Factors Influencing Paternal Involvement in the Neonatal Intensive Care Unit

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Dissertation

Submitted to the Faculty of the

Graduate School of Vanderbilt University

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

in

Nursing Science

May, 2016

Nashville, Tennessee

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Dedicated to my husband, Aaron Clarkson and my children, Alexandria and Tristan Clarkson

ACKNOWLEDGEMENTS

I would like to thank my advisor and dissertation committee chair, Dr. Mary Jo Gilmer. Dr. Gilmer was patient, kind, and understanding when I needed her to be, but also could be tough and always made sure that I stayed on task. With her guidance and support, I gained the knowledge needed to complete my dissertation research and help me further my goal of becoming an independent nurse scientist. Dr. Gilmer has been my friend and advisor through many important and tough times in my life and has been sympathetic throughout the six year journey I undertook for the completion of my PhD.

I would also like to thank the other members of my PhD committee, Dr. Mary Dietrich, Dr. Elizabeth Moore, and Dr. Brent McBride. With Dr. Dietrich's patient help I was able to analyze my data and write up the results. Dr. Elizabeth Moore was supportive and her advice, especially during the development of the methodology, was invaluable. I would also like to thank Dr. Brent McBride who was the committee's expert on father involvement and whose support I greatly appreciate.

I acknowledge and thank the Vanderbilt Institute for Clinical and Translational Research (VICTR) and the Vanderbilt School of Nursing for their support of this project. VICTR provided funds for participant compensation which aided the study by helping to encourage subject enrollment.

I would like to thank my parents, Gene and Victoria Zima. My father, who passed away in 2004, was the inspiration for me to focus on studying fatherhood. My mother, who passed away in 2014, was always interested in how school was going and never seemed to have a doubt in her mind that I would finish someday. Finally, I would like to thank my husband and children. My husband was supportive and my children were understanding.

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CHAPTER I

INTRODUCTION

Literature demonstrates that while father involvement is important in children's lives, much remains unknown, especially regarding father involvement in the care of medically fragile infants in the neonatal intensive care unit (NICU). Evidence indicates early father involvement is important to outcomes of both healthy and preterm infants. Healthy infants whose fathers participated in their care have improved cognitive development (Nugent, 1991), decreased crying after caesarean section birth (Erlandsson, Dsilna, Fagerberg, & Christensson, 2007), improved maternal breast-feeding success (Susin et al., 1999), and improved infant sleep patterns (Tikotzky, Sadeh, & Glickman-Gavrieli, 2010). In the NICU, father visitation is associated with infant weight gain and improved psychosocial behaviors of the infants at 18 months (Levy-Shiff, Hoffman, Mogilner, Levinger, & Mogilner, 1990). Father visitation along with mother visitation contributes to a shorter length of hospital stay for their preterm infants (Ortenstrand et al., 2010) which may result in medical cost savings of approximately $1250 dollars a day or more (Melnyk et al., 2006).

Research suggests that not only is participation in care important, but also duration of involvement may be a factor affecting childhood development outcomes (Dubowitz, Black, Kerr, Starr, & Harrington, 2000). One gap in the literature is limited evaluation of the importance of early father involvement on later father involvement. Another gap is a paucity of longitudinal studies looking at the importance of involvement with the same father figure over time.

Statement of Problem

Limited literature focuses on the effects of father involvement and best ways for fathers to be involved in the preterm or NICU population. Very few studies have been conducted with fathers of either preterm infants or infants in the NICU. Recent research with fathers in the NICU are qualitative in design. Descriptive or correlational quantitative designs may be useful in furthering knowledge of current status and outcomes of father involvement. While literature shows that it is important for fathers to be involved with their premature infants, we do not know the extent of fathers' involvement in the NICU, how they are involved, or the best ways for them to be involved. Literature is limited regarding the effects of father involvement with preterm and NICU infants and not enough evidence has been published to show the best ways for fathers to be involved.

Purpose of the Study

The purpose of this study is to explore factors related to father involvement in a NICU setting. Previous researchers in the NICU asked fathers about their experiences and observed fathers while they interacted with their sick or preterm infants. This study is one of the first studies to explore the factors which may contribute to paternal involvement in this setting. This study queries fathers about factors from the Heuristic model of the dynamic of parental behavior and influence on children over time (Figure 1) in order to explore the relevance of this model in a NICU setting. Further information regarding this model can be found in the theoretical framework section of this paper in chapter II. This study is the first known study to utilize this theoretical model of involvement in a NICU setting.

Research Question

This study explores factors influencing father involvement described as potentially relevant to father involvement in other settings, but not yet tested in the NICU setting. Father involvement has been shown to be potentially important to NICU infants' length of stay and cognitive development. One important first step is to identify factors that affect paternal involvement and some of the ways in which

fathers are involved with their infants. The following research question will be addressed: What are the factors that influence paternal involvement in a NICU setting?

Significance

With births to unmarried women at 40.6% in 2014, and a proven relationship between a lack of father involvement and social, financial, or health related disadvantages to children born to unmarried women (Federal Interagency Forum on Child and Family Statistics, 2015), increased understanding of influences on father involvement and expanded knowledge of the importance of fathers are important topics for additional research. . This section begins with a discussion of the importance of father involvement with the pregnancy of the mother and continues with a discussion of the importance of early paternity establishment. The incidence of prematurity, characteristics of NICU fathers, and incidence of NICU infants will be discussed. This section examines the impact of later father involvement on poverty and healthcare. The importance of financial child support of the child by the father is addressed, followed by the impact of fathers on adolescent delinquency and on academic performance. Finally, the section concludes with a brief discussion of some of the gaps in the literature.

Importance of paternal involvement in pregnancy

A father's involvement prenatally may have an indirect impact on the fetus by reducing stress and improving the health of the mother. Literature shows that pregnant mothers without partner support are more likely to experience depression and have increased stress levels (Bloch et al., 2010; Manderbacka, Merilainen, Hemminki, Rahkonen, & Teperi, 1992), which in turn may increase the incidence of low birth weight infants and premature birth. Bloch, et al. (2010) studied pregnancy outcomes of unmarried poor women related to the quality of their relationships with their partners. After controlling for demographics and socio-economic factors, quality of their relationship with their partners still had an effect on maternal health outcomes, including stress, depression, drug use, and smoking status (Bloch et al., 2010). Researchers in Sweden also found a statistically significant relationship between marital status and poor

perinatal outcomes. Manderbacka, et al. (1992) discovered that unmarried women were more at risk for fetal and newborn deaths, prematurity, and incidence of low birth weight. Additionally, the findings showed that mothers in marital relationships had the lowest risk of these outcomes, but those in cohabitating relationships fared better than single mothers who were not living with their partners (Manderbacka et al., 1992).

In- Hospital Paternity Establishment

Paternity establishment may be considered a proxy measure which may help to indicate presence or absence of a father in an infant's life. Establishing paternity as soon as possible after the infant's birth appears to be important. Literature indicates it is important for fathers to sign the infant's birth certificate in the hospital (Gaudino, Jenkins, & Rochat, 1999). In-hospital paternity establishment is positively correlated with increased frequency in payment of child support ($z=7.09$, $p<0.001$) over out-of-hospital paternity establishment ($z=2.17$, $p<0.01$) and is positively correlated with increases in later biological father-child visitation ($z=4.00$, $p<0.001$) (Mincy, Garfinkel, & Nepomnyaschy, 2005). Some states have publically available birth certificate data bases online that list if paternity has been established. Minnesota, for example, has a data set of paternity establishment, but this is currently inconsistent nationwide. Reported data indicates the majority of the paternities that were established in the year 2000 were established in the hospital (Mincy et al., 2005). Research suggests that in-hospital paternity establishment has been very successful at increasing the number of unmarried parents who establish paternity (Osborne & Dillon, 2014).

Paternity establishment for unmarried mothers may also have an impact on infant mortality. Infant mortality rates are higher for unmarried mothers than married mothers (Bennett, Braveman, Egerter, & Kiely, 1994; Gaudino et al., 1999). Gaudino, et al. (1999) looked at infant mortality rates in the state of Georgia and found that the odds of an infant dying were greater for an unmarried mother whose infant did not have a father listed on the birth certificate (RR= 2.5; 95% CI 2.3-2.7) than for a

married mother whose infant did not have a father listed (RR= 2.3; 95% CI 1.6-3.1). Even after regression techniques were applied to the statistical analysis, the findings continued to show that the absence of a father's name on the infant's birth certificate proved to be an independent factor in the relative risk (RR) for infant death. This finding held true despite adjusting the RR (Mantel-Haenszel adjustment), and after adjusting for factors such as birth weight, congenital malformations, prenatal care, demographic information, smoking status, and complications during pregnancy. During the study, Georgia had an infant mortality rate of 10.6 per 1000 live births with a rate of 8.6 per 1000 for infants who had fathers listed on the birth certificates (Gaudino et al., 1999).

Incidence of prematurity

A full-term pregnancy is generally considered to range between 37 to 41 6/7 weeks post-menstrual gestation (Gomella, 2004). As defined by the Center for Disease Control (CDC), a preterm birth is one which occurs between 32 to 37 weeks post-menstrual gestation (Martin, Hamilton, Osterman, Curtin, & Matthews, 2015). A very preterm birth is defined as less than 32 weeks gestation (Martin et al., 2015). When looking at the percentage of preterm births by race in 2013, we can see that there is a disproportionate number of preterm births by race with White non-Hispanic preterm births at 10.2% , Hispanic preterm births at 11.3%, and Black non-Hispanic preterm births at 16.3% (Federal Interagency Forum on Child and Family Statistics, 2015).

Knowing the incidence of prematurity in the United States may be helpful to understand how many fathers may be affected by having an infant in the NICU. Although rates of prematurity are decreasing, in 2013 the percentage of prematurity was 11.4% (522,885 of a total of 4.2 million births) (March of Dimes Foundation, 2014) which is still one of the highest rates of preterm birth in the world (Martin et al., 2015). The March of Dimes' goal is to decrease premature birth to 9.6% or less by 2020 (March of Dimes Foundation, 2014).

Characteristics of NICU fathers

The following section discusses what is known about the characteristics of fathers in the NICU. In 2013, 40.6% of births were to unmarried women. In 2014, 64% of children were living with 2 parents, down from 77 % in 1980. This data is inclusive of step-families. Twenty four percent of children in 2014 lived with their mothers only. Four percent lived with neither parent and another 4% lived with their unmarried parents. Single fathers care for approximately 4% of American children (Federal Interagency Forum on Child and Family Statistics, 2015).

Currently, very little is known about NICU fathers. Since we do know that 40.6% of births in this country are to unmarried women, it is possible that a large percentage of fathers in the NICU are not married to the mothers. While there is currently no information regarding the number of fathers who have infants in the NICU, a proxy measure such as number of infants in the NICU may be an adequate indicator of the number of fathers in the NICU. This is not be a perfect proxy since there may be fathers with multiple children in the NICU in the same year (multiple gestations or multiple births in one year). There are also some fathers who are not involved with their infants, and the putative father (defined as the man who is reported to be the father) may not even actually be the biological father (meaning there could be two men waiting to establish paternity). Therefore, determination of the number of NICU fathers and NICU stays is problematic.

Incidence of NICU infants

Infants born at term may need to be admitted to the NICU related to suspected illnesses or severe congenital anomalies. In 2011, of a total of 3.8 million newborns hospitalized, 8.5% were preterm with an average length of stay of 2 weeks and average cost of $21,500. The total hospital costs for preterm infants in the United States was 6.9 billion dollars. Over 75,000 infants were admitted with a diagnosis of respiratory distress syndrome which had an average length of stay of 31.3 days and cost an average of $55,000 (Kowlessar, Jiang, & Steiner, 2013). Despite the data being available for certain diagnoses that

required hospitalization such as respiratory distress, the total incidence of NICU stays was not available, making an exact incidence of NICU infants difficult to report.

With regard to the national percentages of preterm birth and NICU stays, typically only infants < 35 to 36 weeks are required to stay in the NICU. In 2013, the percentage of births that were < 34 weeks was 3.4% (133,694) (Martin et al., 2015). These infants are more than likely hospitalized for a longer period of time than those infants who were born at term or late preterm gestations. Multiple gestations affects NICU stays since multiples are more likely to be born early and at lower births weights (Child Welfare Information Gateway, 2010). Multiples also affect the incidence of fathers in the NICU since the babies share the same father. What is known about multiple gestations is that there were 132,324 births in twin deliveries in 2013, 4364 triplets, 270 quadruplets, and 66 quintuplets or higher. There is a relationship between multiple gestations and NICU stays since the higher the parity, the higher the percentage of infants that are born preterm or very preterm and the higher the mortality risk. More than 50% of twins and more than 90% of triplets were born preterm or low birth weight in 2013 (Martin et al., 2015).

Later Father Involvement

Although no current evidence could be found to support this theory, father involvement in infancy may be related to later father involvement in childhood and adolescence. Lack of father involvement in childhood and adolescence is associated with increased poverty (McLanahan & Carlson, 2002), child delinquency (Coley & Medeiros, 2007; Harris, Furstenberg, & Marmer, 1998), sexual experimentation (Ellis et al., 2003; Guilamo-Ramos et al., 2012), and poor academic achievement (Blanchard & Biller, 1971; Goldstein, 1982; Jeynes, 2015). Fathers play a mediating role linking major health determinants to child outcomes. Major health determinants include family income, social support for child and family, and improvements in child education (Ball & Moselle, 2007). Lack of father involvement increases teen sexual experimentation which increases the risk of teen pregnancy (Ellis et al.,

2003). Teenage pregnancy is associated with negative child outcomes (Ellis et al., 2003), low birth weight (Roth, Hendrickson, Schilling, & Stowell, 1998), and subsequent lack of father involvement in the infant (Teachman, 2004) which may again result in an increased risk of poverty for the family. There appears to be a cyclical relationship which starts with lack of father involvement bringing about an increase in teenage pregnancy and poverty leading to a lack of father involvement (McLanahan & Carlson, 2002).

Paternal impact on childhood poverty

Paternal presence in the home helps to reduce incidence of childhood poverty on a societal level. Many children living in poverty in the United States are currently living in homes with single mothers who only have one income. Risk of poverty is increased for families with no man present (McLanahan & Carlson, 2002). In 2014, 21% of all children under the age of 18 were living in poverty, but 44% of children living in female-headed households with no spouse present were living in poverty (Federal Interagency Forum on Child and Family Statistics, 2015).

The odds of living in poverty are increased in a single mother family. In 2014, 30.6% of female households were living below the poverty line as opposed to 15.7% of male households and 6.2% of married couples (DeNavas-Walt & Proctor, 2015). Poverty is a major health determinant since poverty leads to increased risk of health problems (Cook & Blachman, 2011).

Although money received from child support payments does not eliminate poverty, custodial parents can then use support funds for necessary items and basic needs such as shelter, food, and clothing (Turetsky, 2009). Statistics from the Child Support 2014 preliminary report to Congress shows that 16 million children were served by the program and 82% of custodial parents eligible for child support were women. Twenty nine percent of custodial families live in poverty and child support provides 45% of family income for these families (Federal Office of Child Support Enforcement, 2014).

Providing child support is not just about helping to reduce childhood poverty levels, but is also positively correlated with father/child contact (Amato & Gilbreth, 1999; Argys, Peters, Brooks-Gunn, & Smith, 1998; Martinson & Nightingale, 2008; McLanahan & Carlson, 2002; Nepomnyaschy, 2007). Nepomnyaschy (2007) looked at the relationships between father/child contact and formal child support using data from the Fragile Families and Child Wellbeing Study. The author found that formal payments at one year are correlated with contact at three years (Nepomnyaschy, 2007).

Paternal impact on delinquency

Father involvement was also noted to be protective against teenage and pre-adolescent delinquency (Coley & Medeiros, 2007; Harris et al., 1998). Even after controlling for mother involvement and other factors, fathers who were described as having increased emotional involvement had teenagers with less delinquency and psychological distress (Cookston & Finlay, 2006; Harris et al., 1998). The previous study looked at a national sample of intact families, while another study which showed a relationship with nonresident father involvement and delinquency examined pre-adolescent, inner city, poverty stricken youths. Coley and Medeiros (2007) found that increased levels of non-resident father involvement were correlated with decreased levels of delinquency. Delinquency was described as behavior which included stealing, damaging property, alcohol use, drug use, cheating in school, and school detention (Coley & Medeiros, 2007).

Paternal impact on teenage sexual experimentation

Absent fathers may have female adolescent children who are more likely to have sexual intercourse at a younger age and may be at risk for teenage pregnancy (Ellis et al., 2003; Guilamo-Ramos et al., 2012; Mendle et al., 2009). Ellis, et al. (2003) longitudinally followed female teenagers in both the United States and New Zealand from age 5 to age 18. They categorized the girls as having late father absence (6-13 years old), early father absence (< age 5), or no father absence of their biological or adoptive father (who was present from birth). After controlling for demographic and socio-economic

variables, girls whose fathers were absent early had the highest rates of pregnancy and earlier consensual sex, followed by girls who had later father absence, and girls who had present fathers in that order, in both countries (Ellis et al., 2003). The authors state that the reverse was also true, that fathers who were present appeared to be protective against their daughters having earlier sex and as a result, teenage pregnancy (Ellis et al., 2003; Guilamo-Ramos et al., 2012).

Paternal influence on academic performance

Fathers also have an effect on their children's academic performance (Jeynes, 2015) and cognitive development (Blanchard & Biller, 1971; Feldman & Wentzel, 1990; Landy, Rosenberg, & Sutton-Smith, 1969; McBride, Schoppe-Sullivan, & Ho, 2005). Research indicated that father involvement in school in both cognitive and behavioral domains was positively correlated with student achievement even after controlling for mother involvement. Results showed that biological fathers were more involved in school-related discussions with their children and all father figures who talked with school officials more often had children with greater school achievement. Findings showed that father involvement in their children's education positively affects school achievement (McBride, Schoppe-Sullivan, et al., 2005).

Gaps

Fatherhood literature is beginning to describe fathers' impact on their children, but more research is needed on the influence of fathers' involvement on their hospitalized children. Specifically, in the NICU, more research is needed focused on ways to best measure father involvement, on how to describe involved fathers and the factors which may influence paternal involvement. More research on determining the predictors of involvement are needed so that work can begin on assessing risk factors for lack of involvement. Other gaps in the literature are the need to discover the most effective type of involvement (direct engagement, availability, and/or responsibility) and outcomes of involvement for NICU infants.

CHAPTER II

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Theoretical Framework

The most widely used model of father involvement in research appears to be a three component model proposed by Dr. Michael Lamb (Brown, McBride, Shin, & Bost, 2007). This model includes interaction (or engagement) with the child, taking responsibility for the child, and availability to the child (Lamb, Pleck, Charnov, & Levine, 1987). For this study, Lamb's model of father involvement was used to create a list of involvement items that were appropriate for use in the NICU. The model was then combined with the Heuristic model of the dynamic of parental behavior and influence on children over time (see figure 1) which will be described next.

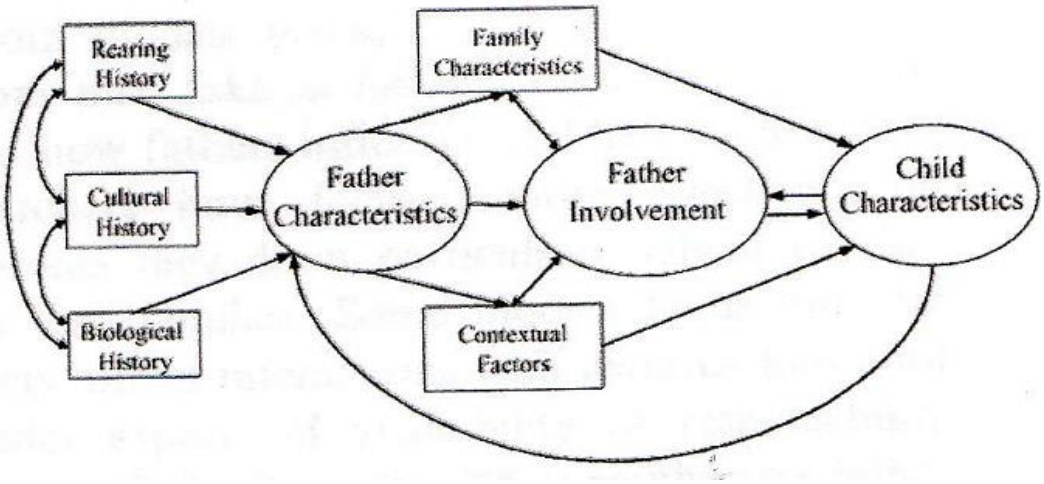

Figure 1. Heuristic Model of the Dynamic of Parental Behavior and Influence on Children over Time. From "Modeling the dynamics of paternal influences on children over the life course," by Cabrera, et al., 2007, Applied Development Science, 11 (4), p. 186.

A relatively recent model of the determinants of father involvement was proposed by Cabrera, et al. (2007). Cabrera, et al. use Lamb's model of father involvement but also built on the three component model of involvement by proposing characteristics that influence father involvement. This model will be described in more detail according to each characteristic. The current study utilized this model to guide development of survey questions to explore the relevance of these characteristics as determinants of father involvement in a NICU setting.

