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## Exploring stress management and coping mechanisms in parents of infants in the neonatal intensive care unit (NICU)

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EXPLORING STRESS MANAGEMENT AND COPING MECHANISMS IN PARENTS OF  
INFANTS IN THE NEONATAL INTENSIVE CARE UNIT (NICU)

by  
SAMANTHA E. DAY

A thesis submitted in partial fulfillment of the requirements  
for the Honors in the Major Program in Nursing  
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## ABSTRACT

The purpose of this study was to conduct a literature review that examined parental coping mechanisms and stress relief techniques for parents of infants admitted to the neonatal intensive care unit (NICU). A search was conducted using multiples databases using key terms such as stress AND coping, parent\* OR caregiver, ped\* OR child\*, support\* or aid, NICU OR neonatal intensive care unit, and nurs\*. The results were limited to scholarly, peer reviewed journals in the English language. Exclusion criteria were articles not relating to parents or caregivers and mechanisms of coping with stress or pertaining to palliative or end-of-life care. Articles meeting the inclusion criteria were critiqued and analyzed for information pertaining to the topic of this review. The thirteen articles yielded from the search included the common themes of Visitation/Participation, Communication, and Comfort Measures. The literature revealed an overall positive association in reducing the amount of stress experienced when an intervention was provided. Implications for further research involve directly comparing the efficacy of interventions to determine which could be most useful in practice.

## DEDICATION

For my mother, Lisa, and sister, Jessica; for always supporting me through life and nursing school. I would not have been able to do this without both of you encouraging me to reach my highest potential. You two knew I could do it and always reminded me when I forgot or needed to hear it. I love you both more than anything!

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## INTRODUCTION

Many parents can attest to experiencing stress as it pertains to raising a child. Without unusual circumstances, upbringing a child brings its own set of challenges and hardships. When factoring in their child's admission to a critical care unit and the uncertainty of their condition, the level of stress grows exponentially. While this increase in stress is comprehensible without evidence to support it, it has been well-established in the literature over many decades (Prugh, Staub, Sands, Kirschbaum, & Lenihan, 1953; Roskies, Bedard, Gauvreau-Giulbalt, & La Fortune, 1975; Vadaro, 1978).

In an attempt to identify the specific sources of stress, researchers Carter and Miles (1982) conducted a study that involved observation followed by informal and formal interviews of parents with children admitted to the pediatric intensive care unit (PICU). The findings of the study showed that the main stressors could be categorized into eight components of the PICU environment; "Sights and Sounds, Child's Appearance, Procedures, Child's Behavior, Child's Emotions, Staff Communication, Staff Behavior, and Parental Deprivation" (Carter & Miles, 1982). Following the study, the authors continued on to standardize the measurement of parental stress in the pediatric critical care unit with the development of the Parental Stressor Scale: Pediatric Intensive Care Unit (PSS: PICU). The 62-item scale has been applied in studies to identify stressors specific to a defined population of parents and how the levels of stress vary. The tool was utilized in a 2003 study with mothers in a PICU of a children's hospital in the Midwestern United States to identify stressors (Board & Ryan-Wegner, 2003). Items from the survey distributed that were reported stressful 100% of the time by the subjects included

“injections/shots”, “sudden sounds of monitor alarms,” “seeing heart rate on monitor” and “sounds of monitors and equipment”. Other items that were perceived as stressful by the mothers were “putting needles in my child,” “too many different people talking to me,” and “tubes in my child,” which were reported by more than 90% of the study participants (Carter & Miles, 1982)

The PSS:PICU was later refined into a scale to fit the specific environment of the neonatal intensive care unit (NICU), or the Parental Stressor Scale: Neonatal Intensive Care Unit [PSS: NICU] (Miles, Funk & Carlson, 1993). Like the original tool, the PSS:NICU has been utilized in studies to identify stressors and levels of stress experienced by parents with an infant in the NICU. The point scale ranges between 0 (not experienced) or 1 (not stressed) to 5 (extremely stressed). A 2012 study was conducted to explore the stress specific to the parents with infants in an Australian NICU, in which the PSS:NICU was used to collect data (Sweet & Mannix, 2012). The results of the study showed that the Australian parents identified common areas of stress that included; “seeing baby in pain,” “separation from baby,” and “unable to protect from pain.” The same study also utilized open-ended questions to obtain data and concluded that other stressors included poor communication, behaviors of staff, and not being understood by the staff, as well as family and friends (Sweet & Mannix, 2012).



## BACKGROUND

Newborns are admitted into the neonatal intensive care unit (NICU) usually as result of being born preterm and at a very low birth weight, which accounts for 70-90% of admissions (CDC, 2010). Other common conditions that lead to NICU admissions included sepsis, asphyxia, respiratory distress, and intracranial hemorrhage (Ziegler, Paul, Hoffman, & Locke, 2016). Regardless of the specific admitting diagnosis to the unit, the patient's condition is deemed critical and requires focused, in-depth care.

In a study conducted between the years of 2007 and 2012, admission rates and characteristics of admitted newborns in 38 US States and the District of Columbia were recorded and analyzed. In this six-year study, the admission rates increased 64.0 to 77.9 per 1000 live births (Harrison & Goodman, 2015). It has been concluded that admissions of infants to the NICU has increased in direct correlation with the increase of positive outcomes for the newborn. With the increase in the number of admissions, NICUs are becoming more prevalent throughout hospitals in the U.S. Between 1980 and 1995, there was a 98.9% growth in the number of hospitals with NICU beds, from 351 to 698. Even more significantly, there was a 137.9% growth in the number of NICU beds in the fifteen year period, from 7,021 to 16,702 (American Hospital Association, 1995).

The introduction of these critical care units specialized to the neonatal population has significantly decreased mortality rates. With the NICU, the overall neonatal mortality rate in the United States has fallen more than 400%, from 18.73 per 1000 live births in 1960 when the NICU was first implemented to 4.04 per 1000 live births in 2012 (CDC, 2012).

When children are hospitalized, the majority of parents are often present to make important medical decisions regarding the child's care and to provide emotional support to their child's during procedures (Bauchner, Vinci & Waring, 1989; Bauchner, Waring & Vinci, 1991). It is in this environment, at the bedside, where parents often endure the stresses of having a child hospitalized while struggling with the uncertainty of medical outcomes and seeing the child in pain. Researchers have found that parents often describe the "total experience" of the time their child spends in the hospital as stressful (Board & Ryan-Wenger, 2000).

