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STATE OF THE SCIENCE OF MATERNAL-INFANT BONDING: A PRINCIPLE-BASED CONCEPT ANALYSIS

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Abstract

Objective—To provide a principle-based analysis of the concept of maternal-infant bonding.

Design—Principle-based method of concept analysis for which the data set included 44 articles published in the last decade from Pubmed, CINAHL, and PsychINFO/PsychARTICLES.

Setting—Literature inclusion criteria were English language, articles published in the last decade, peer-reviewed journal articles and commentary on published work, and human populations.

Measurement and Findings—After brief review of the history of maternal-infant bonding, a principle-based concept analysis was completed to examine the state of the science with regard to this concept. The concept was critically examined according to the clarity of definition (epistemological principle), applicability of the concept (pragmatic principle), consistency in use and meaning (linguistic principle), and differentiation of the concept from related concepts (logical principle). Analysis of the concept revealed: (1) maternal-infant bonding describes maternal feelings and emotions towards her infant. Evidence that the concept encompasses behavioral or biological components was limited; (2) the concept is clearly operationalized in the affective domain; and (3) maternal-infant bonding is linguistically confused with attachment, although the boundaries between the concepts are clearly delineated.

Key Conclusion—Despite widespread use of the concept, maternal-infant bonding is at times superficially developed and subject to confusion with related concepts. Concept clarification is warranted. A theoretical definition of the concept of maternal-infant bonding was developed to aid in the clarification, but more research is necessary to further clarify and advance the concept.

Implications for Practice—Nurse midwives and other practitioners should use the theoretical definition of maternal-infant bonding as a preliminary guide to identification and understanding of the concept in clinical practice.

Keywords

maternal-infant bonding; maternal-infant attachment; principle-based concept analysis

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The process of childbearing is one of the most complex, and common, developmental events in the human experience (Brockington, 2004). The formation of the bond between mother and infant has been a central focus of obstetric, neonatal, and pediatric nursing care for the past 50 years. The concept was introduced in the 1960s with the work of Reva Rubin (1967; 1967) and popularized in the 1970s by Klaus and Kennell, (1976). It is thought that the formation of a strong bond between a mother and her infant can lead to more positive parenting behaviors and improved cognitive and neurobehavioral development of a child (Klaus and Kennell, 1982), while failure to establish this bond during infancy can have serious long-term effects on the mother-child relationship, affecting the child's development (Brockington et al., 2001). Maternal consequences of poor bonding include lack of maternal feelings, irritability, hostility, and rejection of the infant. These behaviors may progress to avoidance, neglect, and child abuse (Brockington, 1996). Given the importance of the maternal-infant bond, the potential exists for nursing interventions to improve the quality of this bond; however, description and measurement of the concept of bonding has been widely inconsistent, slowing the advancement of nursing research in this area. The aim of this paper is to present the findings of a principle-based concept analysis of maternal-infant bonding in order to describe the current state of the concept.

Background

In 1975, Rubin described the importance of bonding between a mother and child in her theory of maternal role attainment. The concept of maternal-infant bonding, however, became widely popularized after the publication of Klaus and Kennell's 1976 book, *Maternal-Infant Bonding*. Their work led to significant changes in the hospital care of postpartum women, including a widely instituted rooming-in policy (Klaus and Kennell, 1983). One of the most significant tenets of their bonding theory was a "sensitive period" which stated that in order for optimal developmental outcomes to be achieved for the infant, parents needed to have close contact with the newborn in the immediate postpartum period (Klaus and Kennell, 1976). Controversy subsequently arose from this tenet when researchers questioned the methods used in studies from which the tenet was derived. Furthermore, many professionals thought psychological harm may have been caused to families who were unable to have close physical contact with their newborns immediately after birth due to medical complications (Lamb, 1982; Crouch and Manderson, 1995). Klaus and Kennell later revised their original idea that close contact was *necessary*, stating that although it could promote bonding, "early separation did not prevent the formation of a close, intimate bond" (Klaus and Kennell, 1982; Kennell and Klaus, 1998). (For an excellent review of the history and social context of bonding theory, please see Crouch and Manderson, 1995).

