literature and previous reviews, with these types of contemporary and alternative medicine interventions decreasing parental distress in the NICU setting (Joseph et al., 2013; Sabnis et al., 2019). The NICU experience is stressful and often traumatic for families, and narrative writing is a strategy that has the potential to aid in coping, growth, and improvement in parental mental health (Crawley, 2020). The study by Jouybari et al. (2018) failed to produce significant results in evaluating narrative writing and art therapy on maternal stress; however, the limited duration of the intervention (4 days between pre-test and post-test measurements) may have contributed to the lack of significant findings. Despite best efforts to limit this within a parallel design, spillover is a risk that would be difficult to completely eliminate within this type of design, especially within the context of the NICU where there is close contract frequent interaction between families, whom often are a source of support for one another.

In evaluation of educational interventions, the mixed results of this review are similar to those of Mendelson et al. (2017), suggesting that educational interventions may not be the most effective type of intervention to address parental distress in the NICU. These types of interventions may need to be combined with complementary or alternative modalities or psychological support to enhance effectiveness with families in the NICU. The results of Koochaki et al. (2017) study suggest that psychological interventions, including both routine care counselling and cognitive behavioural based anxiety counselling are useful tools to decrease maternal anxiety in the NICU. Anxiety counselling using a cognitive behavioural approach had a longer-lasting effect at reducing maternal anxiety levels. These findings are similar to those found by Loughnan et al. (2019) and Shaw et al. (2014) when evaluating an antenatal cognitive-behavioural therapy [CBT] intervention and a NICU-based trauma-focused CBT, respectively. Shaw et al. (2013) found a similar reduction in anxiety measurements of both their control group (receiving education and coping strategies) and their intervention group (receiving trauma-focused CBT). However, reassessment at 6-month post- intervention found a sizable and significant reduction in anxiety levels of the intervention group (Shaw et al., 2014). This provides further evidence for the potential long-term benefits of CBT and emphasizes the need for ongoing support for mothers starting in the antenatal period and extending postnatally to help facilitate anxiety reduction within this highly susceptible and vulnerable group.

Familiar songs can help control anxiety, improve concentration, recover memories, provide a sense of security and motivation, and stimulate social interaction, simultaneously giving people the opportunity to recognize and improve their emotions" (Ribeiro et al., 2018, p. 5-6). The benefit of music therapy on maternal anxiety found by Ribeiro et al. (2018) is mirrored by Roa & Ettenberger (2018) in their clinical pilot intervention evaluating a music therapy self-care group in the NICU. This intervention included both mothers and fathers, also finding reduced stress, improved mood, motivation, and restfulness post-intervention.

The study by Tandberg et al. (2013) evaluating nursing support and parental stress levels, highlighted the importance of nursing communication in reducing parental stress levels in the NICU. Consistency in communication and nursing support has been shown to be important in producing significant reduction in parental distress. The individualized neonatal parent support programme assessed by Mansson et al. (2019) was not associated with a significant reduction in overall parental stress levels. The lack of significant findings in this study may be due to the inconsistent application of the individualized nursing intervention, related to organizational changes and failure to have consistency in the role of designated primary nurses.

In a study by Foutiou et al. (2016), the investigators implemented an intervention assessing the effectiveness of relaxation techniques of parental stress and anxiety levels measured by the PSS: NICU and STAI tools. They found that the intervention was associated with a reduction in trait anxiety levels after discharge. Their results, however, also implied that higher levels of initial stress are associated with significantly increased parental stress measurements three months following discharge. These results emphasize the need for early recognition of those at increased risk and provision with appropriate interventions for ongoing stress management to reduce parental stress levels within the NICU and beyond. Consistent with findings from previous reviews, the majority of literature is focused on evaluating maternal distress in the NICU and paternal distress is often neglected (Sabnis et al., 2019). Lee et al. (2012) found that an early intervention focusing on education, nursing support and guidance, led to higher measures of fathering ability which was associated with reduced paternal stress scores. These findings contradict those found by Noergaard et al. (2018) with their father friendly NICU design, in which increased paternal education and involvement was associated with increased paternal stress levels. These discordant results suggest that there may be additional socioeconomic and culture factors influencing the findings.

Many of the studies included in this review were conducted outside of North America, in single centers, which limits the generalizability of their results to non-comparable jurisdictions. Stress, anxiety, and coping have different sociocultural dimensions. Consideration of these dimensions must be taken into account when designing and adapting interventions within different countries, cultural and religious contexts.

Implications for Nursing Practice

Within the NICU, nurses take on a dual role of caring for the vulnerable preterm infant population, while also caring for and supporting their families. Nurses play a central role in

helping address family's needs, providing emotional support, guidance, communicating and assisting families with decision-making (Toral-Lopez et al., 2016). As parents are the most consistent caregivers for their infants, it is vital that they be physically and mentally healthy to help them cope with the NICU environment. Parental presence, including recognition of infant cues and provision of neurodevelopmental interventions (ex. parental touch) is crucial to support the premature infant's development and physical and developmental well-being.