## PROBLEM

It is apparent that the stress in parents in critical care patients is an issue. Having a child hospitalized is a major event that brings stress, but additional stressors that come with the upgrade to a critical care unit and the declined health status of the child may lead to pronounced anxiety in parents (Carter & Miles, 1989). There is extensive literature on the presence and apparent causes of stress within the NICU, however there is limited information on what tools and techniques can be utilized to alleviate some of this pressure and help parents cope with their child's situation. This gap in the literature has been identified by several studies and validates the need for further research (Board & Ryan-Wenger, 2000; Carter & Miles, 1989; Lam, Spence & Halliday, 2007; Miles, Funk & Carlson, 1993).

When the immediate needs of the patient are met, health care providers should also take into the account that the child's families also have needs. In a study of parents in the NICU of an Australian children's hospital, subjects identified the critical role that nurses play in supporting parents (Lam, Spence & Halliday, 2007). The same study found that there is a need for ongoing education for nurses in the use of support strategies. This review of the literature will identify and examine previously studied tools that can be utilized in the further research of interventions that could determine which may be most effective.

## SIGNIFICANCE

According to The American Institute of Stress (2017), there are numerous emotional and physical disorders that have been linked to stress including depression, anxiety, heart attacks, stroke, hypertension, immune system disturbances, and have direct effects of multiple body systems (i.e. dermatological, gastrointestinal, neurological). A 2013 study was able to associate stress experienced by parents of NICU infants with anxiety, depression, fatigue, and sleep disruption (Busse, Stromgren, Thorngate & Thomas, 2013). This increased stress may also have an impact on the rest of the family unit. Parental stress has been established to be a risk factor for adverse outcomes on the child, “including the development of aggression, externalizing behavior problems, and anxiety, as well as compromised emotional coping [and] impaired social cognition” (Crum & Moreland, 2017, p. 3067).

Increased parental stress could also affect the outcome of patient satisfaction surveys following discharge from the health care facility. A survey of parents in a pediatric emergency department showed that satisfaction with care was associated patient interactions, the adequacy of information provided, and shorter waiting room times (Margaret, Clark, Warden, Magnusson, & Hedges, 2002). These results may correlate with the identified stressors of the pediatric critical care units, like the child being in pain and the parent not receiving adequate communication.

## PURPOSE

The purpose of this literature review is to examine parental coping mechanisms and stress relief techniques for parents of infants admitted to the neonatal intensive care unit (NICU) in an effort to provide recommendations for future research that focuses on effective measures that encourage parental consolation.

## METHODS

A search was conducted using CINAHL, Medline, and PyschINFO databases using key terms stress AND coping, parent\* OR caregiver, ped\* OR child\*, support\* or aid, NICU OR neonatal intensive care unit, and nurs\*. The results were limited to scholarly, peer reviewed journals in the English language. Articles were excluded from the search if they do not relate to parents or caregivers and mechanisms of coping with stress. For the purpose of this review, articles were also excluded if they pertain to palliative or end-of-life care. Each article meeting the inclusion criteria was critiqued and analyzed for information pertaining to the topic of this review.

## FINDINGS

Thirteen studies were included in this review of literature that explored the efficacy of interventions in managing the stress of parents with infants in the neonatal intensive care unit. All studies were published within the past thirty years. Included in this review were four randomized control trials, two semi-structured interview, one qualitative analysis, one pretest-posttest quasi-experimental study, one cohort study, one randomized crossover study, one multi-center study, and one single sample, pretest-posttest design.

### **Visitation and Participation**

Three studies in this review explored the impact of parental visitation and interaction with their infant in the NICU on stress levels (Özdemir & Alemdar, 2017; Vittner, McGrath, Robinson, Lawhon, Eisenfeld, Walsh, Young & Cong, 2017; Smith, SteelFisher, Salhi, & Shen, 2012).

Fathers in a pretest-posttest quasi-experimental study were allowed and encouraged to spend time with their infants in a Turkish NICU (Özdemir & Alemdar, 2017). Researchers included 47 subjects in the study that involved a face-to-face interview followed by an orientation to the staff and unit. After the orientation phase had been completed, fathers were allotted 30 minutes to spend with their infants (Özdemir & Alemdar, 2017). Subjects were then interviewed again, and data was collected via the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU) (Özdemir & Alemdar, 2017). PSS:NICU mean scores were higher before visits ( $2.425 \pm 0.672$ ) compared to mean scores obtained after visits ( $1.932 \pm 0.679$ )

(Özdemir & Alemdar, 2017). Researchers were able to conclude from this study that fathers that visited and supported their infants in NICUs had decreased their stress levels (Özdemir & Alemdar, 2017).

A randomized crossover study was performed in 2017 that examined whether skin-to-skin contact (SSC) alleviates parental stress and anxiety (Vittner et al, 2017). The twenty-eight infants and their parents included in the sample had their stress levels measured via salivary samples taken throughout the study (Vittner et al, 2017). In the Pre-SSC phase, parents had saliva samples collected and completed the validated Visual Anxiety Scale (VAS) anxiety measure, an 8-item instrument printed on one sheet of paper in which subjects indicate how true a statement about different emotions (Vittner et al, 2017). The subjects then engaged in SSC, by holding the infant for sixty minutes. Saliva samples were collected within the last ten minutes of the holding period and again following a forty-five-minute period of rest (Vittner et al, 2017). Results showed that the period of SSC increased salivary oxytocin levels, a hormone that in high amounts has been proven to be stress relieving in humans (Uvnas-Mober, Arn, & Magnusson, 2005), and that these levels dropped significantly after holding the infant (Vittner et al, 2017). The results of the VAS anxiety measure also indicated a decrease in anxiety levels for mothers and fathers (Vittner et al, 2017).