Although the controversy surrounding bonding theory has diminished, the relative frequency of inconsistencies in the use of the concept is a major concern to researchers who aim to develop the science surrounding maternal-infant bonding. For example, a recent concept analysis on maternal-infant bonding (Altaweli and Roberts, 2010) included several statements that described attachment behaviors, thus confusing the distinction between attachment and bonding. Although in lay discourse the terms bonding and attachment are often used interchangeably (Brockington et al., (2006), inconsistencies in the research literature are numerous and require that clarification be made in order for concept advancement to occur. Advancement of the concept will allow researchers to utilize appropriate measurement of the concept allowing nursing interventions to be developed that will improve bonding, thus improving maternal and child outcomes.

Methods

In order to describe the *current* state of the science of the concept of maternal-infant bonding, a principle-based method of concept analysis (Penrod and Hupcey, 2005) using a data sample of articles published in the past decade was completed. This limits the concept analysis to an examination of maternal-infant bonding as it stands after much historical evolution. Principle-based concept analysis requires that evidence is collected only from the scientific literature, which is considered the study data, in order to integrate what is known about the concept (Hupcey and Penrod, 2005). The sample of scientific literature selected for concept analysis was thoroughly reviewed and data was recorded using a review matrix as described by Garrard (2007). In accordance with the method of principle-based concept analysis, the data was then critically analyzed according to four principles of analysis: epistemology, pragmatism, linguistics and logic (Penrod and Hupcey, 2005). In this analysis, the concept was critically examined according to the clarity of definition (epistemology), applicability of the concept (pragmatics), consistency in use and meaning (linguistics), and differentiation of the concept from related concepts (logic).

Following analysis, assessments were integrated into a theoretical definition that provides a higher level of understanding of the concept (Hupcey and Penrod, 2005; Penrod and Hupcey, 2005; Steis et al., 2009). The product of this concept analysis is a “summary of the state of the science that reveals the scientific community’s best estimate of probable truth” (Hupcey and Penrod, 2005, p. 205). The concept of maternal-infant bonding is described as it currently is portrayed in the extant literature, and persistent gaps and inconsistencies are identified in order that subsequent research may enhance scientific precision and improve utility, which will lead to advancement of the concept (Penrod and Hupcey, 2005) and advancement of maternal-newborn nursing.

Data Sources

The databases PsychINFO, PsychARTICLES, Pubmed, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) were searched using the search term *“mother-infant bonding” OR “maternal-infant bonding” OR “maternal bonding” OR “mother-to-infant bonding” OR “maternal infant bonding” OR “mother infant bonding.”* Inclusion criteria were English language, articles published in the last 10 years, peer-reviewed journal articles and commentary on published work, and human populations. The search yielded 91 articles after elimination of duplicates (Figure 1). Each abstract was reviewed and 38 articles were eliminated due to lack of relevance to the present study. Studies were excluded that examined a population other than mothers and infants (e.g., adults’ bonding with their parents or maternal-fetal bonding); if the concept of bonding was only interjected to support the study design; or if the study topic was conceptually unrelated to the current analysis. This yielded a sample size of 53 articles which were subsequently obtained in full text.

Full text review resulted in the elimination of 13 articles due to lack of relevance, using the above criteria. Additional articles meeting the inclusion criteria were obtained through secondary methods. Recognition of references for inclusion at the secondary level occurred when sources were cited frequently by other authors but had not been identified in the original search results. This method added 4 articles to the data. The final sample size for analysis was 44 articles.

Results

The results of this principle-based concept analysis will include the summative conclusions derived from each of the four guiding principles. This is followed by a discussion of

conceptual components of maternal-infant bonding including those contexts in which bonding is promoted, those in which it is hindered, and the outcomes of maternal-infant bonding.

Epistemological principle: Is the concept of maternal-infant bonding clearly defined?

The epistemological principle involves the examination of how clearly the concept has been both explicitly and implicitly defined within the scientific literature. Maternal-infant bonding, most often, refers to a tie from the mother to the infant; not from infant to mother, which is usually referred to as attachment. A few authors referred to maternal-infant bonding as a reciprocal process (Crouch, 2002; Matthey and Speyer, 2008), or maternal bonding and infant attachment as dependent upon each other (Figueiredo et al., 2009).