Characteristics included in the current study are family characteristics, father characteristics, child characteristics, and contextual characteristics. Since the model has not been tested in a NICU setting, it was important to review studies of fathers in the NICU to determine if there is evidence that this model may be relevant to NICU fathers. First, a description of the model will be discussed followed by a literature review presenting evidence that finds that the Cabrera et al. (2007) model is pertinent to this study.

Description of the Model

Cabrera and her co-authors discuss relationships among concepts in the model: Rearing history, culture, and biology of the father are all indirectly related to father involvement and are proposed to affect the fathers' characteristics (employment, education, age). For the present study, only the characteristics of involvement that are directly related will be included, so the indirect characteristics, rearing history, culture, and biology will not be addressed. Information regarding race of the father will be obtained, but only for descriptive reasons.

The fathers' characteristics, in turn, affect family characteristics such as number of children in the family or maternal characteristics such as maternal beliefs of the paternal role, contextual characteristics (parental relationship and socioeconomic status) and father involvement. Father involvement and child characteristics (age, gender, health) have a reciprocal relationship in the model. Family characteristics and contextual characteristics are also affected by father involvement. Direct relationships to father

involvement include family characteristics, father characteristics, child characteristics, and contextual characteristics and these characteristics are addressed in the current study (Cabrera, Fitzgerald, Bradley, & Roggman, 2007).

The literature appears to support the Cabrera, et al. model. The Cabrera, et al. (2007) model is the most complete model of the determinants of father involvement at this time and is an improvement on previous models of the determinants of involvement due to the fact that this model also takes the child's characteristics into account, which literature has shown is also an important determinant factor, This model describes relationships between the direct and indirect determinants which are interrelated with each other in addition to affecting involvement (Cabrera et al., 2007). Although Cabrera et al. (2007) did not include data as evidence in the article presenting their model, literature was located that supports this model and will be presented next.

Critical Analysis of Literature

Characteristics associated with father involvement

The father involvement construct has been widely used within fatherhood research for the past two decades. While the construct has been used frequently in studies of healthy infants or children, very few studies have been conducted with fathers of infants in the NICU. This section will address some of the findings related to father involvement with children and healthy and preterm infants as they relate to the determinants of father involvement summarized in the Cabrera, et al. (2007) model.

Studies located for this review show support for the Cabrera, et al. (2007) model of the direct determinants of father involvement; family characteristics, father characteristics, child characteristics, and contextual characteristics. Family characteristics included variables such as 'other children' and maternal beliefs of the paternal role. Father characteristics included beliefs of the paternal role, confidence, and feelings of readiness to accept the paternal role, employment status, educational background, and age. Child characteristics included age, level of prematurity, gender, and health status.

Contextual characteristics included marital status, socio-economic factors such as wages, and paternal satisfaction with the relationship. Literature supporting this model will be summarized next.

Family Characteristics

Maternal beliefs about the role of the father are conceptualized as being one of the variables described in the family characteristics in the Cabrera, et al. (2007) model and is an important variable in father involvement research. Mothers may increase or decrease paternal involvement with their children (Fagan & Palkovitz, 2007; Gaertner, Spinrad, Eisenberg, & Greving, 2007; Hawkins, Lovejoy, Holmes, Blanchard, & Fawcett, 2008; Kalil, Ziol-Guest, & Coley, 2005; McBride et al., 2005). Nontraditional gender role attitudes are personal characteristics that were positively correlated with maternal support of father involvement (Hoffman & Moon, 1999). In one study, a modified Role of the Father questionnaire was used to determine maternal beliefs about father involvement. Maternal beliefs of acceptance or rejection of father involvement based on the measure were termed 'maternal gatekeeping'. The findings showed that paternal perceptions of a father's own parenting ability and availability and actual involvement were moderated by the mother's beliefs about the paternal role (McBride et al., 2005). Mothers who had more protective attitudes (which were defined by certain items on a scale of childrearing attitudes that reflected maternal protection of her child) had partners who were less involved with their children than fathers of children whose mothers had a lower protectiveness score (Gaertner et al., 2007).

The number of children in the family is another variable within family characteristics. Gaertner, et al., (2007) found that there appears to be a statistically significant correlation between number of siblings in the home and father involvement with infants. The higher number of siblings correlated with less involvement by the father with the infant ($p < 0.05$) (Gaertner et al., 2007).

Contextual Characteristics

Contextual characteristics include relationship status, relationship satisfaction, and socioeconomic factors such as wages. Literature shows that a positive relationship between the infant's father and mother is important to paternal involvement among unmarried, nonresident fathers (Kalil et al., 2005). Fagan and Palkovitz, (2007) assessed relationship satisfaction by asking "How is your relationship with the child's mother?" A significant correlation was found between relationship status and involvement $F(2, 49) = 13.70$, $p<0.001$). Fathers in the acquaintance group had an increased risk of being less involved ($B= -0.28$, $p<0.001$) than the fathers in the relationship group ($B=-0.16$, $p<0.001$) (Fagan & Palkovitz, 2007). Harris, et al, (1998) demonstrated that father involvement decreased when marital conflict was high (Harris, et al, 1998). Fathers who completed a relationship course were found to be more involved in child care than a control group that did not receive a relationship intervention (Hawkins et al., 2008).

Visitation, an important involvement variable, (reflecting the availability of the father to the infant) is not a contextual characteristic, but may be affected by the relationship between the mother and father. Frank and Spencer (2003) found that fathers visited less if mothers visited less. Statistics showed that 28% of the variance of the duration of father visits was explained by duration of maternal visits alone. Fathers visited the NICU about half of the amount of time and frequency of the mother. Fathers were seen to visit less often if the infant was over 7 days of age (Brown, et al., 1989; Franck & Spencer, 2003) and if mothers visited less (Franck & Spencer, 2003).

Residency status of the father is an important factor affecting involvement. Fathers who live with their children may simply have better and more frequent access to their children (Castillo, Welch, & Sarver, 2011). Several published studies located for this review all concur that residency with the child is positively associated with father involvement (Castillo et al., 2011; Fagan & Palkovitz, 2007; Shannon, Tamis-LeMonda, & Margolin, 2005).

Socioeconomic status may be associated with father involvement. Fathers with lower income, in research from the 1990's, were found to be less involved (Yogman, Kindlon, & Earls, 1995). More recent research has reported mixed results. Wages, as part of a cumulative score, was found to be associated with increased involvement in one study (Shannon et al., 2005), but there have also been research published that has not found an association between wages and involvement (Castillo et al., 2011; McBride, Schoppe, Ho, & Rane, 2004).

Father Characteristics

Father characteristics includes variables such as age, education, employment status, confidence, role readiness, and beliefs of paternal role. These variables may all play a role in father involvement. More educated fathers were more found to be more likely to provide financial support (Landale & Oropesa, 2001) and be involved in their children's lives (King, Harris, & Heard, 2004; Shannon et al., 2005). Older fathers were found to be more involved (Castillo et al., 2011; Yogman et al., 1995) because they may have more emotional maturity and therefore be better able to accept their roles as fathers (Wood & Repetti, 2004). Education was found to be correlated with involvement. High school completion, in particular, was found to be associated with increased amounts of involvement (Shannon et al., 2005). While no recent published studies found an association between employment status and involvement, time spent at work was found to be inversely related to the amount of time that fathers spent responsible for their children (McBride et al., 2004).

Paternal confidence may improve involvement (McBride, 1990) and role readiness may be related to a sense of security in fatherhood (Persson, Fridlund, Kvist, & Dykes, 2011). Prenatal involvement, in particular, may help improve role readiness. Fathers of infants interviewed in Sweden described what helped them to feel secure in their new fatherhood role. Participation in the pregnancy and delivery of the infant was important to later contact with the child and improved mental preparation for the arrival of the infant (Persson et al., 2011). Confidence that may have been present due to prenatal

involvement may dissipate when the infant is born preterm and must then be hospitalized. Qualitative studies that have included fathers of preterm infants in the NICU showed that fathers in the NICU often feel out of control or like a novice (Arockiasamy, Holsti, & Albersheim, 2008; Pohlman, 2005). Fathers felt more comfortable performing the involvement activity of providing financially for the infant than in their role as a NICU father (Pohlman, 2005). In order for the father to regain some control, involvement activities such as inquiring about the changes in the infant's condition and plan of care were important (Melnyk et al., 2006). Simply being able to establish eye contact with their infants was important to their reality of becoming a parent (Lundqvist, Westas, & Hallstrom, 2007). Fathers reported that an exclusion from their infant's care was detrimental to their self-esteem, coping ability, and caused increasing uncertainty and distress (Fegran, Helseth, & Fagermoen, 2008). Improved confidence aided fathers in establishing positive beliefs in their role and improved their engagement with their preterm infant which resulted in a statistically significant reduction in the infant's length of stay (Melnyk et al., 2006).

Beliefs of the paternal role have been shown to be important to involvement. Fathers who believe their involvement equal to the mother were more likely to participate in high-involvement activities (Freeley, Sherrard, Waitzer, & Boisvert, 2013). Recent qualitative inquiry found that types of involvement, perception of the paternal role and motivation for involvement were important to fathers in the NICU. Motivation for participation included the desire to learn how to care for their infant, feeling responsible for the infant, and feelings of love from contact with the infant. Highly involved fathers were discovered to be more likely to feel equal to the mother in terms of their own importance to the infant. Fathers associated with this pattern of perceived involvement were found to be the only ones to have performed kangaroo care, bathed their infants or visited all day. Reluctantly involved fathers were described as being afraid of hurting their infants after their infants had been so ill (Freeley et al., 2013). This fear of being involved was seen in another study where it was reported that fathers in the NICU had a desire to be closer to their infants despite being reluctant to be involved due to their infants' fragile conditions (Fegran et al., 2008).

Child Characteristics

Child characteristics such as the child's gender and age have been found to be significantly correlated with father involvement. Fathers tend to have greater involvement with all boys and with girls who have more socialization skills (McBride, Schoppe, & Rane, 2002).

In the NICU child characteristics are especially important because the infants in the NICU are either sick or preterm which, according to the model, are likely to influence father involvement and father characteristics. A study of maternal interaction with sick or preterm infants compared to interaction with healthy infants showed that illness and prematurity was still a significant influence on parent/infant interaction at three months. Healthy infants were shown to have better orientation and state regulation than sick or preterm infants. Preterm infants had less autonomic regulation and motor control than the term infants. Observations of interactions showed that sick infants did not maintain eye contact with their mothers as long as the healthy infants did. Sick infants were described as more irritable and cried more at three months of age than the healthy infants (Greene, Fox, & Lewis, 1983).

Mothers and fathers exhibited less interaction with preterm infants than mothers and fathers with their term infants. Additionally, the fathers of both term and preterm infants showed less interaction with their infants than the babies' mothers (Harrison & Magill-Evans, 1996). Fathers most frequent activities with their infants were found to be social in nature such as talking or holding the infant (Franck & Spencer, 2003) and the majority of interaction between the fathers and infants consisted of play (Yogman et al., 1995). In this study, fathers who tended to have lower levels of involvement were described as black, young, with teenage partners, and low-income (Yogman et al., 1995). These studies of fathers and infants in the NICU mostly consisted of measures of involvement which included social activity such as talking to the infant, holding, rocking, or care tasks such as feeding or diapering.

Theoretical relationships

The proposed theoretical relationships of the independent variables in this study and their relationship to father involvement can be seen in Figure 2. The variables are organized by characteristics as postulated by the Heuristic Model of the Dynamic of Parental Behavior and Influence on Children over Time, (Cabrera et al., 2007). Although directional analysis was not conducted for the current study, rationale for potential direction of the relationship will be discussed next.

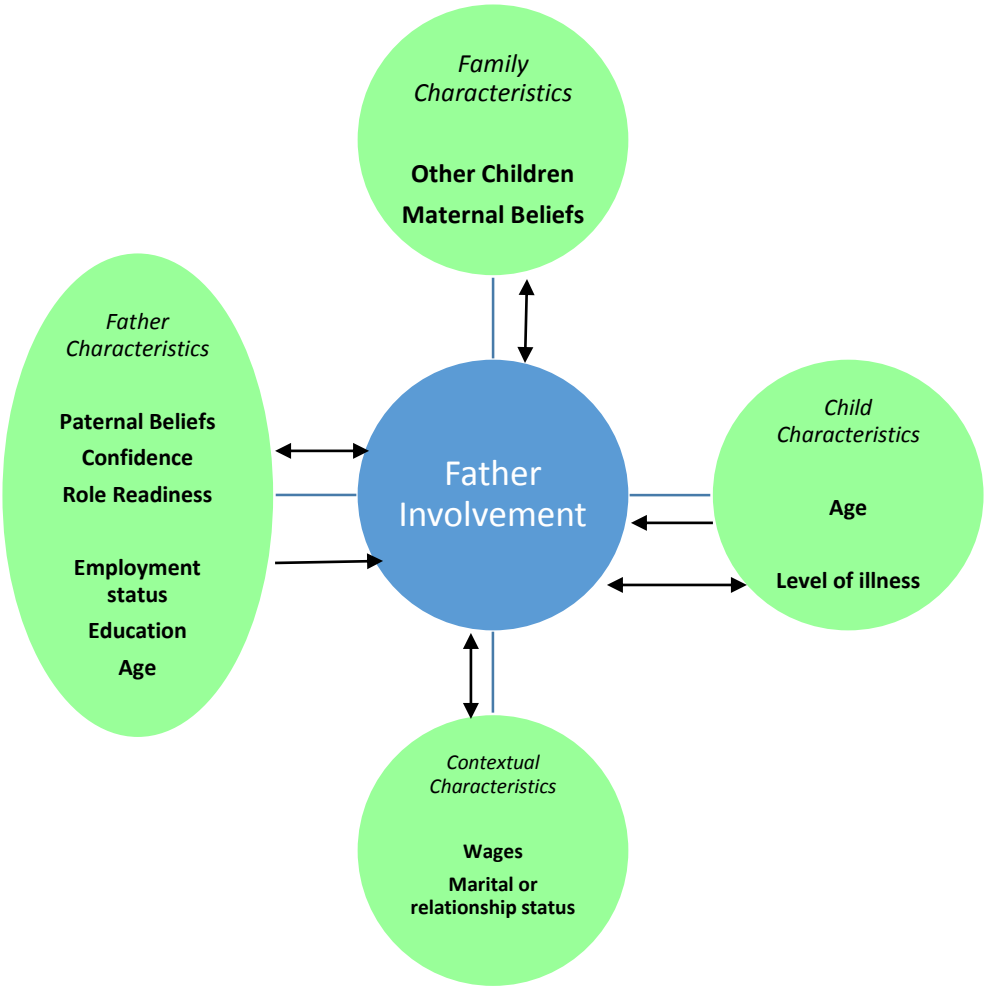

Figure 2. Independent Variables Organized by Characteristic and Theoretical Relationship to Father Involvement

Contextual characteristics such as wages and marital status likely have an effect on father involvement. A father who makes more money may work more but may have more money available for different types of activities than a father who does not have a large income. Wages might not affect the quantity of involvement but perhaps could affect the quality of involvement. Relationship status has been shown to affect involvement. Fathers who have at least an acquaintanceship with the infant's mother are more likely to be involved. Although the Cabrera et al (2007) model shows a bidirectional arrow between contextual characteristics and father involvement, it is unclear as to why father involvement would have an effect on wages or relationship status. Perhaps a father's wages would be affected by spending less time at work and more time with his child? A father who is more involved with his child may have a better relationship with the child's mother.

Father characteristics such as beliefs of the paternal role, confidence, and role readiness likely have a reciprocal relationship with involvement. A father who believes that involvement is important would be more involved. Being involved might also help to change the beliefs of a father who didn't believe that involvement was important. Confidence level would affect amount of involvement since a more confident father would be more involved. Conversely, involvement might help a father become more confident. Role readiness behaviors would mentally prepare a father for becoming a father and therefore help him to be more psychologically ready for involvement. He might become more educated about being a father as part of his mental preparation and this may help improve confidence. Involvement with his infant may also initiate readiness behaviors. Activities such as kangaroo care may initiate role readiness behavior such as putting the infant's crib or nursery together at home. Employment status, education, and age of the father are all likely to play a role in influencing father involvement but without a reciprocal relationship. An older father may have more patience for infant care or a younger father may have the energy to be more involved. An older father may be more educated, and through this formal education, may have more knowledge of how to care for an infant. A father who works many

hours may not have time or the endurance for quality interactions; while a father who is unemployed may be able to spend time with his infant.

Variables which may affect father involvement within family characteristics include other children and maternal beliefs. Although maternal beliefs likely has a reciprocal relationship with father involvement, other children likely does not have a reciprocal relationship. A father either has other children or does not. Having other children may affect involvement because a father with many other children may have less time for involvement with his infant even though he may be more knowledgeable and confident about his involvement activities. First time mothers may initially believe that they should be more involved with their infants and act as gate-keepers to father involvement, but if a father shows desire and skill with his involvement, the mother may begin to believe that a father could and should be more involved.

Child characteristics such as age and level of illness may affect involvement. Fathers may become more or less involved with their infants as they grow older. A father of a newborn premature infant would likely be less involved in the NICU because of constraints of prematurity (level of illness) but may visit more often. As the infant grows older and more able to be handled (lower level of illness), the father may be able to perform more activities with the infant, but may visit less because of work or other children. Thus while involvement may not have a reciprocal relationship with the age of the infant, there is likely a reciprocal relationship between level of illness and involvement.

Analysis of methodological issues in studies of father involvement with infants

Searches were conducted from Fall 2010 to Fall 2015. Search terms included but were not limited to; father, paternal, relationship, involvement, attachment, bonding, neonate, prematurity, preterm, infant, child, NICU, neonatal intensive care unit, and hospital. Searches were conducted using PubMed, CINAHL, ERIC, PsycARTICLES, JSTOR, Dissertations &Theses, and Google Scholar. Titles, abstracts, and references were checked for appropriateness for inclusion. English language was a requirement.

Studies were included if they were published after 1970 or if they contained evidence of fathers and infants as subjects and a measure of involvement.

Research articles that included studies of fathers and healthy, term infants or NICU infants mainly utilized cross-sectional design and survey or observational methodology. There were limited quantitative research studies that focused on fathers in the NICU. There was only one randomized controlled trial (Erlandsson, et al., 2007) with a small sample size and results generalized to fathers in Sweden. The overall lack of randomization in the located research represents an internal threat to validity. Otherwise, the importance of fathers in their infants' lives appears to hold true over a number of outcomes and settings.

Critical Analysis of Measures of Father Involvement

Overall analyses of measures used in father involvement studies show there is general consistency in the types of behaviors that are measured if not in the measurement technique itself. One problem with measures of involvement is the use of self-report surveys. Inaccurate data may result from a single source. Often only mothers are asked to provide data regarding father involvement. One method to control for this problem and help improve validity of the data is to triangulate the data by asking both parents to answer questions regarding the father's involvement. Time diary, time estimates, activity frequency measures, and relative engagement measures are often used to document father involvement (Pleck & Masciadrelli, 2004), but have not been used in the study of NICU infants. Only one study located for this review used time diary. Measures of involvement in the NICU have generally neglected to take the availability and responsibility aspects of involvement into account and have only focused on aspects of direct engagement with the infant.

Another problem in the measurement of father involvement with infants and children is that the use of many different scales and measurement of behaviors makes comparison across studies more difficult. A more consistent approach to measurement of father involvement with infants is needed to

help improve validity and reliability of findings. Many of the measures are created by individual researchers who may not report psychometrics in published studies. Since many of the studies were using regression analysis and multiple variables, the use of unreliable measures may weaken the relationships (Shadish, Cook, & Campbell, 2002).

Although there were previously published measures for infants in the literature, none were appropriate in their entirety for use with fathers of NICU infants. Therefore, a thorough review of the literature in father involvement was conducted in order to determine involvement activities which were relevant to the NICU. These activities were taken from various sources within the literature and reviewed for both appropriateness and completeness by experts in the NICU prior to use in the present study. After this list was created, a qualitative study reported activities that fathers described as being important in the NICU. These activities were diapering, bathing, feeding, observation of the infant, helping nurses with procedures, asking for information about the infant, decision-making for the infant, caring for siblings, household chores, and providing transportation for family visits (Freeley et al., 2013) and are very similar to the activities listed in the involvement measure in the present study. See methodology section for further details regarding the development of the father involvement items measure.

Definition of Variables

This section addresses possible determinants of involvement which have been described in father involvement literature and may be important to NICU fathers (see Table 1). Following is a list of the variables with their definitions and the operationalizations of the variables for this study. The variables are grouped into the type of characteristics described in the model which are postulated to influence father involvement.