In Massachusetts, researchers Smith, SteelFisher, Salhi, and Shen performed a qualitative analysis of interview data to examine parental reports of the NICU experiences, coping strategies, and views of the ways NICU staff supported them (2012). Of the five primary strategies identified, one was ‘participating in care’ (Smith et al, 2012). One 40-year-old mother stated, “It went from not holding her for a week to being able to hold her every couple of days,



and then slowly becoming a very active participant in her day. Just learning how to feed her, and hold her correctly, and bathe her. As time progressed, it seemed more and more like I was her mom, not just someone visiting her” (Smith et al, 2012). For many of the 24 families involved of the study, just being in the room with their infant and watching their growth was a way to limit anxiety surrounding parenting and their infant’s health (Smith et al, 2012).

### **Communication**

A total of four articles in this review related to communication in the alleviating of parental stress related to a NICU admission (Melnik et al, 2001; Hughes, McCollum, Sheftel, & Sanchez, 1994; Enke, Hausmann, Miedaner, Roth, & Woopen, 2016; Preyde & Ardal, 2003).

### *Education*

Educational interventions in this review refers to communication between parents and healthcare providers regarding the status and care of their infant.

The article that fit within this description was a randomized controlled trial to evaluate the effectiveness of a parent-focused intervention program on maternal coping (Melnik et al, 2001). The Creating Opportunities for Parent Empowerment (COPE) NICU program enables parents to effectively cope with an admission by teaching how to identify infant’s characteristics, developmental cues, and milestones as well as education pertaining the working of the unit. In receiving this education, the outcome should be increased parental confidence and belief in their ability to perform the parental role (Melnik et al, 2001). Forty-two mothers were randomly assigned to either the COPE group or the control by randomized blocks of time. COPE mothers received the four-phase educational-behavioral program that began 2-4 days post birth and

continued through 1 week following NICU discharge (Melnyk et al, 2001). The control group received basic information about the unit and the care of the unit via audiotape (Melnyk et al, 2001).

The mothers in the intervention group reported less than stress via the PSS:NICU tool (Melnyk et al, 2001). The 'sights and sounds' subscale of the survey showed significantly lower results than the mothers in the control group ( $p = 0.05$ ) (Melnyk et al, 2001). Mothers who received the COPE intervention also reported significantly stronger beliefs in their ability to understand, interpret, and predict their infant's characteristics and behaviors (Melnyk et al, 2001).

### *Social Support*

This review yielded three articles that pertained to coping interventions that involved communication that was emotion-based or provided to support to the parents of NICU patients.

A semi-structured interview was performed to differentiate between the strategies utilized by mothers and fathers to cope with their infant's NICU hospitalization (Hughes et al, 1994). A one-hour interview was conducted with 32 mothers and 25 fathers within 3 weeks of birth concerning their experience and specific strategies utilized to cope (Hughes et al, 1994). Mothers identified a total of 135 coping strategies, the largest majority of mothers reported strategies being positive communication and social support from their spouse (Hughes et al, 1994). Of the 70 strategies produced by fathers, the largest proportion was receiving positive communication and social support from the medical staff (Hughes et al, 1994). These results were obtained through a questionnaire as well as being reported spontaneously by the parents

during the interview period, providing evidence that researchers used to conclude that parents most often cope by seeking social support and communicating with others (Hughes et al, 1994).

This data is also supported by a German study that explored the effects of clinical staffs' communication styles on parental stress (Enke et al, 2016). Results were collected from a parent questionnaire that reflected the views of 1,277 parents about the care of 923 infants in 66 German NICUs and stress was measured with the PSS:NICU tool (Enke et al, 2016). Parents reported that empathetic communication from medical staff was appropriate in reducing stress while an initial introduction and providing information yielded a smaller reduction in stress levels (Enke et al, 2016). This article concludes that there is a need to empathetically communicate with parents from the beginning of their infant's NICU stay in an attempt to alleviate stress (Enke et al, 2016).

A cohort study with a control group for comparison was performed to evaluate the effectiveness of a parent "buddy" program in alleviating stress, anxiety and depression, while providing social support (Preyde & Ardal, 2003). Thirty-two mothers in the interventional group were paired with another mother who had previously had an infant in the NICU, from which they received telephone support, and 28 mothers were in the control group (Preyde & Ardal, 2003). After 4 weeks of enrollment in the program, mothers in the intervention group reported less stress levels than those of the control group (mean score 1.54 v. 2.93,  $p < 0.001$ ) (Preyde & Ardal, 2003). At 16 weeks the mothers enrolled in the program reported decreased incidence of anxiety, depression, and greater perception of support (Preyde & Ardal, 2003). This response, along with a post-intervention survey that indicated that 87.5% of participants found the

intervention very useful, led to the conclusion that peer support is beneficial to mothers dealing with stress (Preyde & Ardal, 2003).

### **Comfort Measures**

Six articles in this review of literature focused on the implementation of personal activities or exercises and their efficacy in reducing the stress of parents with a hospitalized infant in the NICU (Eotiou, Vlasktarakos, Bakoula, Papagaroufais, Bakoyannis, Darviri, & Chrousos, 2015; Howland, Jallo, Connelly, & Pickler, 2017; Cobiella, Mabe, & Forehand, 1990; Mouradian, DeGrace, & Thompson, 2013; Macnab, Beckett, Park, & Sheckter, 1997; Alemdar, Özdemir, & Tüfekci, 2017).

### *Relaxation Techniques*

Three articles in this review explored interventions that promoted relaxation in parents of NICU infants.

One randomized controlled trial investigated the effects of relaxation techniques of the stress/anxiety of parents with hospitalized parents (Eotiou et al, 2015). Of the 59 subjects, 31 were randomly assigned to the intervention group that practiced three relaxation techniques including diaphragmatic breathing, progressive muscle relaxation, and guided imagery (Eotiou et al, 2015). Both the interventional and control group received interactive training courses that provided information about the NICU, after which the intervention group attended additional courses specifically providing information on positive thinking, health lifestyle, and self-knowledge (Eotiou et al, 2015). Data collected that the relaxation practices, along with the

information-based training, reduced anxiety ( $p = 0.2$ ) in parents of infants admitted to the NICU three months after the infants' discharge (Eotiou et al, 2015).