Most explicit definitions of maternal-infant bonding referred to the original work of Klaus and Kennell (1976). Definitions were similar to that given by Madrid and colleagues, “an intense emotional tie between mother and infant” (2006, p. 271). Many authors described maternal-infant bonding as limited to an affective domain (Brockington et al, 2001; (Else-Quest et al, 2003; Brockington, 2004; Taylor et al, 2005; Brockington et al., 2006; Klier, 2006; Moehler et al., 2006; Reck et al., 2006; Wittkowski et al., 2007; Figueiredo and Costa, 2009; Figueiredo et al, 2009; Garcia et al, 2010; van Bussel et al, 2010; Bienfait et al., 2011; Gunning et al., 2011; Reay et al., 2011) such as the mother’s feelings and emotions toward her infant, and that bonding is not comprised of observable behaviors such as cuddling (Chang, 2011). There were, however, those who defined the concept in terms of only behavioral components including gaze, touch, and physical care (Sharan et al, 2001; Cernadas et al, 2003; Noorlander et al., 2008). Still others defined maternal-infant bonding as encompassing both affective and behavioral domains (Charpak et al, 2005; Kennell and McGrath, 2005; Feldman and Eidelman, 2007) while some specifically stated that the behavioral manifestations were simply an outward expression of maternal-infant bonding (Sevil and Coban, 2005; Chambers, 2009).

In addition to the definitions of bonding as affective or behavioral, some researchers incorporated biological processes into their definition. For example, IsHak et al., (2011) concluded that an association between oxytocin and maternal-infant bonding is well documented in both animal and human studies. In addition, Feldman and Eidelman (2007) found that maternal oxytocin levels were related to two measures of maternal-infant bonding: observed maternal-infant behavior and the assessment of the mothers’ cognitive representations regarding her infant.

Maternal-infant bonding was also defined in terms of a relationship between a mother and infant without specifying behavioral, biological, or affective components (Crouch, 2002; Altaweli and Roberts, 2010). For example, the definition provided by Altaweli and Roberts was “the special, close relationship between the mother and her child” (2010, p. 557). Additionally, in several articles, maternal-infant bonding was discussed at length but even implied definitions were difficult to ascertain (Karacam and Eroglu, (2003; Menahem and Grimwade, 2004; Tallandini and Scalembra, 2006; Parva et al., 2010).

The timing of maternal-infant bonding is also a significant epistemological consideration. In the majority of studies, maternal-infant bonding was described as a process, although two studies also referred to bonding as an outcome (Karacam and Eroglu, (2003; Weisman et al., 2010). In one study, the authors measured time to bonding which implies that maternal-infant bonding occurs at a specific point in time (Karacam and Eroglu, (2003). Most authors also implicitly or explicitly stated that the maternal-infant bonding process occurs over an extended period of time, but is for the most part constrained to the first year of the child’s life. Many studies examined bonding in the first year postpartum (Else-Quest et al., 2003;

Taylor et al., 2005; Reck et al., 2006; Feldman and Eidelman, 2007; Cevasco, 2008; van Bussel et al., 2010; Edhborg et al., 2011; Gunning et al., 2011), although a few extended the definition to include childhood years (Broedsgaard and Wagner, 2005; Madrid, 2005; Klier, 2006; Madrid et al., 2006; Moehler et al., 2006; Matthey and Speyer, 2008; Garcia et al., 2010; Reay et al., 2011), and two included measures of bonding in the antenatal period (Chambers, 2009; Figueiredo and Costa, 2009). Several authors also discussed maternal-infant bonding only in terms of the first week postpartum (Sharan et al., 2001; Cernadas et al., 2003; Karacam and Eroglu, 2003; Sevil and Coban, 2005; Figueiredo et al., 2007; Wittkowski et al., 2007; Figueiredo et al., 2009; Weisman et al., 2010; Bienfait et al., 2011). Karacam and Eroglu (2003) and Parva et al., (2010) purport that that immediate physical contact after birth was essential to promotion of maternal-infant bonding, but neither provided empirical evidence to support this idea.

In summary, the concept of maternal-infant bonding is frequently defined, but not consistently across studies. The majority of authors seem to agree that maternal-infant bonding is a process that includes the emotional tie of a mother to her infant, occurring in the first week or year of a baby's life. Maternal-infant bonding may also be observed through behavioral manifestations, although the exact behaviors are not clearly identified. From this analysis, one can conclude that the concept of maternal-infant bonding is inconsistently defined in the current literature.

Pragmatic principle: Is the concept of maternal-infant bonding applicable and useful?