Table 1. Independent Variables by Characteristic Type

Family	**Contextual**	**Father**	**Child**
Other children	Wages	Paternal beliefs	Age
Maternal beliefs of paternal involvement	Marital status	Confidence	Level of illness
	Relationship status	Role readiness (prenatal involvement, signing the birth certificate)	
		Employment status	
		Education	
		Age	

Demographic Variable

Other demographic variables such as age, wages, marital status, and number of children can be categorized into one of the types of characteristics with the exception of race. Race, according to the model, is a part of a father's cultural history. Cultural history is indirectly related to father involvement, and therefore, correlating race and father involvement was not within the scope of this study. Racial information was obtained as a descriptor.

Race

Definition: A social construct where people share may share similar features, such as skin color, and cultural background.

Operationalization-

Survey question:

Please select one or more of the following categories that you feel best describe yourself.

1) American Indian/ Alaska native
2) Asian
3) Black
4) White
5) Other/Multiracial

Family Characteristics

Family characteristics affect father involvement and child characteristics. Father involvement, in turn, affects family characteristics. Variables within family characteristics include other children and maternal beliefs of paternal role. Increases in number of children in the family has been shown to reduce father involvement with infants. Maternal beliefs of the role of the father has been shown to either limit or allow involvement depending on the amount of maternal 'gate-keeping'.

Other children

Definition: This variable may be a reflection of previous parenting patterns as well as beliefs about those patterns.

Operationalization:

Chart Review:

Is this baby's birth a single gestation or multiple? _____

If multiple, what parity? _____

Survey Question:

How many children do you have? _____

Maternal beliefs of paternal role

Definition: Individual maternal beliefs of the ways that a father could be involved in care.

Operationalization:

Survey:

What is a Father? Questionnaire (WIAF; Schoppe, 2001) described as reliable and valid. No subscales reported. 15 statements, 5 point scale (1=strongly disagree to 5= strongly agree). Higher scores on certain items were thought to reflect more 'nontraditional' beliefs about fathers (α=.70 for fathers and .73 for mothers; M=3.83, SD = 0.3 for fathers; M=3.93, SD = 0.35 for mothers) (Schoppe-Sullivan, Cannon, Brown, Mangelsdorf, & Sokolowski, 2008). (Cannon, Schoppe-Sullivan, Mangelsdorf, Brown, & Sokolowski, 2008)- used same measure and found Cronbach's α for mothers – 0.72 and for fathers- 0.71 (see Appendix).

Contextual Characteristics

Contextual characteristics are theorized to affect father involvement and child characteristics in the model. Father involvement, in turn, affects contextual characteristics. Variables included under contextual characteristics include wages, marital status, and relationship satisfaction. Increased wages may be related to father involvement, but only very old research has found an association. Married or cohabitating fathers and fathers with higher relationship satisfaction are more involved.

Wages-

Definition- How much money the father makes in a year.

Operationalization

Survey Question:

What is your family income range?

a. < $20,000

b. $20,000- $40,000

c. $40-000- $60,000

d. $60,000- $80,000

e. > $80,000

Marital status

Definition: married, single, divorced, cohabitating

Operationalization:

Survey Question:

What is your marital status?

a. married

b. single

c. divorced

d. we live together

Satisfaction with relationship with the infant's mother

Definition: Feelings that the infant's father has regarding his relationship with the infant's mother; positive, negative, or neutral.

Operationalization:

Survey Questions:

What is your relationship with the infant's mother now?

a. romantically involved

b. just friends

c. not in any kind of relationship

If answer is a or b: (branching logic)-

Would you say that your marriage/relationship is...

Mark (X) one

very happy,

fairly happy, or

not too happy?

Father Characteristics

Father characteristics are affected by child characteristics and father characteristics affect family characteristics, contextual characteristics, and father involvement in the model. Variables within father characteristics were paternal beliefs of paternal role, level of confidence, role readiness (including prenatal involvement and birth certificate completion), employment status, education, and age. Fathers who believe that their role is as important to the infant as the mother are more likely to participate in care. Fathers who are confident, involved in the pregnancy, more educated, and older are also more likely to be involved. Employment status may be associated with father involvement, but current research needs to be conducted.

Paternal beliefs of paternal role-

Definition: Perception of what a father's role in a child's life is.

Operationalization:

Survey:

What is a Father? Questionnaire for fathers (see above info for 'maternal beliefs of paternal role') (see Appendix).

Confidence -

Definition: Level of confidence that the NICU fathers feel while performing care tasks for their infants.

Operationalization–

Survey Question:

With each of the following activities, rate your confidence in how well you feel that you perform the task by using the following scale:

1. I do not feel confident in performing the task at all.

2. I feel mildly confident in performing the task.

3. I feel confident that I perform the task well.

a. diapering

b. bathing

c. feeding

d. changing clothes or linen

e. touching

f. holding my swaddled infant

g. kangaroo holding (or skin to skin holding)

h. talking, singing, or reading to the infant

j. sitting quietly at the bedside (or just visiting)

Role readiness-

Definition: Preparedness for the role of father

Operationalization:

(Bronte-Tinkew, Ryan, Carrano, & Moore, 2007)- Fathers who did not want the pregnancy were less likely to show warmth to their child ($B=-0.08$, $p<0.05$) Pregnancy intentions were measured by whether a pregnancy was wanted, wanted at a later time, wanted sooner than it occurred, wanted and occurred at the right time, or unwanted. Men who wanted the pregnancy sooner than it occurred were more likely to be engaged in nurturing ($B=0.37$, $p<0.05$)

Survey Questions:

At the time your wife/partner became pregnant with the child, did you want her to have a(nother) baby at some time?

Mark (X) one

yes

no

Did she become pregnant sooner than you wanted, later than you wanted, or at about the right time?

Mark (X) one

sooner

later

at about the right time

Thinking back to your child's birth, were you in the delivery room or the room where the child was born?

yes

no

Prenatal Involvement-

Definition: attendance of parenting education classes (fathers 'take control' and cope by acquiring skills for caring for baby), involvement with mother pre-natal appointments, attendance at delivery, 'setting up a place for baby' (crib set up, room readiness, renovations), financial planning for baby

Operationalization:

Survey Question:

Did you do any of the following before your child was born? Did you…

Mark (X) one response for each item

a. discuss how your wife's/partner's pregnancy was going with her?.. (Yes or no?)

b. see a sonogram or ultrasound of the baby? (Yes or no?)

c. listen to the baby's heartbeat? (Yes or no?)

d. feel the baby move? (Yes or no?)

e. attend childbirth classes or Lamaze classes with your child's mother? (Yes or no?)

f. buy things for the child? (Yes or no?)

Birth certificate completion-

Operationalization:

Survey Question:

Have you signed the baby's birth certificate? yes or no

(Branching logic**)- If no, do you intend to sign the birth certificate**? yes or no

Employment status-

Definition: Employed full time or part time, or unemployed

Operationalization:

(Bronte-Tinkew et al., 2007)- measured as 'working full time, part time, looking for work, and non in the labor force

Survey Questions:

Are you currently employed?

a. yes b. no

If you are employed, what is your employment status?

a. full time

b. part time

If you are employed, what is your current type of work? _____

Education-

Definition: Highest level of formal education reached.

Operationalization-

Survey Question:

What is your educational level?

a. did not complete high school

b. completed high school, no college

c. some college

d. have completed at least one college degree

Age-

Definition- the age of the father

Operationalization- Ask the father to type his date of birth

Survey Question:

Birthdate in Month, Day, Year format?

Child Characteristics

Child characteristics affect father characteristics and father involvement. Father involvement has a reciprocal relationship with child characteristics. Variables within child characteristics include infant gender, age, and acuity. Research has shown that fathers are more involved with boys, more social girls, and older children. Acuity is being used in this study as a proxy for illness which is also being controlled for. Parents of preterm infants were less likely to interact with their infants than parents of term infants.

Infant gender- (data found in chart)

Definition: male or female

Operationalization-

Chart Review:

Gender:_____

Infant age-

Definition: infant age in weeks

Operationalization-

Chart review:

Age in weeks: _____

Acuity of the infant-

Definition: How ill is the infant?

Operationalization- Four Tier System in use at All Children's Hospital. The infant belongs to a category based on the following criteria:

Level II-

>1001 grams, Vapotherm or oxygen/flow support, requiring between 6 and 12 hours of nursing care each day

> 32 weeks gestation, >1500 grams, moderately ill with problems that are anticipated to resolve rapidly and are not anticipated to need subspecialty services on an urgent basis, infants convalescing after intensive care

1000- 1500 gram birth weight, NAS during withdrawal, oxygen support, moderately ill requiring closer observation and who may need subspecialty services

Level III

< or = to 1000 grams, mechanical ventilation, HFOV, unstable CPAP, inhaled Nitric Oxide, unstable infants, pre-op or post-op, acute surgical/neurological status, total body cooling, exchange transfusions, requiring > 12 hours of nursing care per day

< or = to 1000 grams, any form of ventilator support, Vapotherm, any continuous drip medications, acute surgical/neuro/seizures, congestive heart failure, major cardiac defect, major abdominal defect, palliative or end of life care, 14 hour EEG, 48 hours post op > 1500 grams, 72 hours post op < 1500 grams, first 24 hours of birth for any infant over 1000 grams not meeting higher level criteria, day that a PICC line is inserted. Total body cooling, exchange transfusions, peritoneal dialysis, impending ECMO, < 750 gram new infant first 24 hours after admission

Operationalization:

Chart Review:

Acuity score of infant-_____

How long was the infant in level 3 acuity? _____

How long has the infant been considered level 2 acuity? _____

Involvement Variables

Involvement Tasks-

Definition: the amount of paternal engagement, availability, or responsibility to the infant. Also involves the interactions that the father has either with the infant directly or in interactions with others that are related to the infant's care (such as education, support groups, or care planning meetings). Chart reviews were conducted to attempt to confirm the information provided by the fathers and provide a secondary source of information.

Operationalization:

Survey Questions:

Which of the following activities did you participate in within the last two weeks?

a. diapering (yes or no?)

b. bathing (yes or no?

c. feeding (yes or no?)

d. changing clothes or linen (yes or no?)

e. touching (yes or no?)

f. holding my swaddled infant(yes or no?)

g. kangaroo holding (or skin to skin holding)(yes or no?)

h. talking, singing, or reading to the infant (yes or no?)

j. sitting quietly at the bedside (or just visiting) (yes or no?)

k. asking questions about care plan, treatments, or equipment in the NICU (yes or no?)

l. participation in NICU parent support groups (yes or no?)

m. attending care conferences about my infant (yes or no?)

n. supporting the infant financially (yes or no?)

o. supporting the infant's mother emotionally (yes or no?)

p. I have been backing off to give the infant's mother more time to participate in activities in my place.

q. taking on additional responsibilities at home so that the baby's mother can spend more time with the baby (i.e., caring for the other children or taking care of pets, running errands, house cleaning, etc.)

r. I don't think a father should participate in these types of activities.

s. I haven't participated in any of these activities.

Chart Review:

Observation by the bedside nurse who recorded occurrences of social, cleaning, and feeding activities.

Previous 2 weeks any activities in chart-

_____

Visitation-

Definition- How many days in two weeks the father has come to see his infant in the hospital and if he is visiting alone or with someone and if so, with whom.

Operationalization-

Survey question-

How often have you visited your infant in the past two weeks?

a) I have not visited in the last two weeks b) Visited 1 or 2 times in the last two weeks c) visited 3 or more times, but not every day d) I visited my infant every day in the last two weeks

Do you usually visit with another individual or by yourself?

a. another individual

b. by myself

Branching Logic for 'Another individual' 22. If you visit with someone else, please select the person or people that you usually visit the infant with? A) the baby's mother b) other family c) friends d)other- _____ (If other, please describe the relationship)

Open-Ended Questions

Perceptions of Involvement-

Definition: How much does the father perceive that he is involved?

Operationalization- Survey question asking the father if he feels like he has been involved with his infant since the birth followed by open format questions designed to explore facilitators and barriers to involvement.

Survey Questions:

How would you rate your involvement with your infant since her/his birth?

a. very involved

b. mostly involved

c. not as involved as I would like to be

d. not involved

If you answered 'c' (can use branching logic here)- Why do you think you are not as involved as you would like to be? _____--

If you answered'd' (again, branching logic can be applied)- Why do you say that you are not involved? -

_____

Were there barriers to your involvement and if so, what were they? -

_____

If these barriers were removed, would this change your level of involvement?

_____

(Branching Logic) If you answered a or b- Are there any people or things that have occurred during the NICU stay so far that have helped you to be involved with your infant?_____

Summary

. The model of father involvement by Dr. Michal Lamb proposed in 1987 (Lamb et al., 1987) and a model of the determinants of father involvement proposed by Cabrera et al. (2007) combined are the theoretical basis for this study. The three components of father involvement are direct engagement with the child, responsibility, and availability (Lamb et al., 1987). The direct characteristics influencing father involvement are family characteristics, father characteristics, child characteristics, and contextual characteristics. (Cabrera et al., 2007). The literature supports use of these models with infants, but they have not been utilized with infants in the NICU. Research on father involvement with NICU infants has mostly consisted of qualitative inquiry. There were very few quantitative studies. These few quantitative studies consisted of cross-sectional, survey, or observational methodology with only one randomized controlled trial. Problems in methodology include a lack of randomization, a lack of quantitative research, and a lack of randomized controlled trials. A major methodological issue in the area of father involvement in the NICU is a lack of a consistent, valid, and reliable measure of father involvement. The measures used in this study were mostly obtained from prior research studies and from large surveys. The next chapter will describe the methodology used for this study and will describe the creation of the measures in greater detail.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to describe the methodology that was utilized in this study of fathers in the neonatal intensive care unit. This section discusses the research design and assumptions, followed by a description of the study sample including sample size and characteristics, sampling plan, and strategies to ensure human subjects protection. Description of data collection methods which include descriptions of the procedures and measures that were used to help minimize limitations are followed by a discussion of study credibility, rigor, and validity.

Design and Assumptions

Design

An exploratory, descriptive, correlational, cross-sectional design was used to explore the construct of father involvement and factors which may be related to father involvement in the NICU. Along with demographic information regarding paternal education, name and address for follow-up purposes, age, race, and number of children, fathers were asked about previously discussed factors which have been shown in the literature to affect their involvement with their children. A self-report survey was used to obtain both quantitative and qualitative data that describes father involvement and factors which may affect this involvement. A chart review was conducted to describe what types of involvement activities the babies' nurses documented in their charting.

Assumptions

This dissertation addressed factors important to father involvement in NICU. Two assumptions were made in the design of this study:

a. Factors previously identified as contributors to father involvement in other settings may be relevant to involvement of fathers in the NICU.

b. Involvement activities previously identified in fathers of older children or healthy infants may be relevant to fathers in the NICU.

Description of Research Setting

All Children's Hospital (ACH) is a free-standing children's hospital located in St. Petersburg, FL and is the only specialty licensed children's hospital on Florida's west coast with a full range of pediatric specialists available. ACH was founded in 1926 and is a referral center for children across the state of Florida. In 2010, the facility moved to a new building to house the hospital. In 2011, the organization became a fully integrated member of Johns Hopkins Medicine and is part of the Johns Hopkins Health System. ACH has 259 licensed beds with over 7600 inpatient admissions per year. The hospital boasts a 28 bed pediatric intensive care unit, a 22 bed cardiovascular intensive care unit, 12 operating rooms, a 28 bed pediatric trauma unit, and a 97 bed neonatal intensive care unit. The setting for this study is the 97 bed NICU which includes 37% of the available hospital beds at ACH. (All Children's Hospital, 2014).

While the NICU has a reported availability of 97 beds, typical monthly census ranges from 70-85 patients with approximately 1150 admissions per year. The most common diagnoses for the patients at this NICU include prematurity, respiratory distress syndrome, sepsis, neonatal abstinence syndrome (NAS), and other conditions such as renal or cardiac issues. For the purposes of this study, infants with NAS as their only diagnosis were excluded (see inclusion/exclusion criteria for further details).

In the NICU at All Children's Hospital, involvement activities are encouraged for both parents. Parents are invited to be present during rounds. Visitation is very important so there are some private and some semi-private rooms. Visitation is restricted to two individuals at a time, unfortunately. At night, only one parent is allowed to room with the infant in their hospital room. There are, however, two rooming-in areas where both parents can stay, but these are mostly reserved for parents of infants with

complex care needs or for those who staffing feel would benefit from a night or two to care for their infants with the benefit of NICU nursing support prior to discharge. The staff at All Children's NICU try to encourage positive caring relationships between nursing and families and incorporate primary nursing. Primary nursing is not required for every infant, however, and a primary nurse does not necessarily follow an infant from admission to discharge.

Sample

Nature and size of sample

The sample recruited for this study included father, mother, and infant triads in the NICU at All Children's Hospital in St. Petersburg, Florida. Convenience sampling technique was employed and after determining eligibility, fathers and mothers were recruited either in-person or by telephone. Parents recruited in-person were given a choice of completion of the survey online directly or a verbal interview. The telephone method was used to attempt to contact parents when meeting in-person was not an option prior to the discharge of the infant. Consent to obtain data was inferred based on completion of the survey. Parents recruited over the phone were verbally interviewed. The sample was a convenience sample of eligible parents in the NICU at All Children's Hospital. A total sample size of 80 father/mother/infant triads was enrolled over a 13 month time period.

Criteria for sample selection

The targeted population for this study was fathers of infants in the NICU. Inclusion criteria included biological fathers of infants in the NICU. Fathers were either actively involved or described as being involved by the infant's mother. Fathers were included if their infants were at least 2 weeks in a level II acuity category and either were never in level III or were in level III acuity for 72 hours or less prior to taking the survey. The underlying rationale for the inclusion criteria was to allow inclusion of as many fathers as possible but to attempt to control for the level of illness while at the same time providing enough time for the fathers to be actively involved with their infants prior to taking the survey.

Exclusion criteria were fathers of infants where the only diagnosis was Neonatal Abstinence Syndrome, infants of adoption or same-sex parents, infants who had a Department of Children and Families (DCF) ongoing investigation, or infants being placed into foster care. Infants with neonatal abstinence syndrome were excluded because treatment for these infants is very different than the other infants in the study and these infants require a different type of specialized care.

Methods for subject recruitment

Infant charts were screened prior to parents being approached in order to determine eligibility for inclusion in the study. The researcher reviewed charts of all infants admitted to the ACH NICU from July 27, 2013 to September 13, 2014 to determine eligibility. The researcher then recruited parents who met inclusion criteria by describing the study to them at the bedside or over the telephone. A verbal description of the study was provided to all parents and written information was given to parents when meeting them at the bedside (see Appendix A). Consent to obtain data was inferred based on completion of the survey.

The researcher reviewed 1379 charts, 141 fathers and infants met the inclusion criteria, but 48 were discharged before they could be approached by the investigator. Twelve fathers were too busy to participate as reported by the infant's mothers and 1 father declined participation. His rationale to decline participation in the study was that he felt mistreated by the unit. Eighty fathers agreed to participate and outcome data was obtained for all enrolled fathers. This information can be found in more detail in Table 2. Fathers were asked in the survey if they were interested in participating in a follow-up study and if they were, name and contact information was obtained for follow-up purposes only.

Table 2. Charts reviewed and rationale for inclusion or exclusion from study (N=1379)

Rationale for Exclusion	**N**
Discharged < 14 days	849
Level III status for > 72 hours	202
CPI hold or neonatal abstinence syndrome	128
In prison or not involved	30
Non-English speaking	8
Adoption	2
Homosexual couple	1
Infant death while in NICU (before 72 hours)	18
Met Inclusion criteria	**N**
Participated and outcome data collected	80
Unable to approach prior to discharge	48
Too busy	12
Declined	1

Strategies to ensure human studies protection

After approval from the IRBs at Vanderbilt Medical Center and All Children's Hospital, the researcher developed a Research Electronic Data Capture (REDCap) survey of identified measures. Enrolled participants then directly entered responses into the REDCap survey or the researcher transcribed data into REDCap format from telephone surveys. All data were entered directly into REDCap by either the researcher or the subjects. To ensure confidentiality, a log-in ID and password were required to access the survey and only the study PI and the committee members from Vanderbilt

University had access to the data. The researcher identified eligible participants through a current census list and identifiers such as infant name and medical record number (MRN) were used during the data collection phase of the study only to be able to collect all relevant information needed for the study and to ensure that all possible subjects were recruited with no duplications.

All quantitative data are reported in aggregate. The names and addresses of fathers are maintained in an electronic file protected by a password for the possibility of a future follow-up study. Prior to completing the survey, the researcher informed participants verbally and through written instructions about the study (see Appendix A) that qualitative data may be reported in the results as a quote and therefore could be identifying. All data that is downloaded from REDCap Survey will continue to be stored in either an encrypted laptop computer or a flash drive in a locked cabinet or with the PI on her person.

If the parents agreed to participate, the researcher used the infant's chart to obtain demographic information such as infant age, gestational age, parity, and gender. The PI was granted permission from the ACH IRB to view the charts for the purposes of screening for participants and for obtaining the information needed to complete the study. Information from the chart that was necessary to complete the survey was entered directly into REDCap.