Another study focused specifically on the feasibility of a relaxation guided imagery intervention for NICU mothers and explore the effects related to distress (Howland et al, 2017). 20 maternal subjects listened to a 20-minute audio recording at least once daily for 8 weeks that focused on the following themes: “developing a relaxed state, working with difficult feelings, and developing a friendlier feeling toward self” (Howland et al, 2017). Results collected via multiple self-report measures along with salivary cortisol levels yielded data that was in favor of the intervention's impact on reducing stress levels (Howland et al, 2017). Greater average use of the intervention correlated with lower levels of distress in the mothers (perceived stress [ $r = -0.38$ ], anxiety [ $r = -0.43$ ], and depression [ $r = -0.41$ ]) (Howland et al, 2017). The article concludes that relaxed guided imagery was an acceptable intervention to reduce maternal stress (Howland et al, 2017).

Participants in a randomly controlled trial were assigned to groups to compare the effectiveness of different coping interventions with mothers of NICU infants (Cobiella et al, 1990). Each of the three interventions groups had 10 subjects that were shown a video varying in length and were focused on different topics (Cobiella et al, 1990). While the problem-focused and control groups had informational videos about the hospital and NICU environment, the emotion-focused group watched a presentation in which a mother discusses with a nurse signs of anxiety and ways to manage it (Cobiella et al, 1990). The group who participated in the emotion-focused intervention reported less anxiety and depression than those in the control group, resulting in the conclusion that anxiety management education was an effective measure in reducing parental stress (Cobiella et al, 1990).

### *Art and Writing*

Two studies focused on the effect of art-based interventions on stress experienced by parents.

A mixed-methods study was conducted in order to determine whether an occupation group centered on scrapbooking would reduce stress, operationalized as anxiety (Mouradian et al, 2013). 40 parents in the study reported anxiety levels the State-Trait Anxiety Inventory, a commonly used tool to measure trait and state of anxiety and indicates caregiver distress (Spielberger, Gorsuck, Lushene, Vagg, & Jacobs, 1983). The results of the survey when compared pre- and post-intervention showed a clinically significant decrease in the parents' anxiety following the group interaction (12.7 points,  $p < 0.0001$ ) (Mouradian et al, 2013). A post-experimental interview also revealed that the parents found the intervention provided “distraction and engagement, pleasure, relaxation, a sense of hope, and an opportunity to share” (Mouradian et al, 2013), providing the conclusion that scrapbooking was an effective coping measure.

The effect of journal writing on parental stress was studied in a Canadian NICU in the form of a semi-structured interview following education and the suggestion that a journal can be a valuable way of dealing with stress (Macnab, Beckett, Park, & Sheckter, 1997). The results of the follow-up interviews to study participants indicated the 73% mothers who journaled had reported a considerable decrease in the amount of stress experienced related having an infant admitted (Macnab et al, 1997). One hundred percent of participants in the intervention said that they would recommend the practice to other NICU parents, and 77% said they would strongly recommend the activity (Macnab et al, 1997). Journal writers expressed being able to feel more organized and effectively cope with stress of their situation, leading the researchers to conclude

that encouraging parents to keep a journal is a constructive way of dealing with a NICU admission (Macnab et al, 1997).

### *Spiritual Care*

One article reviewed the effect of spiritual care on the levels of stress in mothers of infants in the NICU setting.

In the randomized pre- and posttest-controlled trial, 60 mothers were assigned by a computer to either be in a spiritual care group or a control group (Alemdar et al, 2017). Mothers in the intervention group were surveyed on their spiritual needs and were allowed to practice from the following based on those results: praying, reading from holy text, placing a small amulet on the infant's incubator, or attaching a small talisman to the incubator (Alemdar et al, 2017). PSS:NICU scores following the spiritual intervention showed a significant decrease in the amount of stress of mothers over the control group ( $p < 0.5$ ) (Alemdar et al, 2017). This article concludes that meeting the spiritual needs of parents could be effective in attempting to lower their experience of stress.

## DISCUSSION

The articles and studies reviewed in this thesis provide insight into the potential interventions that can be provided to the parents of infants hospitalized in the neonatal intensive care unit to alleviate stress and provide comfort during a troubling time riddled with anxiety. The stress experienced by these parents has been identified through decades of research and has even been linked with physical effects (i.e. fatigue, depression, anxiety). Reducing this stress can limit the physical consequences and improve parent satisfaction with care.

The literature assessed, although focused upon different populations and implementing a variety of interventions, was consistent in providing evidence the interventions were beneficial in helping parents coping with their child's critical care admission. The measures reviewed varied in the amount of interaction and resources required to complete, however, all of the interventions resulted in a reduction in biological measures (i.e. salivary cortisol) and/or self-reported measures of stress. Of the articles reviewed, two articles utilized methods of data collection that resulted in biological measures of stress (Howland et al, 2017; Vittner et al, 2017) while the rest of the results were self-reported in origin.

In conclusion, the ever-present stress experienced by NICU parents can be limited by interventions that provides comfort, relaxation, education, and means of expressing their feelings. While this review provides several tools to consider using when interacting with parents in the NICU setting, further studies directly comparing the response to different interventions explored could be essential in providing strong recommendations as to which methods could be most effective. Additionally, further studies to analyze stress management and



coping in fathers, and comparing stress and coping between mothers and fathers, may be helpful to identify differences in gender and may help to recommend interventions specific to gender.

## LIMITATIONS

In this literature review, several limitations are to be considered. Several of the studies were limited to a small size, lacking a control group, and not knowing or measuring the length of time that the participants' stress was reduced. It is also of note that the majority of the study populations only included the mother of the infants, and not the father. The articles that focused on an intervention that included limiting paternal stress in either the mother or father individually were also effective, warranting more research in exploring the effectiveness of comfort measures in fathers versus mothers. The demographics of some studies are also of impact in limiting the findings of this review, as several studies required that the participants spoke English and had received a high school education. This excludes other parents experiencing stress and could have also benefitted from these potentially stress-reducing interventions. The variety of study designs was another limiting factor, as the results of a randomized controlled trial are considered to be of a higher level of evidence than those collected via interviewing. According to Melnyk and Fineout-Overholt's (2015) model, randomized controlled trials are higher on the Hierarchy of Evidence than evidence from a single descriptive or qualitative study and can therefore provide stronger recommendations from the evidence presented.