Based on the synactive theory by Als, and the Newborn Individualized Developmental Care and Assessment Program (NIDCAP), parents play an important role in helping to regulate the infants five subsystems including: autonomic/physiology, state, motor, attention, interaction and self-regulation, and help to support the infants developmental (VandenBerg, 2007). Increased understanding of ways to better support families, including information regarding the effectiveness of different interventions to alleviate parental stress will help to inform knowledge translation, influence nursing practice, and hopefully aid in the planning of evidence-based practice improvements. NICU nurses are in an optimal position to help advocate for and facilitate interventions that will help in the reduction of parental distress. Simple and cost-effective interventions, including art-based group activities, narrative writing, mindfulness techniques, relaxation techniques, and individualized nursing interventions can readily be integrated into the NICU setting. The results of the review have the potential to inform new unit policy and/or organization policy and guidelines with the integration of interventions to help reduce parental distress within this intensive care setting.

Limitations and Biases of Review

A rapid review is less comprehensive than a full systematic review. The search only utilized three databases, excluded grey literature, non-English publications, and was restricted to literature published within the last five years. These restrictions may have excluded evaluation of interventions that had been previously published or not yet published in the literature.

Interventions that evaluated stress or anxiety, but not as primary outcomes, were also excluded based on the scope of this study. This exclusion could limit the available knowledge about targeting stress and anxiety within this population and may have also potentially excluded larger, more broad scale studies (evaluating multiple outcomes). The selected studies were largely single center designs, with imbalances in respect to parent sex, infant gestational age, and geographical location, which may restrict their generalizability in terms of culture, healthcare structures, concepts, and designs.

CONCLUSION AND FUTURE IMPLICATIONS

Although there is an understanding of the burden of NICU-related distress amongst experts and families, and a recognition of the need for ongoing psychosocial support, standard screening practices and supports of NICU parents are not in place universally (Sabnis et al., 2019). There is a need for increased resources and support to address the physical and mental health needs of these infants' families. Interventions targeting mothers' psychological needs can significantly reduce stress and this has a long-term benefit on maternal physical and

mental health, as well as enhancing infant mental health, bonding, and attachment. Larger scope studies, including multi-centre studies are needed on an international level. This should include studies evaluating mindfulness and other relaxation techniques, narrative writing, neurodevelopmental education, group therapy, as well as those incorporating technology to educate and engage families. These types of interventions have the potential to be important in empowering families with education and mental preparedness to help relieve stress and anxiety for families in the NICU. The WOC questionnaire could be incorporated into the NICU setting as a means to help establish how the individual parents cope with stress and could allow for a more tailored approach to psychosocial support within the NICU setting. Literature focusing on fathers in the NICU is limited and there are inherent differences in how mothers and fathers experience stress. There is a need for further research and investigation to evaluate these differences, including more data evaluating paternal stress and its trajectory, so that interventions can be developed and structured to better support fathers within the NICU and to reduce the long-term impact on fathers' mental health.

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APPENDIX A: SEARCH SUMMARY

CINAHL Plus with Full Text
Date searched: Jan 13, 2020
Results: 311

1. ((MH "Intensive Care, Neonatal") OR (MH "Intensive Care Units, Neonatal")) OR (Neonatal-intensive-care or NICU)
2. ((Parent* or mother* or father*) N6 (worry or worri* or stress* or distress* or anxiety or psychosocial or upset*))
3. (MH "Clinical Trials+") or randomized or placebo or randomly or trial or groups
4. S1 AND S2 AND S3

Ovid MEDLINE(R) ALL 1946 to January 10, 2020
Date searched: Jan 13, 2020
Results: 166

1. exp Intensive Care, Neonatal/ or exp Intensive Care Units, Neonatal/
2. (Neonatal intensive care or NICU).mp.
3. 1 or 2
4. ((Parent* or mother* or father*) adj6 (worry or worri* or stress* or distress* or anxiety or psychosocial or upset*)).mp.
5. 3 and 4
6. exp Clinical trial/ or randomized.tw. or placebo.tw. or dt.fs. or randomly.tw. or trial.tw. or groups.tw.
7. 5 and 6

PsycINFO 1806 to January Week 1 2020
Date searched: Jan 13, 2020
Results: 85

1. exp Neonatal Intensive Care/
2. (Neonatal intensive care or NICU).mp.
3. 1 or 2
4. ((Parent* or mother* or father*) adj6 (worry or worri* or stress* or distress* or anxiety or psychosocial or upset*)).mp.
5. 3 and 4
6. exp Clinical trials/ or randomized.tw. or placebo.tw. or randomly.tw. or trial.tw. or groups.tw. or exp experimental design/
7. 5 and 6

RefWorks was used to organize and sort references. Identification of duplicate articles was done within RefWorks utilizing the “Exact Match” function. A total of 97 duplicates were found, leaving a total of 465 articles for further review.