Data Collection Methods

Procedures

An online survey was used to obtain the data for this study. Depending on the situation, the PI was able to use several different methods to conduct the survey. Parents mostly answered survey questions directly into the online data collection tool. For parents who were being interviewed by telephone, uncomfortable with typing, or who for any other reason did not want to fill out the survey themselves, the PI was able to verbally administer the survey and type in the responses directly into the

tool. Of the 80 fathers, only 2 were interviewed by telephone and only one was assisted in responding to the survey. Because the numbers were so small, statistical analysis of differences could not be evaluated.

The next section describes the online tool used for the survey called REDCap and the ways that the PI was able to administer the survey.

REDCap survey

The format for the survey was an online survey creation tool called a Research Electronic Data Capture (REDCap) Survey. The REDCap Survey could be accessed directly for data entry by participants or by the primary investigator. Data could also be downloaded directly from the online database into SPSS or excel for further data analysis. Advantages of this online survey tool are that there is minimal cost, it is user friendly, there is less potential for error in data entry, and data can be managed easily. REDCap also allows for password protected data for human subjects research. External funding for REDCap is provided by the National Center for Advancing Translational Science and the National Institute of Health *(**UL1 TR000445 from NCATS/NIH**).*

Telephone

Surveys by telephone are cost-effective and did not require parents to be at the bedside at the same time as the researcher. Many families have difficulty obtaining money for gas or other forms of transportation. The researcher conducted telephone interviews only when she had difficulty meeting with the parents of a baby at the bedside. The telephone numbers used to reach the father were either provided by the infant's mother or by the patient's chart. The fathers were asked to verify their identity as the father of the baby at the beginning of the phone conversation.

In-person

One advantage of in-person interviewing is the fact that one can be certain of participants' identities, but this can also be a limitation if there are sensitive questions that need to be asked. In this survey, the questions were unlikely to be considered sensitive but the researcher instructed participants that participation was completely voluntary, they had the right to withdraw from the study at any time, and they had the right to not answer any questions that they did not wish to answer.

Measures

The measures used in this study include the survey for the fathers, the brief questionnaire for mothers, and a chart review. Survey development will be discussed first, followed by the development of the involvement score, visitation dependent variable, and confidence score. A description of the open-ended questions is next. Finally, a description of the chart review used to obtain information on the infant and triangulate involvement data on the father, followed by a description of the acuity measure is presented.

Survey Development

The surveys used in this study included 37 questions mostly obtained from surveys previously developed, tested, and shown to have good psychometrics. Involvement items for the dependent variables were selected after a thorough review of literature by the PI who is also a neonatal nurse practitioner. Independent variables were selected based on the proposed determinants of father involvement by the Cabrera et al. (2007) model. To test the appropriateness of the involvement items, pilot work included asking 12 neonatal nurses and neonatal nurse practitioners to evaluate the items and suggest possible revisions to the items. Of those 12, one was a bedside nurse, 2 were nurse educators, and 9 were nurse practitioners. All of the respondents were female, full-time employees and the majority (58%) worked day shift, with one night shift and 4 nurse practitioners who worked two 24 hour shifts a week. There was a large range of ages and experience levels. Age of the respondents ranged from 27 to 63 (M= 44.7,

SD= 11.9). Experience in a NICU (M= 18.6, SD= 12.5) and as a nurse (M=21.1, SD=13.4) both ranged from 2 years to 40 years. The majority of respondents described their race as Caucasian (N=11, 91.7%) with 1 Pacific Islander. Most of the respondents had Master's degrees (N=11, 91.7%) with one holding a DNP. Only 25% of the respondents were working on a higher degree. Eight respondents were married, 1 never married, 1 divorced, and 2 were living with a partner. Seven of the respondents had children.

A change in one of the items was made because one of the pilot testing participants objected to the word "allow" within one of the involvement items. The item was then changed to read that the father was 'backing off' from care so that mother can participate more. The revised survey was then reviewed by the dissertation committee. After approval by the committee and the IRB at both Vanderbilt University and All Children's hospital, fathers began to complete the survey in REDCap or verbal format.

The survey includes established measures/items with adequate psychometrics or conceptual validity based on use in previous surveys to assess factors which may affect father involvement in the NICU. The What is a Father? Questionnaire (WIAF; Schoppe, 2001) (see Appendix B) is reliable and valid (α=.70 for fathers and .73 for mothers; M=3.83, SD = 0.3 for fathers; M=3.93, SD = 0.35 for mothers) (Schoppe-Sullivan, et al., 2008). Cannon et al. (2008) used the same scale and reported the Cronbach's α for mothers as 0.72 and for fathers as 0.71. Previous studies used the What is a Father? Questionnaire with parents of healthy infants and this measure has not been used before in the hospital setting.

The What is a Father? Questionnaire was used in its entirety for the fathers in this study without any changes. The questionnaire was also given to the mothers in this study (see Appendix C) with all but question #15: Fatherhood is a highly rewarding experience. This was removed from the survey because although mothers would have been able to answer a question asking if motherhood was highly rewarding or not, they would not be able to say if fatherhood was rewarding since they are not fathers.

Because this research is related to father involvement with a population not previously studied, no previously developed survey was appropriate for use in the entirety. The items chosen for this study are brief, yet comprehensive in order to reduce burden on the subjects and to achieve maximum participation while still maintaining the integrity of the study. The father's survey can be found in Appendix D.

The survey items utilized for this study to operationalize the dependent variables reflect the three component model proposed by Dr. Michael Lamb and include involvement activities which demonstrate direct engagement with the child, taking responsibility for the child, and availability to the child (Lamb, et al., 1987). The visitation item was kept in the involvement dependent variable list of activities because it reflected paternal availability to the child. The dependent variable of visitation was added so that more specific information about visitation could be collected. The remainder of the involvement items reflect a combination of responsibility and interaction. Out of the thirteen items included in the involvement measure (see Table 3.), only eight items were used to score involvement (see Table 4) because every father in the study would have had an opportunity to participate in each of them during the time of his child's hospitalization. Kangaroo care was part of the involvement score but was singled out as an activity (in addition to bathing) identified by prior research which may reflect a higher level of involvement (Freeley, et al., 2013). Measures included in the father's survey will be discussed next.

Table 3. Involvement Tasks by Component (N=13)

Direct Engagement	Availability	Responsibility
Diapering	Visiting	Asking about baby's care
Bathing		Participating in NICU parent groups
Feeding		Attending care conferences
Changing clothes or linen		Financial support of infant
Touching		
Holding a swaddled infant		
Holding skin-to skin		
Talking		

Table 4. Involvement items Included in the Score (N=8)

Direct Engagement	**Availability**	**Responsibility**
Diapering	Visiting	Asking about baby's care
Changing clothes or linen		Financial support of infant
Touching		
Holding skin-to skin		
Talking		

Involvement score

The involvement score consists of eight activities including diapering, changing clothes or linen, touching, holding skin-to-skin, talking, visiting, asking about baby's care, and financial support of the infant (see Table 3). Due to differences in the gestational ages and health status of the infants in the study, the researcher, in consultation with the study statistician, decided that although data was obtained on thirteen activities, only the items that every father would have had an opportunity to perform would be included in an involvement score (see Table 4). Additionally, the other items had a high amount of involvement and limited variability making statistical analysis unlikely to show correlations for this reason. Fathers checked each item as either performed within the last two weeks or not performed within the last two weeks. The total score was based on one point given for each item that the father checked that he performed with a range of possible scores from 0 to 8. A score of 0 indicated the father did not perform any of the tasks in the past two weeks and a score of 8 indicated the father performed all tasks within the previous two weeks.

Visitation

The Visitation dependent variable was collapsed from the following ordinal categories; not visited in the last two weeks, visited 1 or 2 times, visited 3 or more times but not every day, or visited infant every day. The categories were collapsed, in part, to place more even numbers of subjects into each group for the purposes of statistical analysis. The three remaining groups were: 1) less than or equal to 2 days, 2) between 3 to 13 days, or 3) every day. Visitation was defined as at least one visit per day and did not take into account the length of each visit.

Confidence in Tasks

While thirteen items asked about involvement, not all of those involvement items made sense conceptually to ask fathers if they were confident performing them or not. Only father involvement items that were related to direct engagement in care or availability were included in the confidence item list, so of those thirteen items, only nine were included when asking fathers about their confidence in performing the tasks (see Table 5). Self-report of fathers' confidence focused on nine activities; diapering, bathing, feeding, changing clothes or linen, touching, holding a swaddled infant, holding skin-to-skin, talking/singing/reading to the infant, and visiting. Of these nine items, however, only six were available for every father that was in the study (see Table 6). It may be somewhat confusing that there were eight items in the involvement score and only six were included in the confidence score, but recall that the eight items in the involvement score included all aspects of father involvement; direct engagement, availability, and responsibility. Two of the items that were in the involvement score had initially been excluded from the list of confidence activities because they were associated with responsibility, not direct engagement or care. The six confidence score items were diapering, changing clothes or linen, touching, holding skin-to-skin, talking/singing/reading, and visiting (see Table 6). Fathers chose how confident they felt performing each activity so that a 1 meant the father was not confident, a 2 meant that the father was mildly confident, and a 3 meant that the father felt confident. The items were averaged so that each father received a score between 1 and 3.

Table 5. Confidence Items (N=9)

Direct Engagement	**Availability**
Diapering	Visiting
Bathing	
Feeding	
Changing clothes or linen	
Touching	
Holding a swaddled infant	
Holding skin-to skin	
Talking	

Table 6. Items Included in Confidence Score (N=6)

Direct Engagement	**Availability**
Diapering	Visiting
Changing clothes or linen	
Touching	
Holding skin-to skin	
Talking	

Open-ended questions

Open-ended questions add richness to the information obtained from the survey (see Appendix E). Fathers were asked to rate how they perceived their involvement. If they felt that they were not as involved as they would like to be, they were asked what kinds of barriers were limiting their involvement.

Fathers who indicated that they were very involved or mostly involved were asked if there were any facilitators to their involvement and if so, what those facilitators were. There were no fathers who felt that they were not involved. Finally, fathers were asked if they would provide contact information and consent to be contact in the future for a possible follow up study.

Chart review

Chart reviews provided information about the infants (see Appendix F). Information that was gathered from the chart about the infants included age, gestational age, gender, amount of time on level 2, amount of time on level 3, and if the infants were singletons or part of a set of multiples. Chart reviews also revealed information about the past two weeks of activities by the fathers described in the chart by the bedside nurse. The researcher assessed if there were any qualitative comments in the medical record made by the nurse about the father's comfort level in interacting with his infant during the activities.

Acuity

Infants in the NICU vary in their level of illness. A level III category of acuity generally reflects an infant who is requiring some kind of mechanical ventilation as opposed to a form of respiratory support that may simply provide flow such as a nasal cannula. Infants who are born at earlier gestational ages, or even critically ill term newborns, are more likely to require continuous IV medications that help to keep their blood pressure stable in addition to mechanical ventilation. They may also have central lines that are emergently placed in the umbilicus. Due to these infants' instability and the fact that these types of interventions make holding the infant or performing care difficult or impossible for a parent (for the safety of the newborn), the researcher decided that infants in this study would be limited to those who were less than 3 days on level 3 status. To give the father ample opportunity to be able to hold the infant and perform tasks of care after the infant has become more stable, the researcher also decided that the infant must be on level 2 status for at least 2 weeks prior to inclusion in the study.

Rigor and measurement error

The PI of this study has CITI training and current certification in human subjects' protection. The PI is a PhD candidate, certified neonatal nurse practitioner and an expert in the care of infants in a neonatal intensive care unit. The design of this study is exploratory, cross-sectional, and non-experimental. Due to the state of the science of father involvement in the NICU, an exploratory design is appropriate at this time. While correlational relationships may be discovered, causality cannot be assumed. The aim of this research is to begin to describe factors which contribute to paternal involvement in the NICU.

Error reduction is an important goal in survey methodology. In order to reduce error, two inferences must be made: The subset of the population sampled must be similar to the overall population and answers given to the survey questions must accurately reflect the respondents' characteristics (Groves et al., 2009). Demographic information was obtained from the fathers and on the infants in the sample of the population surveyed in this study, however, due to the lack of knowledge regarding the overall population of fathers in the NICU and its composition related to age, race, marital status, etc., it is difficult to determine accurately if this subset of the population is similar to the population in the U.S (see incidence of NICU fathers section for further information regarding what is known of the population). There is also no data regarding the population of fathers at All Children's Hospital. With regard to the participants' answers accurately reflecting their behaviors and beliefs, measures to control for survey error included using psychometric measures with known construct validity, eliminating duplication and coverage error, reduction of nonresponse error, reduction of refusals (through the use of a small incentive), and reduction of problems in comprehension and misinterpretation of the survey questions (through the use of pilot testing).

Some limitations that can occur when responding to questions in survey methodology include social desirability bias, problems with estimation, and problems with memory. Social desirability bias is

a term which refers to the respondent's desire to place himself in a more flattering light to the interviewer (Groves et al., 2009). One way to reduce the effects of social desirability bias is to ask the respondents to complete the survey anonymously. Therefore, in this study, subjects were able to complete the survey via computer using an online survey program without revealing their identity. The data was also reported in aggregate and ID numbers were used instead of names to identify the subjects during data analysis.

Problems with estimation and problems with memory are two ways that measurement error can occur when obtaining data via survey format. Problems with estimation refer to the act of estimating how many times a deed was performed. Problems with memory refer to the actual recall of relevant information from long-term memory (Groves et al., 2009). To reduce these potential measurement errors in this study, participants were simply asked if a task was performed within the last two weeks, so data collected did not include specific dates and times of performed tasks.

Data Analysis

The research question for the study guided the data analysis: What are the factors that impact paternal involvement in a NICU setting? The SPSS statistical program was utilized for analysis of the data collected. The main strategy for minimizing missing data was to prevent the occurrence of it. After fathers completed each survey, the data collector looked over the survey to see if there were any missing answers prior to leaving the area. The data collector then asked the subject if the intention was to leave the question/questions blank. If this was not the intention, the data collector asked the subject to fill in the answer(s).

Normally distributed continuous data were summarized using means and standard deviations; otherwise medians and interquartile ranges were reported. Nominal data were summarized using numbers and percentages. Ordinal data were summarized using interquartile range and median.

Associations of each of the nominal independent variables [employment status, marital status, relationship status, role readiness, infant gender, infant parity and paternal delivery room attendance] with

father involvement, were assessed with Pearson Chi-Square Tests of Independence. Ordinal and continuous variable associations [educational background, confidence, paternal beliefs, infant age, infant level of prematurity and level of acuity, father's income, and number of children] used Kruskall-Wallis Tests. The maximum alpha was set at 0.05 in order to determine a statistically significant correlation. Qualitative data were obtained in the form of responses to brief questions regarding any additional thoughts or suggestions the father may have to provide more insight into how fathers feel about any facilitators or barriers to their involvement in the NICU.

Sample size and statistical power

Initial sample size calculations were conducted with the intention of conducting a hierarchical regression analysis. The equation used was (N > or equal to 50 + 8 *m)* (where *m* is the number of IVs) for testing the multiple correlation and (N > or equal to 104 + *m)* for testing individual predictors. In this study, there are 13 IVs so the calculation shows a need for N > or equal to 154 for testing multiple correlation and N > or equal to 117 for testing individual predictors which assumes an alpha of .05 and beta of .20 (Tabachnick & Fidell, 2007). A sample size of 160 was recommended to perform a regression analysis.

Recruitment was limited by the eligibility requirements for the infant to be on level III status for less than 72 hours and on level II status for at least two weeks. The majority of infants that met the qualification of being on level III status for less than 72 hours were discharged at less than 2 weeks of age. The unit was undergoing many changes including a change of leadership and a change of ownership during the timing of the study and there was concern that these changes could affect the history of the families that were participating in the study if the study continued for more than 18 months. Sample size required was reduced to 80 mother/father/infant triads to minimize confounding effects of history of the unit.

CHAPTER IV

FINDINGS

Statistical analyses were conducted based on the Heuristic model of the dynamic of parental behavior and influence on children over time (Cabrera et al., 2007). Demographic information about the fathers and the infants in the study were obtained based on the direct relationships of the determinants of father involvement described in the model. Race is indirectly related to father involvement in the model and was obtained for descriptive purposes only. This chapter will initially describe the characteristics of the infants and of the fathers. Subsequently, the presentation of the descriptive and correlational findings with father involvement that are related to the model will be presented.

Sample characteristics

Demographic information was obtained on eighty fathers and infants during this survey study conducted between July 2013 and September 2014 at All Children's Hospital in St. Petersburg, Fl. Ages of the fathers ranged between 20 and 53 with a median age of 31. Most of the fathers reported themselves as being married (58.8%) or living with the mother of the baby (25.0%) at the time of the study. The fathers in the study had as few as one child or as many as 9 children with a mean number of 2 children. For 43% of fathers, the infant was his first child. The majority of fathers had attended some college classes (33.8%) however, 10% did not complete high school and 26.3% completed high school, but did not attend college. On the other hand, 27.5% had completed at least one degree. The majority of fathers were employed full-time. Only 14 (17.5%) were unemployed, and of the 66 (82.5%) who were employed, only 7 of those (10.6%) were working part-time. Of the 80 fathers who participated, 76 responded to the question on family income. Approximately a third of families (32.9%) in the study

made between $20,000 to $40,000 dollars a year in income. However nearly as many participants had family incomes over $80,000 a year (N=17) as those who made less than $20,000 a year (N=18). The majority of the fathers in the study were white (52 of 80, 66.3%) with a minority describing themselves as black (22 of 80, 27.5%) and a smaller minority who described themselves as multiracial (6 of 80, 7.6%).

The infants in the study ranged in age from 2 to 8.7 weeks old at the time of data collection. Most of the infants were male (52.5%) and singleton (77.5%) in parity. Of the infants born with multiple gestation, there were 16 infants who had a twin (20.0%) and 2 infants who were part of a set of triplets (2.5%). Gestational age at birth ranged from 27 to 41 weeks with an average gestational age of 33 completed weeks. Length of time on level III status was required to be less than or equal to 72 hours for inclusion into the study, so the range of length of time on level III status was from 0 to 72 hours with a median of no time on level III status. Infants were on level II status for a median of 20 days with 25% on level II status longer than 15.3 days and 75% on level II status for less than 28.8 days.

Involvement Item Summaries

Out of all thirteen of the involvement items identified, almost all of the items had at least 80% of fathers who had performed the activity within the previous two weeks. Three fathers (3.8%) checked the response that they didn't think a father should participate in any of the activities and 31 (40.8%) said that they were backing off so the mother could spend more time taking care of the infant. Only 79 fathers checked the box saying that they had visited within the past two weeks. There was one missing item because all 80 fathers answered that they had visited when asked more specifically how often they had visited. The chart review showed that the nurses had documented visitation for all of the fathers. There were four items which had less than 80% participation. Participating in NICU care conferences (N=24, 30%) and parent groups (N=24, 36.3%) had the lowest percentages of participation followed by bathing (N=33, 41.3%) and holding skin to skin (N=50, 62.5%). Out of those four items, only bathing (N= 33

41.3%) and holding skin-to-skin (N=50, 62.5%) were identified in previous research to reflect higher levels of involvement and were therefore included as dependent variables (see Table 7).

Table 7. Involvement Items and Involvement Score

% that answered affirmatively to each activity	N (%)
Diapering ** (N=78)	67 (83.8)
Bathing (N=78)	33 (41.3)
Feeding (N=78)	66(82.5)
Changing clothes or linen ** (N=79)	67 (83.8)
Touching ** (N=78)	78 (97.5)
Holding swaddled infant (N=78)	75 (93.8)
Holding skin-to-skin ** (N=79)	50 (62.5)
Talking ** (N=79)	78 (97.5)
Visiting ** (N=79)	79 (98.8)
Asking about baby's care ** (N=79)	78 (97.5)
Participating in NICU parent groups (N=78)	24 (30.0)
Attending care conferences (N=79)	29 (36.3)
Financial support of infant ** (N=78)	76 (95.0)
	Median (min, max)
Involvement Score (included items **)	8 (2, 8)

Involvement chart review

Not all thirteen involvement items were documented by the nurses. Only nine of thirteen items were found to have been documented by nurses. Data was collected from the chart on the items that could be examined and are presented in the table below (see Table 8). Based on documentation by the babies' bedside nurses, fathers visited (N= 79, 98.8%), touched the infant (N= 38, 47.5%), held a swaddled infant (N=44, 55%), fed the infant (N=39, 48.8%), diapered (N = 31, 38.8%), and held skin-to-skin (N= 13, 16.3%). The only item that was consistent in documentation between the nurses and fathers was visitation. Involvement items that were not documented by the nurses to have been performed specifically by the father include bathing, changing clothes, and talking/singing/reading (see Table 8).