## **Appendix A**

### **Table of Evidence**

Title Author(s) Year Location	Study Design and Purpose	Methodology	Summary of Major Findings	Key Findings and Limitations
<p><i>Supporting of the fathers to visit their infants in Neonatal Intensive Care Unit decreases their stress level: A pretest-posttest quasi-experimental study</i></p> <p>Özdemir, Funda Kardeş; Alemdar, Dilek Küçük</p> <p>2016</p> <p>Turkey</p>	<p>Pretest-Posttest Quasi-Experimental Study</p> <p>To determine the effect of visiting infants in NICUs on stress levels of their fathers.</p>	<p>47 fathers were included in the study. Phase I involved a face-to-face interview followed by an orientation to the staff and unit. During Phase II, fathers were allowed 30 minutes with their infants. Subjects were interviewed again, and data collection forms were administered.</p>	<p>Outcomes were measured via the “Parental Stressor Scale: Neonatal Intensive Care Unit” (PSS: NICU)</p> <p>PSS: NICU was developed to identify the physical and psychological stressors in the ICU, as perceived by parents (Miles et al. 1993). The point scale ranges between 0 (not experienced) or 1 (not stressed) to 5 (extremely stressed).</p>	<p>PSS: NICU mean scores were higher before visits (<math>2.425 \pm 0.672</math>) compared to mean scores obtained after visits (<math>1.932 \pm 0.679</math>).</p> <p>Fathers visiting and supporting their infants in NICUs had decreased their stress levels.</p> <p>No limitations?</p>
<p><i>How parents cope with the experience of neonatal intensive care</i></p> <p>Hughes, Mary-alayne; McCollum, Jeanette; Sheftel, David; and Sanchez, George</p> <p>1994</p> <p>Illinois, USA</p>	<p>Semi-structured interview</p> <p>To delineate mothers’ and fathers’ coping efforts during the first few weeks of their preterm infant’s NICU hospitalization.</p>	<p>32 mothers and 25 fathers were interviewed separately within 3 weeks of their infants’ birth. The duration of each interview was 1 hr and consisted of two phases. During phase one, participants responded to open-ended questions concerning the experience of having low-birthweight, premature infant hospitalized in a NICU. In the second phase, parents were specifically questioned about their coping strategies.</p>	<p>Mothers identified a total of 135 coping strategies, the largest proportion of self-reported strategies being positive communication/social support from spouse and crying. Fathers reported a total of 70 coping strategies, the largest proportion being positive communication/social support from the medical staff. Both reported relying on religious faith and focusing on the infant (e.g., visiting the infant, talking to the infant).</p>	<p>Results from this study indicate that parents coped most often by communicating with others and seeking social support. It was a strategy that was used most often as assessed by the Ways of Coping Questionnaire and spontaneously reported by the majority of parents.</p> <p>Limitations: chronicity and variability of infants’ status, restricted demographics (white and middle class sample)</p>

<p><i>A comparison of two stress-reduction treatments for mothers of neonates hospitalized in a neonatal intensive care unit</i></p> <p>Cobiella, Connie W; Mabe, P Alex; and Forehand, Rex L</p> <p>1990</p> <p>Georgia, USA</p>	<p>Randomly controlled trial</p> <p>To compare the effectiveness of interventions with mothers of NICU-hospitalized premature infants based on two different coping strategies.</p>	<p>Subjects consisted of 30 mothers, 10 in each group</p> <p>1) Problem-focused: subjects watched a 9-minute videotaped presentation that included learning about the environment by asking questions, and then becoming more confident by modelling stroking her baby</p> <p>2) Emotion-focused: subjects watched a 13-minute videotaped presentation in which a mother discusses with a nurse signs of anxiety and ways to manage it</p> <p>3) Control: subjects watched an 11-minute tape that informed the viewer about the history of the city, hospital, and the establishment of the NICU.</p>	<p>The problem-focused group had mixed results; more stress than the control group but less global anxiety. The emotion-focused intervention group was more effective than the control group on the anxiety and depression measures.</p>	<p>The emotion-focused strategy appears to reduce indicators of both depression and global anxiety</p> <p>Limitations: small sample size, mothers were assessed early in their infants' hospitalization, and thus delayed stress reactions could not be observed</p>
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<p><i>Coping with the neonatal intensive care unit experience: parents' strategies and views of staff support</i></p> <p>Smith, Vincent C; SteelFisher, Gillian K; Salhi, Carmel; and Shen, Lisa Y.</p> <p>2012</p> <p>Massachusetts, USA</p>	<p>Qualitative analysis of prospectively collected interview data</p> <p>To examine parental reports of their NICU experiences, coping strategies, and views of the ways NICU staff supported them.</p>	<p>A researcher trained in interview techniques conducted all interviews. Common topics discussed were transformed into a semi structured interview script that consisted of approximately 100 open-ended questions. Parents were allowed to speak as long as they wanted on any topic they chose and if they did not naturally respond, they were given a prompt to respond.</p>	<p>Analysis revealed 5 primary coping strategies that parents adopted to handle the NICU experience: (1) participating in care; (2) getting away from the NICU; (3) gathering information; (4) involvement of friends and family; and (5) engagement with other NICU parents.</p>	<p>The study accentuates key practical strategies that parents find helpful to cope with the NICU experience</p> <p>Limitations: several potential subjects were not able to participate, limited amount of paternal participation, single NICU setting, reluctance of parents to identify negative coping strategies (such as alcohol)</p>
<p><i>Parental stress management using relaxation techniques in a neonatal intensive care unit: A randomised controlled trial</i></p> <p>Fotiou, Catherine; Vlastarakos, Petros. V; Bakoula, Chrysa; Papagaroufalis, Konstantinos; Bakoyannis, George; Darviri, Christine; and Chrousos, George</p> <p>2015</p> <p>Athens, Greece</p>	<p>Randomized controlled trial</p> <p>To investigate the effect of relaxation techniques on the stress/anxiety of parents with hospitalized premature infants</p>	<p>The trial was conducted in the neonatal intensive care unit of a tertiary maternity hospital including 59 parents, who were randomized into two groups: 31 in the intervention and 28 in the control group. Parents in the intervention group practiced three relaxation techniques, in addition to undergoing the same information-based training courses as did the parents of the control group.</p>	<p>Applying relaxation techniques, in addition to providing information-based training, in parents of preterm infants admitted to a NICU reduces the trait of anxiety (<math>p = 0.2</math>) three months after the infants' discharge, but not the respective state. No statistically significant difference in parents stress reduction was found between the two modes of stress management.</p>	<p>Follow-up of families with a NICU experience may explore delayed effects of stress management</p> <p>Limitations: subsequent reduction in stress over time post-discharge, lack of control group, use of standardized self-assessment questionnaires, small sample size</p>