Table 8. Involvement Chart Review

Diapering	N (%)
checked	31 (38.8)
unchecked	49 (61.3)
Bathing	
checked	0 (0.0)
unchecked	80 (100.0)
Feeding	
checked	39 (48.8)
unchecked	41 (51.3)
Changing clothes	
checked	0 (0.0)
unchecked	80 (100.0)
Touching	
checked	38 (47.5)
unchecked	42 (52.5)
Holding swaddled infant	
checked	44 (55.0)
unchecked	36 (45.0)
Holding skin to skin	
checked	13 (16.3)
unchecked	67 (83.8)
Talking, singing, or reading	
checked	0 (0.0)
unchecked	80 (100.0)
Visiting	
checked	79 (98.8)
unchecked	1 (1.3)

Involvement Score

Approximately 50% of the fathers (42 of 80, 52.5%) had a total involvement score of 8, the maximum possible. Subsequently, the fathers were then placed into 3 categories based on their total score; < 7, 7, and 8. These categories allowed for some variability for testing associations. There were 17 fathers who scored less than 7 (21.3%), 21 fathers who scored a 7 (26.3%), and 42 fathers who scored an 8 (52.5%) (see Table 9).

Summaries of the associations of the overall involvement score with the specific behaviors are presented in Table 9. There were statistically significant associations of kangaroo care and bathing with

the involvement score (p< 0.001 and p=0.025 respectively) but not visitation (p=0.411). As shown in Table 9, all of the fathers with involvement scores of '8' had performed kangaroo care while less than one-third of those with scores of < 8 had done so. Approximately half of the fathers with involvement scores of 7 or 8 had bathed and only 2 (12.5% of those with scores < 7 had bathed their infant. Regardless of the involvement score, approximately 90% of the fathers had visited more than 2 days over the 14 days (see Table 9).

Table 9. Summary of Involvement Score for Each of the Other Father Involvement Measures.

Involvement Score	<7	7	8	
	N (%)	N (%)	N (%)	P value
Entire sample (N=80)	17 (21.3)	21 (26.3)	42 (52.5)	
Kangaroo Care				<0.001
No	11 (68.8)	18 (85.7)	0 (0.0)	
Yes	5 (31.3)	3 (14.3)	42 (100.0)	
Bathing				0.025
No	14 (87.5)	11 (52.4)	20 (48.8)	
Yes	2 (12.5)	10 (47.6)	21 (51.2_	
Visitation days in 2 weeks				0.411
<= 2	2 (11.8)	2 (10.0)	1 (2.4)	
3-13	8 (47.1)	6 (30.0)	20 (47.6)	
14	7 (41.2)	12 (60.0)	21 (50.0)	

Visitation

The majority of fathers visited every day (N=40, 50%) with 34 of them visiting at least once a day for at least three days but less than every day in the two week period. Only 5 fathers (6.3%) visited two or less days in the two weeks. Fathers typically visited with the infant's mother (N = 61, 76.3%) followed by family (N= 21, 26.3%) and friends (N= 12, 15.0%). Only 22.5% (N=18) of fathers reported usually visiting by themselves. Visitation was statistically significantly related to bathing (p = 0.016) so that the more often a father visited, the more likely

he was to bathe the infant. Visitation was not statistically significantly related to kangaroo care (see Table 10).

Table 10. Summary of Visitation with Each of the Other Behavior Variables.

Visitation	<=2	3-13	14	
	N (%)	N (%)	N (%)	P value
Entire sample (N=79)	5 (6.3)	34 (43.0)	40 (50.6)	
Kangaroo Care				0.554
No	1 (20.0)	11 (32.4)	16 (41.0)	
Yes	4 (80.0)	23 (67.6)	23 (59.0)	
Bathing				0.016
No	4 (80.0)	25 (73.5)	16 (42.1)	
Yes	1 (20.0)	9 (26.5)	22 (57.9)	

Kangaroo Care and Bathing

Out of 79 fathers, 50 (63.3%) performed kangaroo care with their infants in the two week period. Performance of kangaroo care was only statistically significantly related to the involvement score ($p< 0.001$) and not statistically significantly related to bathing or visitation. Out of the 50 fathers who performed kangaroo care 49 % (N=24) of those also bathed their infants, 84% (N=42) had an involvement score of 8, and 46% (N=23) visited every day (see Table 11). The majority of fathers had not bathed their infants during the hospital stay (N= 45, 57.7%). As previously discussed, bathing was statistically significantly related to the involvement score and visitation.

Table 11. Summary of Kangaroo Care for Each of the Other Father Involvement Measures.

Kangaroo Care	No	Yes	
	N (%)	N (%)	P value
Entire sample (N= 79)	29 (36.7)	50 (63.3)	
Bathing			0.121
No	20 (69.0)	25 (51.0)	
Yes	9 (31.0)	24 (49.0)	
Involvement score			<0.001
< 7	11 (37.9)	5 (10.0)	
7	18 (62.1)	3 (6.0)	
8	0 (0.0)	42 (84.0)	
Visitation days in 2 weeks			0.554
<= 2	1 (3.6)	4 (8.0)	
3-13	11 (39.3)	23 (46.0)	
14	16 (57.1)	23 (46.0)	

Father Characteristics and Associations with Involvement

The characteristics of the father proposed in the model to directly influence paternal involvement include age, employment status, education, role readiness, confidence, and beliefs. Associations of each of those characteristics with the father involvement variables will be summarized in this section.

Age

Summaries of the fathers' age overall and each of the involvement categories are shown in Table 12. The median age of fathers was 31 years. Fifty percent of the fathers ranged in age from 26.2 to 35 years. There was a statistically significant association of age with the father involvement score (p=0.042). The younger fathers scored higher with a median age of 31 for fathers who scored an 8 versus a median age of 35 for fathers who scored less than 7. No statistically significant relationships were seen with age and the involvement behaviors of kangaroo, bathing or the variable of visitation (see Table 12).

Table 12. Summaries of Age for Each of the Father Involvement Measures

Age (in years)	N	Median (IQR)	
Entire sample	79	31 (26.2, 35.7)	P value
Kangaroo			0.938
No	29	31 (25.8, 35.6)	
Yes	50	31 (26.3, 35.9)	
Bathing			0.109
No	45	31 (26.4, 38.2)	
Yes	33	29 (25.8, 33.4)	
Involvement score			0.042
< 7	17	35 (27.8, 44.4)	
7	21	29 (25.6, 33.0)	
8	42	31 (26.3, 35.5)	
Visitation days in 2 weeks			0.674
<= 2	5	33 (28.3, 38.5)	
3-13	34	32 (26.5, 37.3)	
14	40	31 (25.6, 35.7)	

Employment

Summaries of the fathers' employment status overall and for each of the involvement categories are shown in Table 13. Most of the fathers who participated in the study were employed full-time. Only 14 (17.5%) of fathers described themselves as unemployed. None of the dependent variables were statistically significantly correlated with employment status although bathing approached significance ($p = 0.051$) with a higher percentage of employed fathers having bathed the infant than the unemployed fathers (47% vs. 16.7%) (see Table 13).

Table 13. Summaries of Employment Status for Each of the Father Involvement Measures

Employment status	Employed	Unemployed	
	N (%)	N (%)	P value
Entire sample (N=80)	66 (82.5)	14 (17.5)	
Kangaroo (N=79)			0.440
No	23 (34.8)	6 (46.2)	
Yes	43 (65.2)	7 (53.8)	
Bathing (N=78)			0.051
No	35 (53.0)	10 (83.3)	
Yes	31 (47.0)	2 (16.7)	
Involvement score			0.091
< 7	11 (16.7)	6 (42.9)	
7	18 (27.3)	3 (21.4)	
8	37 (56.1)	5 (35.7)	
Visitation days in 2 weeks			0.543
<= 2	5 (7.7)	0 (0.0)	
3-13	28 (43.1)	6 (42.9)	
14	32 (49.2)	8 (57.1)	

Education

Summaries of the fathers' education overall and for each of the involvement categories are shown in Table 14. Most of the fathers in this study had at least some college or a college degree (N= 49, 61.3%). Only 10 fathers did not complete high school (12.5%). This study did not find a statistically significant relationship with education and any of the dependent variables; kangaroo care, bathing, involvement score, or visitation (see Table 14).

Table 14. Summaries of Education for Each of the Father Involvement Measures

Level of Education	Did not complete HS	Completed High School	Some College	At least one degree	
	N (%)	N (%)	N (%)	N (%)	P value
Entire sample (n=79)	10 (12.5)	21 (26.3)	27 (33.8)	22 (27.5)	
Kangaroo					0.697
No	5 (50.0)	8 (40.0)	8 (29.6)	8 (36.4)	
Yes	5 (50.0)	12 (60.0)	19 (70.4)	14 (63.6)	
Bathing					0.860
No	6 (60.0)	12 (60.0)	16 (61.5)	11 (50.0)	
Yes	4 (40.0)	8 (40.0)	10 (38.5)	11 (50.0)	
Involvement score					0.211
< 7	4 (40.0)	3 (14.3)	6 (22.2)	4 (18.2)	
7	4 (40.0)	8 (38.1)	4 (14.8)	5 (22.7)	
8	2 (20.0)	10 (47.6)	17 (63.0)	13 (59.1)	
Visitation days in 2 weeks					0.171
<= 2	0 (0.0)	3 (14.3)	2 (7.4)	0 (0.0)	
3-13	2 (22.2)	10 (47.6)	14 (51.9)	8 (36.4)	
14	7 (77.8)	8 (38.1)	11 (40.7)	14 (63.6)	

Role Readiness

Variables associated with role readiness include the timing and desirability of the pregnancy, prenatal involvement, intentions regarding the birth certificate, and attendance at the delivery. Summaries of the fathers' role readiness overall and for each of the involvement categories are shown in Table 15. The fathers were asked questions about whether or not the pregnancy was wanted and if so, if the pregnancy occurred sooner than desired, later than desired, or about the right time. Most of the fathers wanted another baby (N= 71, 91%) and felt that the pregnancy occurred at about the right time (N= 38, 54.3%). Of those who wanted another baby 24 (34.3%) felt that the pregnancy occurred sooner than desired. There were 7 fathers (9%) who did not want another baby. Role readiness was not found to be statistically significantly related to any of the dependent variables in this study (see Table 15).

Table 15. Summaries of Role Readiness for Each of the Father Involvement Measures

Role Readiness	Did not want another baby	Wanted another baby		Sooner than desired	Later than desired	About the right time	
	N (%)	N (%)		N (%)	N (%)	N (%)	P value
Entire sample (N=78)	7 (9.0)	71 (91.0)		24 (34.3)	8 (11.4)	38 (54.3)	
			P value				
Kangaroo			0.053				0.812
No	5 (71.4)	24 (34.3)		9 (37.5)	2 (25.0)	13 (34.2)	
Yes	2 (28.6)	46 (65.7)		15 (62.5)	6 (75.0)	25 (65.8)	
Bathing			0.018				0.695
No	7 (100.0)	37 (53.6)		14 (60.9)	4 (50.0)	19 (50.0)	
Yes	0 (0.0)	32 (46.4)		9 (39.1)	4 (50.0)	19 (50.0)	
Involvement score			0.207				0.733
< 7	3 (42.9)	12 (16.9)		4 (16.7)	0 (0.0)	7 (18.4)	
7	2 (28.6)	19 (26.8)		7 (29.2)	2 (25.0)	10 (26.3)	
8	2 (28.6)	50 (56.3)		13 (54.2)	6 (75.0)	21 (55.3)	
Visitation days in 2 weeks			0.675				0.358
<= 2	0 (0.0)	4 (5.7)		3 (13.0)	0 (0.0)	1 (2.6)	
3-13	4 (57.1)	30 (42.9)		11 (47.8)	3 (37.5)	16 (42.1)	
14	3 (42.9)	36 (51.4)		9 (39.1)	5 (62.5)	21 (55.3)	

In addition to asking the fathers about the desirability of the timing of the pregnancy, fathers were asked about their prenatal participation and their intentions regarding the birth certificate. Almost all of the fathers discussed how the pregnancy was going with the mother (N= 77, 98.7%), saw an ultrasound of the baby (N=79, 100%), felt the baby move (N=77, 97.5%) and bought things for the baby (N=75, 94.9%). Only 22 of the78 who responded said that they attended childbirth classes prior to delivery (28.2%). Most of the fathers had already signed the birth certificate (N= 64, 80%) with only 16 fathers having not already signed it. Of those, 15 (93.8%) said that they intended to sign the birth certificate. There were no statistically significant relationships between the prenatal involvement items and the father

involvement items. Most of the above items did not have enough variability between groups for adequate testing associations.

Summaries of the fathers' delivery room attendance overall and for each of the involvement categories are shown in Table 16. Most of the fathers were present in the delivery room at the time of the infant's delivery (N=70, 87.5%). Only 10 fathers were not present (12.5%). Delivery room attendance was not statistically significantly correlated with kangaroo care, involvement score, or visitation but was statistically significantly associated with bathing (p= 0.006). Of the 10 fathers who were not present at the delivery, 9 of them answered the item on bathing and all 9 reported that they had not bathed the infant in the past two weeks (100%) while 47.8% of fathers who had attended the delivery had bathed the infant (N= 45) (see Table 16).

Table 16. Summaries of Delivery room Attendance for Each Father Involvement Measure.

Delivery room attendance	No	Yes	
	N (%)	N (%)	P value
Entire sample (N= 80)	10 (12.5)	70 (87.5)	
Kangaroo			0.351
No	5 (50.0)	24 (34.8)	
Yes	5 (50.0)	45 (65.2)	
Bathing			0.006
No	9 (100.0)	36 (52.2)	
Yes	0 (0.0)	33 (47.8)	
Involvement score			0.051
< 7	5 (50.0)	12 (17.1)	
7	1 (10.0)	20 (28.6)	
8	4 (40.0)	38 (54.3)	
Visitation days in 2 weeks			0.147
<= 2	2 (20.0)	3 (4.3)	
3-13	3 (30.0)	31 (44.9)	
14	5 (50.0)	35 (50.7)	

Confidence in Tasks

Summaries of the fathers' confidence overall and for each of the involvement categories are shown in Table 17. Percentages of fathers who felt confident performing care tasks (diapering, bathing, feeding, changing clothes, touching, holding a swaddled infant, holding skin-to-skin, talking/singing/reading to the infant, and visiting) with their infants ranged from 68.4% to 97.5%. Most fathers felt confident in all of the tasks. The tasks with the lowest percentage of fathers who felt confident included bathing the infant (68.4%), changing clothes (88.5%). and diapering (89.7%).

The confidence score for each father included the following items: diapering, changing clothes, touching, holding skin-to-skin, talking/singing/reading, and visiting. See the Measures section in Chapter III for a further description of how this score was developed. A score of 1 reflected low confidence and a score of three, reflected high confidence. There was a minimum possible score of 1 and a maximum of 3. Averages were created from these six items. The median score was also the highest score of 3 since most of the fathers in the study were confident in all of the tasks. Variability in scoring was low with 50% of the fathers' scores' ranging from 2.9 to 3.0. Confidence was not found to be statistically significantly related to bathing, involvement score, or visitation. Skin-to-skin holding was found to be statistically significantly related to confidence ($p=0.005$) so that fathers who had performed kangaroo care tended to have a higher confidence score (see Table 17.).

Table 17. Summaries of Confidence in Tasks Score for Each of the Father Involvement Measures

Confidence in Tasks	N	Median (IQR)	P value
Entire sample	80	3.0 (2.9, 3.0)	
Kangaroo			0.005
No	29	3.0 (2.8, 3.0)	
Yes	50	3.0 (3.0, 3.0)	
Bathing			0.905
No	45	3.0 (2.8, 3.0)	
Yes	33	3.0 (2.9, 3.0)	
Involvement score			0.103
< 7	17	3.0 (2.8, 3.0)	
7	21	3.0 (2.8, 3.0)	
8	42	3.0 (3.0, 3.0)	
Visitation days in 2 weeks			0.356
<= 2	5	3.0 (2.8, 3.0)	
3-13	34	3.0 (3.0, 3.0)	
14	40	3.0 (2.8, 3.0)	

Confidence Chart Review

Chart reviews were conducted to describe what nurses were documenting, if anything, about the fathers' confidence. Fathers were generally described as interacting appropriately and being content, cooperative, and social during their visits. Only one father was described as agitated with minimal interaction and there were no descriptions of behavior for many of the fathers.

Paternal Beliefs

Summaries of the fathers' paternal beliefs overall and for each of the involvement categories are shown in Table 18. The fathers were asked to complete the What is a Father? Questionnaire to determine if the fathers had more traditional or more progressive beliefs regarding the role of the father. Although typically the items that are considered to reflect more traditional views of father involvement are reversed to obtain the overall score, the Cronbach's alpha for the measure was very low when these items were

reversed. It was decided not to reverse the items and re-evaluate. When the scale was examined statistically in this manner, it held together with a total Cronbach's alpha score of 0.74. Traditional beliefs items had a Cronbach's alpha of 0.60 and progressive beliefs items of 0.72 (see Table 19). The What is a Father? Questionnaire (including total score, progressive items, and traditional items) was not found to be significantly associated with any of the father involvement measures (see Table 18).

Table 18. Summary of Paternal Beliefs for Each Father Involvement Measure.

Paternal Beliefs		Total Paternal Beliefs		Progressive Beliefs		Traditional Beliefs	
	N	M (SD)	P value	Med (IQR)	P value	M (SD)	P value
Kangaroo			0.481		0.204		0.369
No	29	62.2 (5.1)		22.0 (20.0, 24.0)		17.1 (2.9)	
Yes	50	63.4 (5.9)		23.0 (21.75, 24.0)		17.7 (3.1)	
Bathing			0.111		0.112		0.551
No	45	62.3 (4.8)		22.0 (20.5, 24.0)		17.3 (2.5)	
Yes	33	63.8 (6.6)		23.0 (21.5, 25.0)		17.7 (3.7)	
Involvement score			0.104		0.428		0.758
< 7	17	60.8 (4.5)		22.0 (20.0, 23.5)		16.9 (2.9)	
7	21	63.6 (5.1)		23.0 (21.0, 24.0)		17.5 (3.0)	
8	42	63.5 (6.0)		23.0 (21.8, 24.0)		17.8 (3.1)	
Visitation days in 2 weeks			0.758		0.955		0.562
<= 2	5	61.8 (6.1)		23.0 (17.5, 24.0)		17.2 (1.5)	
3-13	34	62.7 (4.5)		22.5 (20.8, 24.0)		17.1 (2.6)	
14	40	63.2 (6.4)		23.0 (21.0, 24.0)		17.9 (3.6)	

Table 19. Paternal Beliefs (WIAF Questionnaire) (N=75)

WIAF Questionnaire	**Number of Items**	**Cronbach's Alpha**	**Median**	**IQR**	**Range**
Progressive Beliefs (N=78)	5	0.72	23.0	21.0, 24.0	5-25
			Mean	**SD**	
Traditional Beliefs (N=77)	5	0.60	17.5	3.0	5-25
Total Paternal Beliefs (N=75)	15	0.74	62.9	5.6	15- 70

Variables associated with child characteristics

The variables determined to be associated with the child's characteristics related to father involvement described in this study were infant age, gender, and health status. Findings related to each of these characteristics about the infant will be discussed further in the next section.

Age of the infant

Summaries of the infants' age overall and for each of the involvement categories are shown in Table 20. The infants in the study were all over 2 weeks old and with a median age of 2.9 weeks with 50% of the infants in the study ranging in age from 2.3 to 4.3 weeks. The age of the infant was not statistically significantly related to kangaroo care, bathing, or the involvement score but was statistically significantly related to visitation. In general, the older the infant, the less the fathers visited (p= 0.025) (see Table 20).

Table 20. Summaries of Infant Age for Each of the Father Involvement Measures.

Infant Age (in weeks)	N	Median (IQR)	P value
Entire sample	80	2.9 (2.3, 4.3)	
Kangaroo			0.858
No	29	2.9 (2.4, 4.1)	
Yes	50	2.9 (2.1, 4.5)	
Bathing			0.976
No	45	2.9 (2.4, 4.3)	
Yes	33	2.9 (2.2, 4.5)	
Involvement score			0.777
< 7	17	2.7 (2.5, 3.4)	
7	21	2.9 (2.4, 4.4)	
8	42	3.0 (2.1, 5.0)	
Visitation days in 2 weeks			0.025
<= 2	5	4.3 (2.9, 6.1)	
3-13	34	3.3 (2.5, 4.6)	
14	40	2.6 (2.1, 3.1)	

Gestational age

Summaries of the infants' gestational age overall and for each of the involvement categories are shown in Table 21. Gestational age at delivery averaged 33.1 weeks (SD= 3.3). Gestational age was not statistically significantly correlated with any of the dependent variables (see Table 21).

Table 21. Summaries of Gestational Age at Birth for Each of the Father Involvement Measures.

Gestational age (in weeks)	N	Mean (SD)	P value
Entire sample	79	33.1 (3.3)	
Kangaroo			0.141
No	29	33.7 (3.2)	
Yes	49	32.7 (3.4)	
Bathing			0.516
No	45	33.2 (3.3)	
Yes	32	32.9 (3.5)	
Involvement score			0.204
< 7	17	32.2 (2.4)	
7	21	34.2 (3.5)	
8	41	32.9 (3.5)	
Visitation days in 2 weeks			0.109
<= 2	5	32.4 (3.1)	
3-13	33	32.1 (3.1)	
14	40	33.8 (3.3)	

Gender

Summaries of the infants' gender overall and for each of the involvement categories are shown in Table 22. The infants in this study were mostly male (N=42, 53.2%) by a small majority. Infant gender was not significantly related to any of the dependent variables (see Table 22).

Table 22. Summaries of Infant Gender for Each Father Involvement Measure.

Infant Gender	Male	Female	
	N (%)	N (%)	P value
Entire sample (N=78)	42 (53.2)	36 (46.8)	
Kangaroo			0.262
No	18 (42.9)	11 (30.6)	
Yes	24 (57.1)	25 (69.4)	
Bathing			0.833
No	25 (59.5)	20 (57.1)	
Yes	17 (40.5)	15 (42.9)	
Involvement score			0.071
< 7	10 (23.8)	7 (18.9)	
7	15 (35.7)	6 (16.2)	
8	17 (40.5)	24 (64.9)	
Visitation days in 2 weeks			0.105
<= 2	4 (9.5)	1 (2.8)	
3-13	14 (33.3)	20 (55.6)	
14	24 (57.1)	15 (41.7)	

Acuity

Summaries of the infants' acuity status overall and for each of the involvement categories are shown in Table 23. Most of the infants in the study did not spend any time on level III status (N=43, 53.8%) with a range from no time on level III to a maximum of 72 hours. Fifty percent of the infants spent between no amounts of time on level III to 23 hours in high acuity status. Infants' overall time on low acuity was a median of 20 days with 50% from 15.3 days to 28.8 days. Low acuity was statistically significantly related to the visitation score ($p = 0.048$). Fathers who visited less than or equal to 2 days had infants who had spent more days on level 2 acuity (median= 28 days) compared to fathers who had visited all 14 days (median = 18 days). Acuity status, both high and low, were not significantly related to kangaroo care, bathing, or the involvement score (see Table 23).

Table 23. Summaries of Acuity for Each of the Father Involvement Measures.

Acuity status	Overall	High acuity (Hours)		Low acuity (Days)	
	N	Median (IQR)	P value	Median (IQR)	P value
Entire sample	80	0.0 (0.0, 23.0)		20.0 (15.3, 28.8)	
Kangaroo			0.912		0.721
No	29	0.0 (0.0, 25.5)		19.0 (15.5, 28.0)	
Yes	50	1.0 (0.0, 23.3)		21.0 (15.0, 31.5)	
Bathing			0.947		0.816
No	45	0.0 (0.0, 28.0)		19.0 (15.5, 29.0)	
Yes	33	0.0 (0.0, 22.5)		21.0 (15.5, 30.0)	
Involvement score			0.999		0.613
< 7	17	0.0 (0.0, 22.5)		18.0 (15.5, 23.5)	
7	21	0.0 (0.0, 29.0)		19.0 (15.0, 28.5)	
8	42	0.0 (0.0, 23.3)		21.0 (15.0, 33.8)	
Visitation days in 2 weeks			0.070		0.048
<= 2	5	23.0 (11.5, 33.0)		28.0 (18.5, 42.0)	
3-13	34	6.5 (0.0, 28.0)		22.5 (15.0, 31.5)	
14	40	0.0 (0.0, 18.0)		18.0 (14.3, 22.8)	

Variables associated with family characteristics

Maternal Beliefs of Paternal Involvement

The mothers of the infants were asked to complete the What is a Father? Questionnaire. The data were analyzed using the author of the measure's recommendations of reversing the items that were associated with more traditional beliefs and also the scores were analyzed using the summary of the total score for each mother. Cronbach's Alphas were very low (0.44 to 0.47) and therefore, it was decided that the measure did not hold together in this subsample for the population of NICU mothers who were sampled.

Number of children

Summaries of number of children overall and for each of the involvement categories are shown in Table 24. The median number of children of fathers was 2 with 50% having 2 or 3 children. Visitation was significantly correlated with number of children (p = 0.001). Of the 5 fathers who visited less than or equal to 2 days in the 14, the median number of children was 5 with 50% of them having between 3 and 7 children. Number of children was not significantly associated with the other measures of involvement (see Table 24).

Table 24. Summaries of Number of Children for Father Involvement Measures.

Number of children	N	Median (IQR)	P value
Entire sample	79	2.0 (1.0, 3.0)	
Kangaroo			0.974
No	29	2.0 (1.0, 3.0)	
Yes	49	2.0 (1.0, 3.0)	
Bathing			0.080
No	45	2.0 (1.0, 3.0)	
Yes	32	1.5 (1.0, 3.0)	
Involvement score			0.182
< 7	17	2.0 (1.5, 3.5)	
7	21	1.0 (1.0, 2.5)	
8	41	2.0 (1.0, 3.0)	
Visitation days in 2 weeks			0.001
<= 2	5	5.0 (3.0, 7.0)	
3-13	33	2.0 (1.0, 3.0)	
14	40	1.0 (1.0, 2.8)	

Parity

Summaries of parity overall and for each of the involvement categories are shown in Table 25. Fathers who had a single newborn (N= 62, 77.5%) greatly outnumbered the fathers who had multiple newborns (N= 18, 22.5%). There were no statistically significant relationships noted between parity and

bathing or visitation. Kangaroo care was noted to be statistically significantly related to parity (p= 0.010). A much larger percentage of fathers of multiples performed kangaroo care (N=16, 88.9%) than the fathers of singletons (N= 34, 43.3%). There was also a statistically significant relationship between parity and the overall involvement score (p=0.011). A much higher percentage of fathers of multiples scored an 8 on the involvement score (N=14, 77.8%) than the fathers of singletons (N= 28, 45.2%) (see Table 25).

Table 25. Summaries of Parity for Each of the Father Involvement Measures.

Parity	Singleton	Multiple	
	N (%)	N (%)	P value
Entire sample (N=80)	62 (77.5)	18 (22.5)	
Kangaroo			0.010
No	27 (44.3)	2 (11.1)	
Yes	34 (55.7)	16 (88.9)	
Bathing			0.738
No	34 (56.7)	11 (61.1)	
Yes	26 (43.3)	7 (38.9)	
Involvement score			0.011
< 7	13 (21.0)	4 (22.2)	
7	21 (33.9)	0 (0.0)	
8	28 (45.2)	14 (77.8)	
Visitation days in 2 weeks			0.081
<= 2	3 (4.9)	2 (11.1)	
3-13	23 (37.7)	11 (61.1)	
14	35 (57.4)	5 (7.8)	

Variables associated with contextual characteristics

Wages

Summaries of income overall and for each of the involvement categories are shown in Table 26. Many of the fathers in this study had a family income from $20,000 to $40,000 a year (N= 25, 32.9%). Eighteen (23.7%) of families reported income less than $20,000 a year and 17 (22.3%) reported an

income greater than $80,000. Only 5 fathers had wages between $60,000 and $80,000. When involvement items were examined by groups according to annual income there were no significant relationships seen between income and any of the father involvement measures (see Table 26).

Table 26. Summaries of Income for Each of the Father Involvement Measures.

Income	< $20,000	$20,000-$40,000	$40,000 to $60,000	$60,000 to $80,000	> $80,000	
	N (%)	N (%)	N (%)	N (%)	N (%)	P value
Entire sample (n=76)	18 (23.7)	25 (32.9)	11 (14.5)	5 (6.6)	17 (22.3)	
Kangaroo						0.466
No	8 (44.4)	8 (33.3)	5 (45.5)	2 (40.0)	3 (17.6)	
Yes	10 (55.6)	16 (66.7)	6 (54.5)	3 (60.0)	14 (82.4)	
Bathing						0.414
No	13 (76.5)	14 (58.3)	5 (45.5)	2 (40.0)	9 (52.9)	
Yes	4 (23.5)	10 (41.7)	6 (54.5)	3 (60.0)	8 (47.1)	
Involvement score						0.182
< 7	5 (27.8)	4 (16.0)	0 (0.0)	2 (40.0)	3 (17.6)	
7	6 (33.3)	7 (28.0)	5 (45.5)	1 (20.0)	1 (5.9)	
8	7 (38.9)	14 (56.0)	6 (54.5)	2 (40.0)	13 (76.5)	
Visitation days in 2 weeks						0.571
<= 2	2 (11.1)	3 (12.5)	0 (0.0)	0 (0.0)	0 (0.0)	
3-13	6 (33.3)	11 (45.8)	7 (63.6)	2 (40.0)	7 (41.2)	
14	10 (55.6)	10 (41.7)	4 (36.4)	3 (60.0)	10 (58.8)	

Marital status

Summaries of marital status overall and for each of the involvement categories are shown in Table 27. Most of the fathers in this study described themselves as being married (N=47, 58.8%) with 20 (25%) living together and 13 (16.3%) single. Of the 76 fathers who answered the question on their level of satisfaction in their relationship, 82.5% said that they were very happy (N= 66). Eight (10%) reported being fairly happy. Only 2 fathers (2.5%) said that they were not too happy. There were no significant

relationships seen between marital status and kangaroo care, bathing, or visitation. Marital status was seen to be significantly related to the overall involvement score (p=-0.019). A higher percentage of married fathers (N=27, 57.4%) and those who were living together (N=13, 65%) scored an 8 on the involvement score. There were fewer single fathers who scored an 8 (N=2, 15.4%) and there was a higher percentage of single fathers who scored < 7 (N=6, 46.2%) (see Table 27).

Table 27. Summaries of Marital Status for Each of the Father Involvement Measures.

Relationship Status	Single	Live Together	Married	
	N (%)	N (%)	N (%)	P value
Entire sample (N= 80)	13 (16.3)	20 (25.0)	47 (58.8)	
Kangaroo				0.095
No	8 (61.5)	5 (25.0)	16 (34.8)	
Yes	5 (38.5)	15 (75.0)	30 (65.2)	
Bathing				0.244
No	10 (76.9)	9 (47.4)	26 (56.5)	
Yes	3 (23.1)	10 (52.6)	20 (43.5)	
Involvement score				0.019
< 7	6 (46.2)	1 (5.0)	10 (21.3)	
7	5 (38.5)	6 (30.0)	10 (21.3)	
8	2 (15.4)	13 (65.0)	27 (57.4)	
Visitation days in 2 weeks				0.824
<= 2	1 (7.7)	1 (5.3)	3 (6.4)	
3-13	4 (30.8)	10 (52.6)	20 (42.6)	
14	8 (61.5)	8 (42.1)	24 (51.1)	

Summary of statistically significant quantitative findings

Of the four dependent variables (bathing, kangaroo care, visitation, and the involvement score), the involvement score had the most associated variables. See the measures section for a description of how the involvement score was developed. A higher involvement score was associated with performance of kangaroo care. Fathers who had a higher involvement score were younger and either married or living with the mother. Fathers of multiples tended to have a higher involvement score.

Visitation decreased over the length of the hospitalization. Age of the infant and length of time in level II status were associated with decreased visitation. Another variable associated with visitation was the number of children in the family. As the number of children increased, the amount of visitation decreased.

Bathing was associated with the involvement score, visitation, and delivery room attendance. Fathers with a higher involvement score and more visitation also tended to have bathed the infant. Of the fathers in this study who did not attend the birth, none of them had bathed the baby. Kangaroo care was associated with the involvement score, confidence score, and multiple gestation. Fathers with a higher involvement score and more confidence tended to perform kangaroo care. Fathers of multiples were also more likely to have performed kangaroo care. For a summary of independent variable associations, see Figure 3.

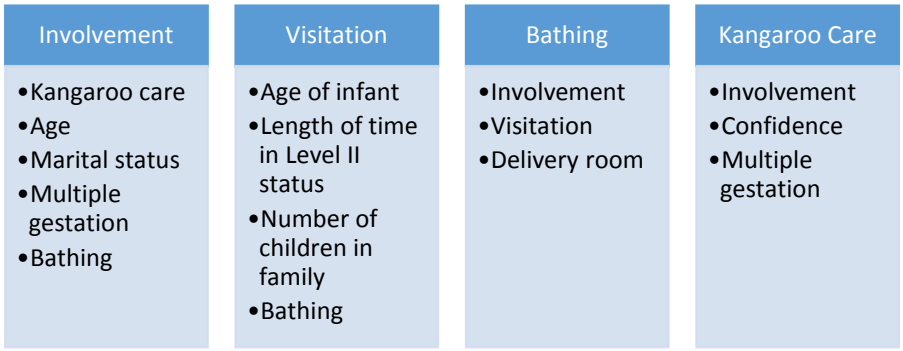

Figure 3. Independent variable associations

Qualitative Inquiry

Some qualitative responses were elicited from the subjects to provide richness and more completeness to the quantitative data. Since little is known about what kinds of facilitators and barriers there may be to involvement in the NICU, fathers were asked to provide their answers in an open-ended question format. Data were independently analyzed through content analysis for common themes by two researchers, the PI (GC) and a senior nurse researcher (MJG) who worked with this population for many years. Content analysis is a qualitative method used to examine data obtained from open-ended questions (Krippendorf, 1989).

Content Analysis and development of themes

Data was initially analyzed as a whole. All of the responses for each open-answered question were placed into an excel sheet with the respondents' other answers for the entire survey so that the researchers could analyze the data holistically. Researchers immersed themselves in the transcripts and reflected on emerging ideas. The responses for each question were read through several times within the context of the individual questions. Once similar ideas were clustered, researchers discussed potential themes. Although some themes had been previously identified from the literature, such as other children and work, review of data was conducted several times by the researchers independently prior to discussion of potential themes in an effort to be open to the possibility of new themes emerging from the data. The themes identified were based on qualitative responses as well as previous research. After lengthy discussion, researchers reached consensus.

After consensus, participant responses were recoded according to the themes. Coding decisions were then compared and consensus for initial categorization was 72% with 100% agreement after discussion. Many of the fathers' responses fit into multiple categories depending on how much detail was provided in the answer.

Open-ended questions

Fathers were asked about their perceptions of involvement in an effort to identify some possible facilitators and barriers to their involvement. Of the 80 fathers who responded to this item, 58 (72.5%) fathers felt that they were very involved, 16 (20.0%) felt that they were mostly involved, and 6 (7.5%) felt that they were not as involved as they would like to be. These 6 fathers were asked what they felt may have been barriers to their involvement. All six felt that their work was a barrier. Additionally, two cited their other children and four mentioned access issues. The other fathers were asked about facilitators and barriers to their involvement and those who identified barriers were asked if their involvement would change if the barriers were removed. These results will be discussed next.

Facilitators

Fathers who felt that they were very or mostly involved with their infants were asked what may have helped them to be involved during their NICU stay. Sixty four fathers responded to this question. Inter-rater agreement for initial categorization was 58% with 100% agreement after discussion. Five categories were chosen based on these themes and agreed upon by the two researchers. The five categories that emerged were: Healthcare team, education and knowledge, self-motivation, everything, and examples of involvement. The majority of responses were categorized into the themes of 1) healthcare team and 2) education and knowledge. See Table 28 for categories with exemplar quotes. Examples of multiple category responses have also been included (see Table 28).

Table 28. Facilitators to Involvement: Categories and Exemplar Quotes

Categories	Exemplar quotes
Healthcare team	"All of the nurses have encouraged me, as well as mom to participate as much as possible to interact with our baby."
Healthcare team and Education and knowledge	"Nurses have been frank and open about answering questions based on their experiences. This has encouraged me to ask more follow-up questions. I find it valuable to compare the information I receive from various sources (Doctors on Rounds, Nurse Practitioners, RN's, etc.) to help make decisions and understand the whole picture."
Education and knowledge	"the classes provided helped me understand what I could do (to) stay highly involved with her development"
Self-motivation	"I wanted to be very involved from the start. We found out that our child would have medical problems at 18 weeks so I knew she would need a high level of family support and involvement."
Healthcare team and Self-motivation	"The nursing staff have been very supportive in our desire to spend as much time per day with the babies."
Examples of Involvement	"We weren't allowed to pick him up at first, when we first were able to pick him up and hold him was probably the greatest event that occurred to us in the NICU."
Everything	"everything has been good"

Barriers

Fathers were also asked about any barriers that may have hindered their involvement with their infants during the time in the NICU. Using the same process as described in the above section, the two researchers categorized the responses. As with facilitators, the more detailed responses often comprised

more than one category. Twenty-five fathers responded to this question. Inter-rater agreement for initial categorization was 86% with 100% agreement after discussion.

Categories that emerged included work, access, nurses, other child, knowledge, and hospital logistics (see Table 29). The category of 'other child' was not mentioned alone as a barrier. Of the five fathers who mentioned the category 'other child' as a barrier to involvement, all of them mentioned other categories in their responses such as work and access. Work was mentioned most often as a barrier, followed by access and other child. Nurses were only mentioned twice (see Table 29).

Table 29. Barriers to Involvement: Categories and Exemplar Quotes

Categories	Exemplar quotes
Work	"working full time and traveling for work have limited the amount of time I am able to spend with the children during the weekdays, despite these barriers I was still actively involved on a daily basis."
Access	"living far away from the hospital and trying to get back and forth between my house and the hospital without a job"
Nurses	"A couple nurses at times would not allow us to hold our son due to the devices he was hooked up to."
Other child, (Work and access)	"I work and distance trying to work and be at the hospital and having a child at home is quite the barrier in involvement its hard sometime trying to make sure your still giving everyone attention and still taking care of yourself."
Knowledge	"I was very unfamiliar with changing diapers. Luckily, I work nights so during the day I could support my significant other in baby duties."
Hospital logistics	"…we found it very difficult to get from floor 3 to floor 6. …it was frustrating that I couldn't even get to go see my baby without someones help. Even getting back downstairs was a challenge. If there was only 1 person at that desk, they couldn't level to help us get back into the elevator to get downstairs."

Fathers who described barriers to involvement were then asked if they believe that their involvement with their infants would have changed if the barrier were removed. Twenty three of the 25 fathers responded to this question. Interrater agreement was 83% for initial categorization with 100% agreement after discussion. Three categories emerged: More time, more involved, and unrealistic. Fathers whose responses were categorized under 'more time' tended to report that they would be more involved if they just had more time. "I'd be here all the time with him if I had the time and availability to be here." "Less time at school getting prepared for my new job would give me more time up here." Fathers whose responses fell into the 'more involved category' reported that they would be more active in involvement with their infant. "I would stay here and take turns with mother at the hospital." "I would have been up there a lot more and stayed longer when I had the chances. I probably would have been more comfortable with bathing and feeding." Only one father's response was categorized under 'unrealistic'. He responded by saying that he would have more time to be at the hospital if his barrier were removed but "the removal of this barrier is unrealistic".

Summary

Fathers described facilitators to involvement such as the healthcare team, education and knowledge, and their own motivation to be involved. It is unclear if by providing examples of involvement the fathers were implying that the involvement itself facilitated further involvement or if they were simply describing their involvement. Barriers to their involvement included work, transportation and access to the hospital issues, other children, lack of knowledge, nursing staff, and hospital logistics. Fathers expressed feelings that if those barriers were removed, they would be able to spend more time with their infants and be more involved.

CHAPTER V

DISCUSSION

This chapter will discuss the findings related to the aim of the study. Comparisons between sample characteristics and published research will be discussed first followed by discussion of each of the determinants of father involvement; father characteristics, contextual characteristics, infant characteristics, and family characteristics. Strengths and limitations of the study will be discussed next, followed by implications and recommendations for future research.

Sample Characteristics

Demographic characteristics for this sample when compared to other quantitative studies conducted with fathers of preterm infants will be described next. Age for fathers in this study ranged from 20 to 53 with a median age of 31 (mean=31.7, SD=7.01), similar to most of the comparison studies. The mean age of fathers reported by Melnyk et al. (2006) was 30.6 (SD = 7.4) with a range of 18 to 49, but older than the mean age reported by Yogman, et al. (1995) of 28 (SD = 6.7) with a range of 13 to 54. Levy-Shiff et al (1990) reported that fathers ranged in age from 23 to 44 with a mean of 31.2 years (SD = 6.3). Harrison and Magill-Evans (1996) reported the mean age for fathers of preterm infants as 32.3 years (SD = 5.6) and for fathers of term infants as 31.6 years (SD = 5.5).

The present study included a slightly higher percentage of married or cohabitating fathers when compared to other studies; with many of the fathers in this study being married (58.8%) or living with the mother (25%). Melnyk et al. (2006) reported approximately 63.6% of fathers as married but did not report the percentage that lived with the mother. Yogman, et al. (1995) reported 46.2% of fathers were married and that a father figure lived with the mother in 56% to 60% of households over the 3 years of the study,

with the same male over the 3 year period living in the household for approximately 2/3 of these families. Brown et al. (1989) reported 33% of the mothers as married.

Comparison of number of children between the present study and other studies appears to show a similar number of first-time fathers. The fathers in this study had a mean of 2 children with a range of 1 to 9 with 43% of fathers having only the one child. Levy-Shiff et al. (1990) reported that for 43% of their subjects and Harrison and Magill-Evans (1996) reported that for 51% of their subjects, the infant was the first child. These studies differed from Frank and Spencer (2003) who reported at least one sibling for all of the 110 infants in their study.