<p><i>Journal writing as a social support for parents of premature infants: a pilot study</i></p> <p>Macnab, Andrew J.; Beckett, L. Yvonne; Park, Christine Cohen; and Sheckter, Lori</p> <p>1997</p> <p>British Columbia, Canada</p>	<p>Semi-structured interview following intervention</p> <p>Assess the potential value of keeping a journal for parents receiving social support in a 'premature nursery'.</p>	<p>Parents invited to participate were given a comprehensive pamphlet with the suggestion that a journal be a valuable way of dealing with stress. Six weeks following enrollment, structured telephone follow-up interviews were made to all study participants.</p>	<p>Keeping a journal had a positive effect in reducing the stress of having a baby admitted for all mothers and was reported to have helped considerably in this regard by 73%. One hundred would recommend the practice to other parents (77% strongly).</p>	<p>The main reason voiced for parents not starting a journal is uncertainty as to how to do so effectively. Writers felt themselves better organized and better able to cope with stress.</p> <p>Limitations: no control group, inclusion material (English, high school education), small sample</p>
<p><i>Art-based occupation group reduces parent anxiety in the neonatal intensive care unit: a mixed-methods study</i></p> <p>Mouradian, Laurie E.; DeGrace Beth W.; Thompson, David M.</p> <p>Oklahoma</p> <p>2013</p>	<p>Mixed-methods study</p> <p>Determine whether an art-based occupation group using scrapbooking in the neonatal intensive care unit (NICU) would reduce parent stress, operationalized as anxiety.</p>	<p>Forty parents from a Level 3 NICU in a large metropolitan hospital participated. The State-Trait Anxiety Inventory was administered pre-activity and post-activity along with a brief interview.</p>	<p>The decline in parents' mean state anxiety (12.7 points, <math>p &lt; 0.0001</math>) was clinically significant. The decline in mean trait anxiety (2.6 points, <math>p = 0.0036</math>) was statistically significant but not clinically meaningful.</p>	<p>Parents said that participation offered distraction and engagement, pleasure, relaxation, a sense of hope, and an opportunity to share.</p> <p>Limitations: lack of comparison group, use of self-report tool bias, length of time that state anxiety was reduced was unmeasured/unknown</p>
<p><i>The effect of spiritual care of stress levels of mothers in NICU</i></p> <p>Alemdar, Dilek K.; Özdemir, Funda K.; Tüfekci, Fatma G.</p>	<p>Randomized pre- and posttest-controlled trial</p> <p>Investigate the effect of spiritual care on levels of stress in mothers with infants in a neonatal intensive care unit.</p>	<p>Sixty mothers were randomly assigned using a computer program into a spiritual care group (<math>n = 30</math>) and a control group (<math>n = 30</math>). Spiritual needs of the mothers visiting their infants after being admitted were determined via</p>	<p>Following the intervention, there was a significant difference between the PSS:NICU scores of the mothers, in favor of the spiritual care group (<math>p &lt; 0.5</math>).</p>	<p>HCP's should consider the spiritual needs of families as part of the holistic care approach.</p> <p>Limitations: failure to measure extraneous variables such as mother's health status, emotional</p>

<p>Turkey 2017</p>		<p>questionnaire. The mothers in the spiritual care group were informed they could perform practice of from a list of four (praying, reading from holy text, placing a small amulet on the infant's incubator, or attaching a small talisman to the incubator). PSS:NICU was applied pre- and post-practice and compared with the control group.</p>		<p>well-being, and knowledge about her infant's health status.</p>
<p><i>Feasibility of a relaxation guided imagery intervention to reduce maternal stress in the NICU</i>  Howland, Lois C.; Jallo, Nancy; Connelly, Cynthia D.; and Pickler, Rita H.  2017  San Diego, California</p>	<p>Single sample, pretest-posttest design  Test the feasibility of a relaxation guided imagery (RGI) intervention for mothers of hospitalized preterm infants and to explore the biobehavioral effects of RGI on their distress, responsiveness, and physiological stress.</p>	<p>Twenty mothers of hospitalized preterm infants listened to a 20-minute RGI recording at least once daily for 8 weeks. Recordings had the themes of developing a relaxed state, working with difficult feelings, and developing a friendlier feeling toward self. Multiple self-report measures were utilized as well as salivary cortisol level and cortisol awakening response.</p>	<p>Average use of RGI varied from 1.7 to 7.4 times per week. Greater average use of RGI was correlated with lower awakening cortisol levels (<math>r = -0.38</math>), greater cortisol awakening response (<math>r = 0.36</math>), and lower levels of distress (perceived stress [<math>r = -0.38</math>], anxiety [<math>r = -0.43</math>], and depression [<math>r = -0.41</math>]).</p>	<p>RGI may be a feasible and acceptable intervention to reduce mental and physiologic stress and improve responsiveness in mothers of hospitalized preterm infants.  Limitations: study design (no control), small sample, lost salivary data, and self-reporting of usage.</p>