Of the 80 fathers included in the analysis for this study, 27.5% had at least one college degree, 33.8% had attended some college classes, 26.3% completed high school, and 10% did not complete high school. This is a higher percentage of high school graduates than Melnyk et al. (2006) and Levy-Shiff et al. (1990). Melnyk et al. reported 83.4% of subjects being at least high school graduates and Levy-Shiff et al. (1990) reported a mean of 12.5 years of schooling (SD = 2.5, range 8 to 18).

Most of the fathers in the present study were employed (86%), either full-time or part-time. Rates of employment were not reported in previously published studies. Over 30% of families made a yearly income between $20,000 to $40,000 and only 22% made less than $20,000. The remaining majority made over $40.000 per year. Subjects in the comparison studies had generally lower family incomes. Melnyk et al. (2006) reported 21% of subjects with family incomes of $20,000 to $40,000 and 32% made less than $20,000. Older studies like Yogman, et al. (1995) and Brown et al. (1989) show much lower yearly family incomes reflecting lower annual wages of the past making comparison more difficult. Brown et al. (1989) reports that over half of the subjects in the study had incomes under $7500 a year and 65% of the families were Medicaid recipients. Yogman, et al. (1995) described the sample from their study as “relatively disadvantaged” and family income ranged from < $5000 a year to > $50,000 with 63.2% of families with incomes < $25,000 a year.

The majority of fathers in this study were white (66.3%) with 27.5% identifying themselves as black and 7.6% as multiracial. The U.S. Census Bureau (2014) cites the American population as being 77.4% white (U.S. Census Bureau, 2014). Minorities are slightly over-represented in this study. When compared to previously published studies, however, the present study has a lower percentage of white participants than Melnyk et al. (2006) (80% white) and a higher percentage of white participants than Yogman, et al. (1995) (36% white) making the present study more representative of racial demographics of the American population.

It is likely this sample is representative of the families seen at ACH. The hospital cares for a large group of middle to upper middle class, married, Caucasian, and well-educated fathers, but also there was a representative sample of minority (35% of the sample was black or multiracial) fathers. In the 48 contiguous United States a yearly salary of $37,167 or less for a family of 3 qualifies for WIC (United States Department of Agriculture, 2015) and 56.6% of the sample in this study made less than $40,000 a year. Unfortunately, the information on ethnicity (Hispanic or not) could not be used because the question appeared to confuse people about whether they were black Hispanic or white Hispanic. There were only eight non-English speaking fathers who couldn't participate in the study, however, of these few families, their native language was not always Spanish. So, Hispanic families may be under-represented according to national demographics.

Research Question

This study used an exploratory design to survey fathers in the NICU and asked about factors that may impact their involvement. The theoretical framework was the Heuristic model of the dynamic of paternal influences on children over the life course, by Cabrera, et al. (2007). The direct determinants proposed to influence father involvement were father characteristics, family characteristics, contextual factors, and infant characteristics. This study builds on the current body of knowledge that contributes to the model especially in the area of father involvement with hospitalized infants.

Dependent Variables

Involvement score compared to other dependent variables

The majority of fathers in this study participated in all of the listed involvement activities. Participation in NICU care conferences and parent groups was low because care conferences were reserved for infants with multiple medical issues during their hospital stay and there was a very limited number of parent groups. These activities were not included in the involvement score for these reasons. Involvement score items were included because every father would have had an opportunity to perform the tasks regardless of their infant's condition.

Fathers reported themselves as being very involved in each of the involvement activities with percentages ranging from 62.5% for holding skin-to-skin to 98.8% for visiting. Chart reviews agreed with the visitation percentage reported by the fathers (for the involvement score visitation criteria of visiting at least once in the two week period), but skin-to-skin participation and other involvement activities documented by the bedside nurse showed much lower percentages. Rationale for this difference could be related to the way that activities were documented. Since the majority of fathers visited with the mothers, the nursing staff documented that both parents visited and the activities that were performed by the parents, but not specifically which parent did each activity. Therefore, although the chart review was conducted and differed greatly from the self-report of involvement by the fathers, it could not be utilized to improve validity of the involvement measure.

Results of this study show that the majority of fathers participated in all 8 activities that were part of the involvement score (kangaroo care was a part of this score in addition to being another dependent variable but bathing was not). The involvement score was significantly related to performance of other dependent variables such as kangaroo care and bathing. Both of these activities had lower percentages of total fathers performing them, but the higher the involvement score, the more likely the father was to have participated in these activities. These results are similar to findings of Feeley et al. (2013) who

demonstrate that the fathers in their study, who believed that they were equally important to the infant as the mother, were more highly involved and were more likely to engage in bathing and skin-to-skin care. Frank and Spencer (2003) found that less than 20% of the fathers in their study participated in feeding or bathing. In that study, fathers who participated in bathing were more likely to feed the infant (Franck & Spencer, 2003) which is similar to the results from this study which show that the higher number of involvement activities the father participated in, the more likely he was to have also bathed the infant.

Visitation compared to other dependent variables

As a dependent variable, visitation data included a specific question related to how many days within the two week time frame the father visited. The visitation dependent variable was found to be significantly related to bathing. Although no other studies specifically report a significant relationship between visitation and bathing, Levy-Shiff et al. (1990) did find a significant relationship between visitation frequency during the hospital stay and caregiving at discharge, at 8 months, and at 18 months with preterm infants (Levy-Shiff et al., 1990).

Father Characteristics and associations with the dependent variables

Age

Age, in this study, was found to be significantly associated with the involvement score, but not with kangaroo care, bathing, or visitation. The median age of fathers who scored the highest possible (a score of 8) on the involvement score was 31 compared to the median age of 35 for the fathers who scored less than 7. The results from previous research are contradictory to this study's results. Two previous studies that examined age as a factor affecting father involvement did find a statistically significant correlation between age and involvement but instead found that older fathers tended to be more involved (Castillo et al., 2011; Yogman et al., 1995). After further examination of the results of these two studies, there are possible explanations for the different findings. Castillo et al. (2011) included a sample of fathers whose ages were positively skewed. They also report that after holding other variables constant,

residency status of the father seemed to be the overall largest predictor of involvement and the older fathers in the study tended to be resident fathers. Residency status was not controlled for when the authors examined the bivariate correlation between age and involvement (Castillo et al., 2011). Yogman et al. (1995) reported older fathers to be more involved, however, there was missing data for 160 of the fathers and rationale for the missing data was that these fathers were not in contact or the mother did not know his age implying that these fathers were likely not co-residential (Yogman et al., 1995). Fagan and Palkovitz (2007) confirm that older fathers tend to also be co-residential fathers (Fagan & Palkovitz, 2007). Considering that the current study was examining father involvement in very early infancy with presumed biological fathers in a hospital setting (where residency status was not a major issue), the differences between these studies may be too great to compare the results.

The results from the present study suggest that although age has been previously shown to be a contributing factor to involvement, it may be important to control for other factors, such as residency status or other children, in order to confirm this correlational finding. In the present study, other children and visitation were found to be correlated, so that the more children a father had, the less he visited. When Spearman's rho correlation coefficient was used to examine age and number of children further, they were found to be significantly correlated ($p<0.001$). One can see that the median age of the father increases from 27.9 with one child to 37.0 with four children and to 42.7 with nine children. More research needs to be conducted to determine which of the two variables is more important in influencing father involvement.

Employment

No statistically significant correlations were found between employment status and the involvement variables. Fathers in this study were asked if they were employed full-time, part-time, or unemployed. Comparison studies reported contradictory results. Paternal time spent working has been found to be significantly associated with aspects of father involvement (McBride et al., 2004). Steady

employment has also been found to be associated as part of a group of resilience variables (such as social support and attending religious services) (Fagan & Palkovitz, 2007). Wood and Repetti (2004), however, reported that changes in life events, such as employment status, were associated with an increase in paternal care giving (Wood & Repetti, 2004). It is possible the present study did not discover a significant finding between employment status and involvement because fathers were not asked about the amount of time they spent working each week or about their changes in employment. Or, perhaps the two week period of time that the fathers were asked to report about their involvement for this study was not enough time to show an effect between employment status and involvement. Open-ended question responses from the fathers did demonstrate that fathers felt that work was a barrier to their involvement while their infant was in the NICU.

Education

Level of scholastic education was not found to be significantly related to father involvement in this study. This differs from previously published research that did find a relationship between paternal education and involvement (King et al., 2004; Landale & Oropesa, 2001; Shannon et al., 2005). More highly educated fathers have been shown to be more involved with their children. It may be that the more formally educated a man is, the more likely he is to also have or to seek additional knowledge on how to care for his infant. Although formal education did not appear to be significantly related to involvement in the NICU, fathers in this study reported that a facilitator to their involvement with their infants was education and knowledge on how to interact with them. One explanation for the difference in findings between this study and prior studies may be because fathers in the NICU are provided informal education by the nursing staff which may help to increase their involvement. Responses to open-ended questioning in this study showed that fathers believed that improved knowledge about caring for their infants and the NICU nursing staff were facilitators to involvement, lending support to this theory.

Role readiness

Pregnancy readiness, prenatal involvement, and delivery room attendance were assessed in an effort to determine role readiness. When asked about their readiness for the pregnancy, fathers generally reported wanting another baby at some point in the future. Of those who wanted another baby, 34.3% felt that the pregnancy occurred sooner than desired. Only 9% did not want another baby. No significant correlations were seen between desire to have another baby or timing of pregnancy and the involvement variables.

In addition to pregnancy readiness, fathers were asked about their prenatal involvement. Fathers in this study were very involved prior to the delivery. Prenatal involvement showed very little variability with almost all of the fathers reporting involvement in all of the activities. The only activity that fathers did not perform was attending a childbirth class. Many of the fathers verbally reported during data collection that either they had already attended one with their first child or they did not attend a class because the mother of the infant did not attend a class. Almost all of the fathers in this study either had already signed the birth certificate (80%) or intended to sign it, showing an improved percentage of paternity establishment in the hospital over the 69% previously reported (Mincy et al., 2005).

A majority of fathers were present in the delivery room (87.5%). Delivery room attendance was the only role readiness variable to show a significant correlation with any of the involvement variables. Fathers who attended the infant's delivery were more likely to have bathed the infant. Limited variability of the results within the variables of pregnancy readiness, prenatal involvement, and birth certificate acknowledgement may have reduced the likelihood of finding significant correlations among those variables.

The results from this study are inconsistent from one previously published study. Bronte-Tinkew et al. (2007) utilized the same measures of pregnancy readiness, prenatal involvement, and asked fathers about delivery room attendance. Although Bronte-Tinkew et al. (2007) found significant relationships

between prenatal involvement and pregnancy readiness with father involvement, they found no significant relationship between delivery room attendance and involvement. It is unclear why the findings were different, though the differences in results may be related to the differences in the subjects' children between the two studies. Bronte-Tinkew et al. (2007) studied fathers whose children were not in the NICU and were older than the infants in this study.

Confidence in Tasks

Confidence in tasks was found to be significantly related to the performance of kangaroo care but not to the involvement score, bathing, or visitation. These results show partial support for the hypothesis that paternal confidence is important to involvement. McBride (1990) also found partial support for this hypothesis and cited research from the early 1980s that reported sense of competence to be important to parenting. More recent quantitative studies were not found. Since kangaroo care has been found to be an involvement task that fathers who are identified as being more highly involved tend to perform, it may be an activity that only the more confident fathers are likely to do. Results from Melnyk (2006) lend support to this theory. Melnyk (2006) found that fathers who were instructed on the kinds of behaviors to expect from their preterm infants and how to care for them were more involved with and more sensitive to their infants (Melnyk et al., 2006).

Paternal Beliefs

Paternal beliefs were measured using the What is a Father? Questionnaire. Although the scale did not hold together (as evidenced by a low Cronbach's alpha) when traditional belief items were reversed, the scale had a total Cronbach's alpha of 0.74 when items were not reversed and this approach was recommended by the study statistician. No statistically significant correlations were seen between total score or either subscale with any of the father involvement variables. These results differ from McBride et al. (2004). McBride et al. (2004) tested a model of the multiple determinants of father involvement. Paternal beliefs were found to be the strongest predictor of all aspects of involvement. McBride et al.

(2005) did not use the What is a Father? Questionnaire but instead used survey question items which appeared to be similar in content to items from the questionnaire (McBride et al., 2004). It is unclear why the results differ, although there are a couple of possibilities. The use of the What is a Father? Questionnaire utilized for the current study may have confounded the results. The fathers in this study generally selected responses indicating agreement with all of the items, indicating both progressive and traditional beliefs. This could have reflected an acquiescence bias on the part of the respondents. Or, fathers in this study may have thought that all of the items were important which may show a binary belief that both the traditional role and the progressive role were important to them which would warrant future research into the possibility of recent changes in paternal beliefs in the United States.

Child Characteristics and associations with the dependent variables

Age

Infants in this study ranged in age from 2 to 8.7 weeks. Although the age of the infant was not related to kangaroo care, bathing, or the involvement score, age of the infant was significantly related to visitation. This is comparable with previously published studies which show that fathers tend to visit less after the first week of hospitalization (Brown, et al., 1989; Franck & Spencer, 2003).

Gestational age

Infants in this study ranged from 27 to 41 weeks of gestation at time of birth with a mean of 33.1 weeks. Gestational age of the infant was not significantly associated with kangaroo care, bathing, the involvement score, or visitation. Two studies that examined paternal caretaking and visitation patterns in the NICU also included infants with varied gestational ages but did not report an evaluation of correlation with gestational age and visitation or involvement in their results sections (Franck & Spencer, 2003; Levy-Shiff et al., 1990). Harrison and Magill-Evans (1996) found that fathers of preterm infants scored lower on a measure of interaction with their infants than fathers of term infants did (Harrison & Magill-Evans, 1996). Results may differ due to the differences in the ages of the infants, but also due to the

differences in the time periods of the two studies, with the comparison research having been conducted nearly two decades ago. It is possible that the staff in the NICU may be better educating families on how to interact with their preterm infants now than they were twenty years ago.

Gender

Infant gender was not found to be correlated with kangaroo care, bathing, visitation, or the involvement score. Studies that have examined infant gender and its possible effect on father involvement are mixed in results. Previously published research has shown that fathers are more involved when there are more male children in the family (Wood & Repetti, 2004), that involvement with girls is modified by temperament (McBride et al., 2002), and, similar to the current study, have reported no statistically significant findings related to gender at all (Gaertner et al., 2007; McBride et al., 2004).

Acuity

Time on level III status and time on level II status was not found to be correlated with kangaroo care, bathing, or the involvement score. Length of time on level III status approached significance ($p=0.07$). Length of time on level II status was significantly correlated with visitation. This finding is likely related to the finding that as infant age increases, paternal visitation decreases. It stands to reason that those infants who were on level II status longer are also requiring more hospitalization time. Many infants in this study were being discharged very quickly after two weeks on level II status without having ever spent any time at all in level III status. Of the infants in this study whose fathers visited less than or equal to two times in two weeks, their median high acuity hours was 23 with 28 low acuity days. Of the infants whose fathers visited every day, most spent no time in high acuity status with only 18 days in low acuity. Since the infants were all on level II status for at least two weeks prior to the point of data collection, the infants were all in relatively the same state of health and were not critically ill. No published quantitative research could be located that attempted to correlate level of illness in the NICU with father involvement, however, one qualitative study was suggestive of a relationship. Freeley et al.

(2013) described one characteristic of fathers who were reluctantly involved as being very fearful of handling their infants due to history of illness (Freeley et al., 2013).

Family Characteristics and associations with the dependent variables

Maternal Beliefs of Paternal Involvement

The instrument used for this study to attempt to measure maternal beliefs of paternal involvement was the What is a Father? Questionnaire which is a modified version of the Role of the Father Questionnaire. The instrument attempts to identify traditional vs. progressive beliefs. The theory is that a mother taking this questionnaire with more progressive beliefs about paternal involvement would be more likely to encourage or allow the father's participation in infant care. Unfortunately, for this sample of mothers, the Cronbach's alpha scores for the instrument were very low. Psychometrics were obtained with the traditional measures reversed, as was done previously by the instrument's creator, and with the traditional measures not reversed, as the fathers questionnaire was statistically evaluated for this study, but it was finally concluded that the scale did not hold together for this sample and no further statistical testing was conducted. One reason that this scale did not hold together may have been because of the elimination of question 15, however, the Cronbach's alpha was so low that this is unlikely.

Number of children

This study has found that increased number of children in the family is significantly correlated with reduced visitation. This is similar to previously published studies showing that hospital visits are less when there are more siblings at home (Brown et al., 1989; Franck & Spencer, 2003). No significant correlations were found between total number of children and kangaroo care, bathing, or the involvement score. No published studies were found that specifically look at father involvement in the NICU and compare their involvement to the number of total children in the family. Previously published research correlating family size and father involvement show that fathers reported decreased affection and lower levels of parental monitoring with larger family size (McBride et al., 2004). These aspects of father

involvement were not measured with the current study because of the age and status of the infants which would explain differences in the findings. Although quantitative analysis did not suggest a relationship between total number of children and involvement, open-ended questions did show that a large number of fathers felt that their other children were a barrier to their involvement with their hospitalized infants.

Parity

Although no significant relationships were found between multiple gestation and bathing or visitation, multiple gestation was significantly related to both kangaroo care and the overall involvement score. Quantitative studies could not be located that examined the impact of multiples on father involvement, but one qualitative study did note a finding of interest. Of the eighteen fathers studied by Freeley at al. (2013), six perceived their pattern of involvement as equal to the mother and were described as high-involvement. These fathers tended to spend the entire day in the NICU performing care activities. Four of these six fathers had partners who were ill after childbirth for an extended period of time, during which, the fathers spent much of their day in the NICU. Three of the six fathers were fathers of twins (Freeley et al., 2013). One possible explanation for the finding of a relationship between multiples and increased involvement could be that there is more opportunity for the father to be involved since there was more than one infant to care for. Another possibility is perhaps mothers of multiples are more likely to encourage fathers to participate in care, especially if the infants need care at the same time. When the fathers in this study were asked if they are backing off so that the mother can participate more, out of 76 responses, 31 (40.8%) said that they were. Out of 18 multiples, 5 (31.3%) said that they were backing off and 11 (68.8%) were not, compared to 26 (43.3%) of fathers of singletons who were backing off and 34 (56.7%) were not. Although these two variables did not show a statistically significant correlation, there was a higher percentage of fathers of singletons who were backing off from care with the infant so that the mother could be more involved than fathers of multiples.

Contextual Characteristics and associations with the dependent variables

Wages

Annual family income was not found to be significantly related to any of the dependent variables and this is inconsistent with one previously published study showing that low wages was related to decreased levels of father involvement (Yogman et al., 1995). However, the results from the present study are consistent with another published study which showed no significant relationship between father involvement and a sixteen item measure of economic stress (McBride et al., 2004). It is unclear why results vary with regard to income and father involvement.

Marital status

A statistically significant relationship was seen between marital status and the involvement score. Cohabitating fathers were seen to be more involved whether they were married or living together. These results are consistent with previously published research. Married fathers were more involved with their infants (Shannon et al., 2005). Although resident fathers were likely to be more involved, there was no relationship seen between residency and visitation. While previous research has shown that father visitation in the NICU is dependent upon mother visitation in the NICU (Frank and Spencer, 2003), no other studies have looked at residency status and paternal visitation in the NICU.

Study Strengths and Limitations

This was one of the first studies to look at the determinants of father involvement in a NICU setting. One of the few quantitative studies to explore father involvement with hospitalized infants, this study also explores other possible barriers or facilitators which may be unique to a NICU environment. Strengths will be discussed first, followed by limitations of this study.

Strengths

By asking fathers open-ended questions in the study, richness is added to the quantitative data obtained, allowing for a more complete understanding of the determinants of father involvement in the NICU. Fathers were asked for ten to fifteen minutes of their time to fill out the survey. Due to the low subject burden and a small incentive, this study had a very low refusal rate with only one father who was approached refusing to participate. Additionally, this study had a 100% completion rate. Other research studies utilized large data sets based on surveys that families filled out typically for another purpose. The survey designed for this study was specifically developed to explore father involvement in this setting. Previous research relied on observations of father involvement whereas in this study, fathers reported their own involvement and nurses documented fathers' activities. Although triangulation of involvement activities between father self-report and the infant's chart is a strength of the study, unfortunately, the only activity that nurses and fathers agreed on was visitation so, the attempt at triangulation via the chart complicated the matter instead of providing a more complete picture. The NICU setting for this study was a large unit located at a children's hospital in Florida. Demographics for this study included a representative sample of minority fathers. Variation in ages, wages, and marital status potentially allowed for greater generalization to other populations.

Limitations

Although the variation in demographics within this study allow for greater generalization, NICU settings each have a specific culture of nursing and medical practice. Nursing practice may vary in each NICU for timing of families to be allowed to hold their infants, on how much kangaroo care is encouraged, and on how much families are encouraged to participate in their infants' care. Although certain standards of practice exist, the level at which some neonatal intensive care units have exceeded the standards may vary. This variation may reduce generalizability. Additionally, findings can only be

generalizable to areas where demographics for fathers are similar to the fathers in this study, such as the southern United States. Hispanic families may be underrepresented in this study.

Since this study's aim was to explore and describe the factors affecting father involvement in the NICU and although certain associations were found, causation cannot be assumed. Although the study was originally designed to allow for a regression analysis, inclusion and exclusion criteria limited the number of subjects eligible to participate. A regression analysis would have offered a greater understanding of the determinants of father involvement in the NICU setting.

Due to the inclusion and exclusion criteria, many fathers did not qualify for participation in the study during the thirteen month time-frame of data collection. The majority of fathers (N=849) were excluded because their infants were on level II status less than 14 days. A large number (N=202) had to be excluded because their infants were on level III status for longer than three days. Other fathers were excluded because their infants were under a child protective investigative hold or had neonatal abstinence syndrome (N=128). Thirty fathers were in prison or described as not involved by the mother, 8 were non-English speaking, 2 infants were adopted, 1 family was gay, and eighteen were fathers of infants who died in the NICU.

Only one father who was approached declined to participate but there were 48 fathers who had infants discharged quickly after 14 days on level II status, and they were unable to be approached in time. Occasionally, a mother was approached but the father was unavailable, too busy, or out of town (N=12). Other than the rationale for non-participation in the study, no other data was collected on these fathers, so their inclusion into the study might have altered the results.

Of the fathers who did take the survey, many of them attempted to interact with the researcher or with the mother during the data collection. Interaction between the parents was discouraged gently by the researcher. Initially, the plan to help minimize missing data was for the researcher to be present during the data collection in order to answer questions. This strategy did help with reduction of missing data, but

also may have contributed to social desirability bias. Fathers felt the need to communicate to the researcher about some items, in particular. Fathers appeared to need to rationalize why the task wasn't done. Many of them asked if they could mark the item as accomplished, even if it had not been, as if in need of achieving a higher score on a test. After several of these encounters, the researcher attempted to discourage this type of interaction by waiting just outside of the room while the father was taking the survey in case there were questions and instead of instructing that the survey would be looked over afterwards for missing items, the researcher no longer looked over the completed surveys. This technique was more successful and these behaviors greatly diminished but unfortunately, missing data increased.

Although this study attempted to validate paternal self-report of involvement through the use of chart reviews, there were large differences noted between the self-report of activities and the chart review report of activities. Possibilities for the differences include paternal self-report may have included activities outside of the two week timeframe or nursing staff may not have been noting all of the activities that the fathers specifically were performing. Nursing staff typically report activities that parents are involved in as part of their routine documentation, but it was noted in chart review that many activities were documented by saying 'mother/father visiting, care performed 'making it unclear what activities the fathers had performed. One activity that would be documented separately and by whom it was performed would be kangaroo care. There was a large discrepancy between nurses' and fathers' reports of participation in kangaroo care making it possible that fathers were documenting involvement tasks outside of the two week interval for the study,

Another limitation with the present study is that although factors associated with direct relationships with father involvement were explored using the model, the indirect relationships were not evaluated. The variables that were not examined included race, culture, rearing history, and mental health of the father. These are variables that may have an impact on the father's characteristics, according to the model, and although very important to future research, were not included in this study, limiting findings of predictive factors of involvement.

Another limitation in measurement validity for this study was the use of the What is a Father? Questionnaire. Although prior research had shown the measure to be valid and reliable, it had not been previously tested in this population. The measure could not be used at all to evaluate maternal beliefs and although the scale that the fathers filled out was used, it is unclear if it was truly able to measure paternal beliefs since it was not able to be statistically evaluated in the manner described by the author. The fact that paternal beliefs were not found to be correlated with any of the measures of involvement despite previous research showing a very strong relationship, is a potential argument against future use of this measure for this population, but more research needs to be conducted prior to coming to any final conclusions.

One final thought with regard to any additional potentially confounding influences limiting the findings of this research focuses on the influence of the infants on their fathers' involvement. Although the infants were similar in age and acuity status, there was a wide range of gestational ages and types of illness. Despite attempts to control this variable with the inclusion/exclusion criteria and by making the involvement score be composed of items that every father would have had an opportunity to do, it may be that there were still differences in the infants' health status that affected involvement.

Implications

The aim of this study was to explore and describe factors which may influence father involvement in the NICU. Independent variables that were shown by previous research to be important determinants of involvement and dependent variables such as visitation, kangaroo care, bathing, and an involvement score were examined for statistically significant associations. Important positive findings of this study agreed with previous research, but often the variables were tested quantitatively for the first time in the NICU. Fathers who were married or living with the mother were found to have a higher involvement score. Visitation was seen to decrease over the length of the hospitalization as the infant became older and if there were more children in the family, the less fathers tended to visit.

There were also new associations discovered from this research. Fathers who had participated in bathing their infants had a higher involvement score, tended to visit more often, and were more likely to have attended the delivery. Fathers of multiples were more involved than fathers of singletons and were more likely to perform kangaroo care. Fathers who were more involved and more confident were more likely to perform kangaroo care. Nurses need to be aware of the importance of encouraging involvement especially for fathers who have demonstrated a lack of confidence about handling the infant. Fathers at risk may be those who have not attended the delivery, who have infants that have been in the NICU for more than 3 months, who have a large number of children at home, or who are not cohabitating with the mother.

Fathers described nurses and the healthcare team as important facilitators to their involvement. Not only is the healthcare team important in encouraging involvement, but they are also important in educating the fathers about how to be involved. Nurses can provide educational classes for fathers or have support groups set up to encourage father involvement in the NICU.

Fathers described the major barriers to involvement as employment, difficulty with transportation, and having other children. Hospitals can help encourage involvement by providing trained professionals who can watch siblings while parents are visiting their sick infants or by assisting with transportation for at-risk families. Nursing staff can encourage fathers to visit when fathers are not working and employers could consider paternity leave for new fathers, especially those fathers who have infants in the NICU.

Future Research

While this study is an important first step into father involvement studies in the NICU, more research is needed. As previously stated, this study only measured the determinants that were hypothesized to be directly linked to father involvement and future research should include the indirect variables as well. This study also only examined correlations and future research could examine the

relationships between variables. Exclusion criteria for this study limited the participants to a female mother and a male father who were presumed to be biologically related to the infant. Future research could focus on adoptive parents or infants of surrogate mothers and could include same-sex parents.

Another variable which could be studied in future research is the health status post-birth of the infant's mother. This variable could be operationalized as Cesarean section or vaginal delivery. Since mothers who have had cesarean sections often need more assistance than mothers who delivered vaginally, this could be an important factor in father involvement in the NICU that should be examined in future research.

Since the What is a Father? Survey had questionable usefulness for the fathers in this study and was not able to be used for maternal beliefs, the best way to measure maternal and paternal beliefs about the role of the father will need to be determined. Since the What is a Father? Questionnaire is a modified version of the Role of the Father Questionnaire, it is unclear whether or not the Role of the Father Questionnaire is useful for fathers in the NICU. It may be that the questionnaire simply does not hold together in this population or there may have been some confounding variables within this sample. Since use of the What is a Father? Questionnaire in this sample appeared to be problematic, future research could be conducted to determine what the best measure of beliefs of the role of the father would be. Also, there may be differences in the beliefs between fathers of sick newborns with their infants still in the hospital and fathers of well infants whose infants have been home for a few months. Inexperienced fathers of sick newborns may have more idealized beliefs than fathers who have been in the role for several months. Paternal beliefs may change over time, especially between birth and one year. More research could be conducted to test this theory.

Longitudinal studies are needed for many reasons. Contact information was obtained for the fathers in this study and a follow-up study is planned in order to survey this same group of fathers again

at a later date regarding their involvement in their children's lives. A follow-up to this study is crucial to help determine if there are any influences from the NICU stay itself that affect later involvement.

The healthcare team was generally described to be a facilitator to involvement. Fathers in this study described themselves as being very involved. One explanation for this increased amount of involvement could be the encouragement and education that the fathers received from the healthcare team. Additional research could investigate how the NICU stay might influence involvement both in infancy and in childhood.

Future research could focus on the best way to measure father involvement in the NICU. One possible method to increase validity of the date is to ask fathers to keep a diary of the activities that they engaged in during their visits. Unfortunately, the increased subject burden in this population may limit participation and decrease generalizability. Chart review is another alternative, provided nursing staff are able to accurately document paternal activities.

The present research examined factors hypothesized to be associated with paternal involvement. Since it is known that father involvement in the NICU is important to the infant, more studies on the possible outcomes of an involved father on the infant are needed. Once it is determined how to best predict father involvement, it is important to study how we can best encourage involvement and precisely what aspects of involvement (direct engagement, availability, and/or responsibility) are most important for infant outcomes. Research by Melnyk et al (2006) showed that the infant outcome most often influenced by father involvement is length of stay. In that study, fathers were given an educational intervention which helped to improve their confidence. Improved confidence led to improved interactions which then helped to reduce infant length of stay. However, more research needs to be conducted on infant and father outcomes of increased involvement. More research is also needed to explore ways that health care providers can help fathers be more involved. The new knowledge generated from these studies will inform nurses and medical professionals on how best to support fathers while their infants are

in the NICU. The findings could contribute to improvements in the father/infant relationship that might last beyond the hospital stay and be critical for the continuing health of the child, families, communities, and society-at large.

Appendix A

Letter of Information for Parents

FATHERS IN THE NICU
(IRB Number: 13-0565)

Hello,

You are being asked if you would like to participate in a research study. The title of the study is 'Fathers in the NICU'. The research is being conducted by Gina Clarkson, MSN, NNP-BC, a nurse practitioner in the NICU at All Children's Hospital and a Doctoral Candidate for PhD at Vanderbilt University School of Nursing. This is an online survey that both mothers and fathers of infants will complete. The questionnaire for fathers is slightly longer in duration but will likely only take about 30 minutes to complete. The questionnaire for mothers will likely only take about 5 to 10 minutes to complete.

This research study will help future families by allowing us to learn more about how fathers interact with their infants while in the NICU. The purpose of this study is to examine the ways in which fathers are involved with their infants and also the ways in which other factors may affect this involvement.

The research is considered to be minimal risk. Your consent to be a research participant is strictly voluntary and should you decline to participate or should you decide to drop out at any time during the study there will be no adverse effects. You do not need to sign a consent form, if you agree to participate; you need only complete the online survey.

There is no direct benefit for participants in this study; however, the results of this study may lead to an intervention in the future to help with parental involvement in the NICU. Parental involvement has been shown in other studies to help to reduce infant length of stay in the hospital. Should both parents participate, a $10 check can be mailed to you as a token of gratitude.

Funding for the $10 check is being provided for by the Vanderbilt Institute for Clinical and Translational Research which is supported by the Vanderbilt Office of Research and the National Institute of Health (NIH) sponsored Clinical and Translational Science Award. In order to receive the funds, one parent must fill out the form provided and attached to this cover letter and a check will be mailed after both parties have completed the survey.

If you would like to receive the check, you will need to provide information to the Vanderbilt Institute for Clinical and Translational Research. This information will include your name, address, phone number, and whether or not you are an American citizen. The form will be faxed by the primary investigator to the Vanderbilt Institute for Clinical and Translational Research. This office will mail your check to the address that you provide within 2 to 3 weeks. The primary investigator will shred your form at the end of the study or, if you have not received your check yet, when you receive your check. The Vanderbilt Institute for Clinical and Translational Research will keep your form at their office on file

as determined by the rules stated by the Department of Finance and NIH regulations. Your information will not be used for any other purpose except for providing the $10 reimbursement check and formal notification of official agencies of this reimbursement as stated by law.

I would like to opt in (receive the check): _____

If yes, which parent will receive the check? Mother_____ Father_____

I would like to opt out (I do not wish to receive the check.): _____

As a research participant, information that you provide will be held in strict confidence to the extent permitted by law. Results of the study will be presented in aggregate form with the exception of any of the 'fill-in-the-blank' questions which may be presented in the study results as a quote. The only protected health information that will be obtained from the chart is your infant's gestational age, chronological age, gender, and past family interactions that are described. Your participation in completion of the study will imply consent to obtain and record this information from your baby's chart. All of this information will be presented in a group results format.

Additionally, fathers will be asked to provide contact information if willing to participate in a future follow up study. This information will not be published or given to any third party and will only be used by the researcher in order to contact you for the future study.

If you have any questions about this research study contact: principal investigator Gina Clarkson at 727-767-XXXX.

All Children's Hospital, Inc. will not provide compensation for injury, illness, or other loss resulting from participation in this study. For further information on this subject, please contact the Department of Risk Management of All Children's Hospital at 727-767-XXXX.

If you have any questions about your rights as a person who is taking part in a research study, you may contact a representative of the Institutional Review Board at: 727-767-XXXX.

Appendix B

What is a Father? Questionnaire for Fathers

The following questions ask about your perceptions of the father's role. Please check the extent to which you agree or disagree with each of the following statements.

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1. Fathers should spend more time interacting with their children and less time at work.					
2. Fathers play a central role in the child's personality development.					
3. Fathers should be the disciplinarians in the family.					
4. The father's role is to provide for his family, not babysit the children.					
5. A father should be as heavily involved in the direct care of his child (e.g., feeding, dressing) as the mother.					
6. The responsibilities of fatherhood never overshadow the joys.					
7. Fathers and mothers should spend an equal amount of time with their children.					
8. Fathers have a special responsibility to make sure their children feel safe and protected.					
9. It is as important for a father to meet a child's emotional needs (e.g., love, security) as it is for the mother to do so.					
10. The most important thing a man can invest time and energy into is his family.					
11. Fathers are just as sensitive in caring for children as mothers are.					
12. A special part of the father's role is to give children moral and ethical guidance.					
13. The way a father treats his child has important life-long effects.					
14. Taking care of his children financially is the best way for a father to show he cares about them.					
15. Fatherhood is a highly rewarding experience.					

Appendix C

Maternal Survey:

The following questions ask about your perceptions of the father's role. Please check the extent to which you agree or disagree with each of the following statements.

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1. Fathers should spend more time interacting with their children and less time at work.					
2. Fathers play a central role in the child's personality development.					
3. Fathers should be the disciplinarians in the family.					
4. The father's role is to provide for his family, not babysit the children.					
5. A father should be as heavily involved in the direct care of his child (e.g., feeding, dressing) as the mother.					
6. The responsibilities of fatherhood never overshadow the joys.					
7. Fathers and mothers should spend an equal amount of time with their children.					
8. Fathers have a special responsibility to make sure their children feel safe and protected.					
9. It is as important for a father to meet a child's emotional needs (e.g., love, security) as it is for the mother to do so.					
10. The most important thing a man can invest time and energy into is his family.					
11. Fathers are just as sensitive in caring for children as mothers are.					
12. A special part of the father's role is to give children moral and ethical guidance.					
13. The way a father treats his child has important life-long effects.					
14. Taking care of his children financially is the best way for a father to show he cares about them.					

Appendix D

Father Survey:

Please answer the following questions. If you have any questions, please ask the study investigator. Your answers will be kept confidential. However, any responses to the 'fill in the blank' questions may be reported as a quote and could be published in a scientific journal. When you are finished answering the questions, please let the investigator know.

1. Birthdate in Month, Day, Year format? _____ (example September 9, 1985 would appear as 9/9/1985)

2. What is your educational level?

a. did not complete high school

b. completed high school, no college

c. some college

d. have completed at least one college degree

3. Please select one or more of the following categories that you feel best describe yourself.

a. American Indian or Alaska Native

b. Asian

c. Black or African American

d. Native Hawaiian or Other Pacific Islander

e. White

f. Other: _Please describe:_____

4. Please select one of the following categories that you feel best describes yourself.

a. Hispanic or Latino

b. Not Hispanic or Latino

c. Other: Please describe:_____

5. Are you currently employed?

a. yes b. no

6. If you are employed, what is your employment status?

a. full time

b. part time

7. If you are employed, what is your current type of work? _____

8. What is your family income range?

a. < $20,000

b. $20,000- $40,000

c. $40-000- $60,000

d. $60,000- $80,000

e. > $80,000

9. What is your marital status?

a. married

b. single

c. divorced

d. we live together

10. What is your relationship with the infant's mother now?

a. romantically involved

b. just friends

c. not in any kind of relationship

If answer is a or b: (branching logic)-

11. Would you say that your marriage/relationship is...

Mark (X) one

very happy,

fairly happy, or

not too happy?

12. How many children do you have? _____

13. At the time your wife/partner became pregnant with the child, did you want her to have a(nother) baby at some time?

Mark (X) one

yes

no

14. Did she become pregnant sooner than you wanted, later than you wanted, or at about the right time?

Mark (X) one

sooner

later

at about the right time

15. Did you do any of the following before your child was born?

Mark (X) one response for each item

j. Did you discuss how your wife's/partner's pregnancy was going with her? ..... (yes or no?)

b. If an ultrasound was done of your baby prior to delivery , did you see it?.....(yes or no?)

c. Did you listen to the baby's heartbeat? .....(yes or no?)

d. Did you feel the baby move? .....(yes or no?)

e. If your baby's mother attended childbirth classes prior to the delivery did you attend any classes with her?.....(yes or no ?)

f. Did you buy things for the child? .....(yes or no?

16. Thinking back to your child's birth, were you in the delivery room or the room where the child was born?

Yes

no

17. Which of the following activities did you participate in within the last two weeks?

Branching logic (if a father answers 'yes' – the item will then ask him 'How much did this activity help you to feel involved with your baby?' and present an ordinal scale such as:

1. very involved 2. Involved a small amount 3. Not involved

a. diapering (yes or no?)

b. bathing (yes or no?

c. feeding (yes or no?)

d. changing clothes or linen (yes or no?)

e. touching (yes or no?)

f. holding my swaddled infant(yes or no?)

g. kangaroo holding (or skin to skin holding)(yes or no?)

h. talking, singing, or reading to the infant (yes or no?)

j. sitting quietly at the bedside (or just visiting) (yes or no?)

k. asking questions about care plan, treatments, or equipment in the NICU (yes or no?)

l, participation in NICU parent support groups (yes or no?)

m. attending care conferences about my infant (yes or no?)

n. supporting the infant financially (yes or no?)

o. supporting the infant's mother emotionally (yes or no?)

p. I have been backing off to give the infant's mother more time to participate in activities in my place.

q. taking on additional responsibilities at home so that the baby's mother can spend more time with the baby (i.e., caring for the other children or taking care of pets, running errands, house cleaning, etc.)

r. I don't think a father should participate in these types of activities.

s. I haven't participated in any of these activities.

18. With each of the following activities, rate your confidence in how well you feel that you perform the task by using the following scale:

1. I do not feel confident in performing the task at all.

2. I feel mildly confident in performing the task.

3. I feel confident that I perform the task well.

a. diapering

b. bathing

c. feeding

d. changing clothes or linen

e. touching

f. holding my swaddled infant

g. kangaroo holding (or skin to skin holding)

h. talking, singing, or reading to the infant

j. sitting quietly at the bedside (or just visiting)

19. How often have you visited your infant in the past two weeks? a) I have not visited in the last two weeks b) Visited 1 or 2 times in the last two weeks c) visited 3 or more times, but not every day d) I visited my infant every day in the last two weeks

20. Do you usually visit with another individual or by yourself?

a. another individual

b. by myself

21. Branching Logic for 'Another individual' If you visit with someone else, please select the person or people that you usually visit the infant with? A) the baby's mother b) other family c) friends d)other-_____ (If other, please describe the relationship)

22. Have you signed the baby's birth certificate? yes or no

(Branching logic)- If no, do you intend to sign the birth certificate? yes or no

Appendix E

Open-ended questions for fathers

How would you rate your involvement with your infant since her/his birth?

a. very involved

b. mostly involved

c. not as involved as I would like to be

d. not involved

If you answered 'c' (Branching Logic)- Why do you think you are not as involved as you would like to be? _____--

If you answered 'd' (Branching Logic)- Why do you say that you are not involved? -
_____

Were there barriers to your involvement and if so, what were they? -_____

If these barriers were removed, would this change your level of involvement? _____

(Branching Logic) If you answered a or b- Are there any people or things that have occurred during the NICU stay so far that have helped you to be involved with your infant?_____

If you would be willing to be contacted in the future for a follow-up study, please provide your name, phone number, email address, and/or home address:

Appendix F

Chart Review

The following will be on a separate sheet to be completed by the PI:

1. Date information is obtained from chart:_____

2. Birth date of infant: _____

3. Infant MRN: _____

4. Name of infant: _____

5. Gender:_____

6. Acuity score of infant-_____

7. How long was the infant in level 3 acuity?_____

8. How long has the infant been considered level 2 acuity? _____

9. Infant's gestational age at birth-_____

10. Is this baby's birth a single gestation or multiple? _____

11. If multiple, what parity? _____

12. From Chart: Previous 2 weeks any activities in chart that father performed that were described by the bedside nurse-_____

13. If there were any qualitative comments made by the nurse about the father's comfort level in interacting with his infant during these activities, what were they?

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Disclaimer:

This dissertation was supported by CTSA award No. UL1TR000445 from the National Center for Advancing Translational Sciences. Its contents are solely the responsibility of the author and do not necessarily represent official views of the National Center for Advancing Translational Sciences or the National Institutes of Health