<p><i>Improving cognitive development of low-birth-weight premature infants with the COPE program: a pilot study of the benefit of early NICU intervention with mothers</i></p> <p>Melnyk, Bernadette M.; Alpert-Gillis, Linda; Feinstein, Nancy F.; Fairbanks, Eileen; Schultz-Czarniak, Jaclyn; Hust, Diane; Sherman, Laura; LeMoine, Christine; Moldenhauer, Zendi; Small, Leigh; Bender, Nancee; and Sinkin, Robert A.</p> <p>2001</p> <p>Milwaukee, WI</p>	<p>Randomized clinical trial</p> <p>Evaluate the effectiveness of a parent-focused intervention program (COPE) on infant cognitive development and maternal coping.</p>	<p>42 mothers were randomly assigned to the COPE group or a comparison group by randomized blocks of time (4-week periods). COPE mothers received the four-phase educational-behavioral program that began 2-4 days post birth and continued through 1 week following discharge from the NICU. Comparison mothers received audiotaped information.</p>	<p>COPE mothers reported significantly less stress on the sights and sounds subscale of the PSS:NICU than did mothers in the comparison program (<math>p = 0.05</math>). COPE mothers also reported significantly stronger beliefs in their ability to understand, interpret, and predict their infant's characteristics and behaviors.</p>	<p>The facilitation of maternal confidence and positive parenting in the NICU may be key in establishing and sustaining long-term healthy mother-infant interactions and positive child outcomes.</p> <p>Limitations: small sample size, low internal consistency reliability of the baby subscale of the Parental Beliefs Scale.</p>
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<p><i>Effectiveness of a parent “buddy” program for mothers of very preterm infants in a neonatal intensive care unit</i></p> <p>Preyde, Michele and Ardal, Frida</p> <p>2003</p> <p>Ontario, Canada</p>	<p>Cohort study with control group for comparison</p> <p>Evaluate the effectiveness of a parent “buddy” program – a hospital-based intervention for parents of very preterm neonates – in alleviating stress, anxiety and depression and providing social support.</p>	<p>32 mothers were recruited for the intervention group and 28 for the control group. Mothers in the intervention group were paired with trained mothers who had previously had a preterm infant in the NICU and who provided principally telephone support. Data consisted of self-reported, standardized measures of parental stress, state anxiety and depression. Secondary measures included self-reported, standardized measures of perceived social support and trait anxiety.</p>	<p>At 4 weeks enrollment in the study, mothers in the intervention group reported less stress than those in the control group (mean score 1.54 v. 2.93, <math>p &lt; 0.001</math>). At 16 weeks, the intervention group reported less state anxiety, less depression, and greater perceived social support. In evaluations of the program, 87.5% indicated it was very helpful for helpful.</p>	<p>Support from individual, trained peers was found to be effective in helping mothers deal with the stress of very preterm birth.</p> <p>Limitations: reliance on quasi-experimental design, different settings, selection bias, lack of blinding of researchers.</p>
<p><i>Increase in oxytocin from skin-to-skin contact enhances development of parent-infant relationship</i></p> <p>Vittner, Dorothy, McGrath, Jacqueline, Robinson, JoAnn, Lawhon, Gretchen, Eisenfeld, Leonard, Walsh, Stephen, Young, Erin and Cong, Xiaomei</p> <p>2017</p> <p>Connecticut</p>	<p>Randomized crossover study</p> <p>Whether skin-to-skin contact (SCS) alleviates parental stress and anxiety while also supporting mother-father-infant relationships.</p>	<p>28 infants and their parents had salivary samples taken throughout the study. In the Pre-SSC phase, saliva samples were collected and parents completed the VAS anxiety measure. Then parents held the infant for 60 min, with saliva samples taken within the last 10 minutes of holding. Samples were then taken following a 45 minute rest period.</p>	<p>60 minutes of SSC significantly increased salivary OT levels; decreased SC levels for preemies; and decreased anxiety levels for mothers and fathers. It was also discovered that OT levels dropped significantly for both mothers and fathers after SSC.</p>	<p>The nursing intervention of facilitating the implementation of SSC thus may be used to reduce parent and infant stress in the NICU.</p> <p>Limitations: small sample size, non-diverse population, crossover study design, use of convenience sampling.</p>

<p><i>Communicating with parents in neonatal intensive care units: the impact on parental stress</i></p> <p>Enke, Christian; Hausmann, Andrés Oliva y; Miedaner, Felix; Roth, Bernhard; Woopen, Christiane</p> <p>2016</p> <p>Germany</p>	<p>Multi-center-study</p> <p>(1) To identify groups of parents in the NICU who are particularly at risk of experiencing stress, and (2) to explore the effects of clinical staffs' communication on parental stress.</p>	<p>Views from 1277 parents about care for 923 infants in 66 German NICUs were evaluated. Data was collected via a parent questionnaire pertaining to sociodemographic, experiences of stress and perceptions of the clinical staffs' communication. Stress was measured via the PSS:NICU.</p>	<p>While empathetic communication as one aspect of staffs' communication was shown as appropriate in reducing parental stress, an initial introduction and the quantity of information were only slightly associated with lower levels of stress.</p>	<p>Results provide evidence for the need to involve parents empathetically from the beginning of their child's stay in the NICU.</p> <p>Limitations: unvalidated utilization of PIEC-S measure, interpretation of PSS:NICU from English to German</p>
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## List of References

- Bauchner, H., Vinci, R., & Waring, C. (1989). Pediatric procedures: Do parents want to watch? *Pediatrics*, 84, 907-909.
- Bauchner, H., Waring, C., & Vinci, R. (1991). Parental presence during procedures in an emergency room: Results from 50 observations. *Pediatrics*, 87, 544-548.
- Board, R. & Ryan-Wenger, N. (2000). State of the science on parental stress and family functioning in pediatric intensive care units. *American Journal of Critical Care*, 9(2), 106-122.
- Board, R. & Ryan-Wenger, N. (2003). Stressors and stress symptoms of mothers with children in the PICU. *Journal of Pediatric Nursing*, 18(3), 195-202.
- Busse, M., Stromgren, K., Thorngate, L., & Thomas, K. A. (2013). Parents' responses to stress in the neonatal intensive care unit. *Critical Care Nurse*, 33(4), 52-60.
- Carter, M. & Miles, M. (1989). The parental stressor scale: pediatric intensive care unit. *Maternal-Child Nursing Journal*, 18(3), 187-198.
- Center for Disease Control and Prevention (2012). Neonatal intensive-care unit admission of infants with very low birth weight – 19 States, 2006. Center for Disease Control and Prevention. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5944a4/html>
- Center for Disease Control and Prevention (2012). Deaths: Final Data for 2012. *National Vital Statistics Reports*, 63(9), 1-117.
- Cobiella CW, Mabe PA, & Forehand RL. (1990). A comparison of two stress-reduction treatments for mothers of neonates hospitalized in a neonatal intensive care unit. *Children's Health Care*, 19(2), 93-100.

- Crum, K. & Moreland, A. (2017). Parental stress and children's social and behavioral outcomes: the role of abuse potential over time. *Journal of Child and Family Studies*, 26(11), 3067-3078.
- Enke, C., Oliva y Hausmann, A., Miedaner, F., Roth, B., & Woopen, C. (2017). Communicating with parents in neonatal intensive care units: The impact on parental stress. *Patient Education & Counseling*, 100(4), 710–719.
- Fotiou, C., Vlastarakos, P. V., Bakoula, C., Papagaroufalis, K., Bakoyannis, G., Darviri, C., & Chrousos, G. (2016). Parental stress management using relaxation techniques in a neonatal intensive care unit: A randomised controlled trial. *Intensive & Critical Care Nursing*, 32(1), 20–28.
- Gupta, P., Gossett, J., & Rao Rettiganti, M. (2018). Trends in mortality rates in pediatric intensive care units in the united states from 2004 to 2015. *Critical Care Medicine*, 46(1), 30.
- Harrison W. & Goodman, D. (2015). Epidemiologic Trends in Neonatal Intensive Care, 2007-2012. *JAMA Pediatrics*, 169(9), 855-862.
- Howland, L. C., Jallo, N., Connelly, C. D., & Pickler, R. H. (2017). Feasibility of a Relaxation Guided Imagery Intervention to Reduce Maternal Stress in the NICU. *JOGNN: Journal of Obstetric, Gynecologic & Neonatal Nursing*. 46(4), 532–543.
- Hughes M, McCollum J, Sheftel D, & Sanchez G. (1994). How parents cope with the experience of neonatal intensive care. *Children's Health Care*, 23(1), 1–14.
- Kardaş Özdemir, F., & Küçük Alemdar, D. (2017). Supporting of the Fathers to Visit Their Infants in Neonatal Intensive Care Unit Decreases Their Stress Level: A Pretest-Posttest Quasi-Experimental Study. *Community Mental Health Journal*, 53(4), 490–495.

- Krmpotic, K. & Lobos, AT (2013). Clinical Profile of Children Requiring Early Unplanned Admission to the PICU. *Hosp Pediatr*, 3(3), 212-218.
- Küçük Alemdar, D., Kardaş Özdemir, F., & Güdücü Tüfekci, F. (2018). The Effect of Spiritual Care on Stress Levels of Mothers in NICU. *Western Journal of Nursing Research*, 40(7), 997–1011.
- Lam, J., Spence, K., & Halliday, R. (2007). Parents' perception of nursing support in the neonatal intensive care unit (NICU). *Neonatal, Paediatric & Child Health Nursing*, 10(3), 19-25.
- Macnab AJ, Beckett LY, Park CC, & Shekter L. (1998). Journal writing as a social support strategy for parents of premature infants: a pilot study. *Patient Education & Counseling*, 33(2), 149–159.
- Magaret, N. D., Clark, T. A., Warden, C. R., Magnusson, A. R. and Hedges, J. R. (2002), Patient Satisfaction in the Emergency Department - A Survey of Pediatric Patients and Their Parents. *Academic Emergency Medicine*, 9, 1379-1388.
- Miles, M.S., Funk, S.G., & Carlson, J. (1993). The parental stressor scale: neonatal intensive care unit. *Nursing Research*, 42, 148-152.
- Melnyk, B. M., & Fineout-Overholt, E. (2015). *Evidence-based practice in nursing and healthcare: A guide to best practice*. Philadelphia: Wolters Kluwer/Lippincott Williams et Wilkins
- Melnyk BM, Alpert-Gillis L, Feinstein NF, Fairbanks E, Schultz-Czarniak J, Hust D, Sinkin RA. (2001). Improving cognitive development of low-birth-weight premature infants with the COPE program: a pilot study of the benefit of early NICU intervention with mothers. *Research in Nursing & Health*, 24(5), 373–389.

- Mouradian, L. E., DeGrace, B. W., & Thompson, D. M. (2013). Art-Based Occupation Group Reduces Parent Anxiety in the Neonatal Intensive Care Unit: A Mixed-Methods Study. *American Journal of Occupational Therapy*, 67(6), 692–700.
- Preyde M, & Ardal F. (2003). Effectiveness of a parent “buddy” program for mothers of very preterm infants in a neonatal intensive care unit. *CMAJ: Canadian Medical Association Journal*, 168(8), 969–973.
- Prugh, D.G., Staub, E.M., Sands, H.H., Kirschbaum, R.M., & Lenihan, E.A. (1953). A study of the emotional reactions of children and families to hospitalization and illness. *American Journal of Orthopsychiatry*, 23, 70-106.
- Randolph, A., Gonzales, C., Cortellini, L., & Yeh, T. (2004). Growth of pediatric intensive care units in the United States from 1995 to 2001. *J. Pediatrics*, 144(6), 792-798.
- Roskies, E., Bedard, P., Gauvreau-Giubault, H., & La Fotrune, D. (1975). Emergency hospitalization of young children: some neglected psychological considerations. *Medical Care*, 13, 570-581.
- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stress Effects. (2017, January 04). Retrieved from <https://www.stress.org/stress-effects#effects>
- Sweet, L. & Mannix, T. (2012). Identification of parental stressors in an Australian neonatal intensive care unit. *Neonatal, Paediatric & Child Health Nursing*, 15(2), 8-16.
- Uvnas-Moberg, K., Arn, I., & Magnusson, D. (2005). The psychobiology of emotion: The role of the oxytocinergic system. *International Journal of Behavioral Medicine*, 12, 59–65.
- Vardaro, J. (1978). Preadmission anxiety and mother-child relationships. *Journal of the Admission of Care of Children in Hospitals*, 7, 8-15.

- Vittner, D., McGrath, J., Robinson, J., Lawhon, G., Cusson, R., Eisenfeld, L., Cong, X. (2018). Increase in Oxytocin From Skin-to-Skin Contact Enhances Development of Parent–Infant Relationship. *Biological Research for Nursing*, 20(1), 54–62.
- Ziegler, K. A., Paul, D. A., Hoffman, M., & Locke, R. (2016). Variation in NICU admission rates without identifiable cause. *Hospital Pediatrics*, 6(5), 255-260.