The pragmatic principle involves analyzing whether the concept explains a phenomenon encountered within nursing and other practice disciplines and whether it has been operationalized. Examination of the literature revealed that maternal-infant bonding is easily recognizable in clinical practice, either through observation of maternal behavior or self-report of emotions by the mother. Several clinical case reports of maternal-infant bonding were found in the medical, psychology, and sociology literature (Sharan et al., 2001; Sevil and Coban, 2005; Klier, 2006; Parva et al., 2010). For example, Sevil and Coban (2005) reported a case of a young mother giving birth after an unwanted pregnancy. Initially the mother demonstrated anger and unhappiness and displayed indifferent behaviors toward her newborn. However, after the nurses educated her on infant care and breastfeeding, the mother began to display signs of bonding such as smiling at the baby. In this example, both the presence and absence of maternal-infant bonding were clearly recognizable. Furthermore, treatment of maternal-infant bonding disorders is reported using various techniques such as repetitive transcranial magnetic stimulation (Garcia et al., 2010), hypnosis (Madrid, 2005), and eye movement desensitization and reprocessing (Madrid et al., 2006). Notably, these treatments were all aimed at maternal cognitive and emotional representations, suggesting that maternal-infant bonding disorders can be improved without treatment of the infant.

In addition to recognition of the concept in practice, maternal-infant bonding has also been operationalized for use in research and practice. Several self-administered questionnaires have been developed to measure maternal-infant bonding (Taylor et al., 2005) or to screen for bonding disorders (Brockington et al., 2001). The most frequently cited questionnaire in this sample was the Postpartum Bonding Questionnaire (PBQ) developed by Brockington and colleagues (2001). The questionnaire contains 25 items addressing a mother's feelings toward her infant such as "I feel close to my baby" and "I resent my baby." Similar to the PBQ, the Mother-to-Infant Bonding Scale (MIBS) was developed to assess the emotional response of a mother to her infant (Taylor et al., 2005). The scale contains 8 one-word items such as "joyful", "dislike", and "loving." Each of these scales specifically addresses the mother's emotions and feelings toward the infant, rather than her behavior or parenting confidence.

Maternal-infant bonding has also been measured using observational methods. For example, in a study by Cernadas et al., (2003) maternal-infant bonding was measured by nurses' observation of mother-infant interaction with regard to three factors: gaze, touch, and support of the baby. Although most methods of observational measurement focused on maternal behavior (Sharan et al, 2001; Cernadas et al., 2003; Feldman and Eidelman, 2007; Schaffer et al., 2012), Noorlander et al. (2008) reported use of the Bethlem Mother-Infant Interaction Scale which included a component that measured infant contribution to interaction.

In summary, it is clearly evident that the concept of maternal-infant bonding is relevant to and recognizable in clinical practice. In addition, treatment modalities that demonstrate success have been developed. Instruments used to measure the concept varied, but for the most part displayed consistency between how individual authors defined the concept of maternal-infant bonding and how they measured it.

Linguistic principle: Is the concept used consistently and appropriately within the scientific literature?

The linguistic principle involves analyzing whether consistency in use and meaning are maintained. For the concept of maternal-infant bonding, inconsistencies in linguistic use were frequent, as the term maternal-infant bonding was often used interchangeably with the terms maternal-infant attachment or maternal attachment (Sharan et al., 2001; Crouch, 2002; Cernadas et al., 2003; Madrid, 2005; Klier, 2006; Figueiredo et al., 2007; Matthey and Speyer, 2008; Chambers, 2009), even by authors who specifically defined the difference (Kennell and McGrath, 2005; Altaweli and Roberts, 2010). For example, Kennell and McGrath (2005) wrote that “by general consensus a bond is the emotional tie from parent to infant, whereas the word attachment refers to the tie in the opposite direction, from infant to parent” (p. 775) and then later stated that certain factors “contribute to the attachment of the mother to the infant” (p. 776).

Brockington, who frequently used the term “mother-infant relationship”, offered the following discussion of linguistic utilization: “‘Bonding’ is an unsatisfactory term, but is widely used and less cumbersome than ‘mother-infant relationship’. ‘Attachment’ is a synonym for bonding, and risks confusion with infant-mother attachment, a totally different phenomenon” (p. 238–239). Although Brockington stated that bonding is a linguistic synonym for attachment, he noted the difficulty that can arise from using the two interchangeably. Several authors also interchangeably used the terms mother-infant bonding and mother-infant relationship (Brockington, 2004; Klier, 2006; Bienfait et al., 2011; Edhborg et al., 2011; Gunning et al., 2011; Dearman et al., 2012). Notably, these studies all appeared to be based on the work of Brockington. In summary, although linguistic consistency exists internally within some articles, there were still authors that used the terms maternal-infant bonding and maternal-infant attachment or mother-infant relationship interchangeably, creating discrepancies in linguistic practice.

Logical principle: Does the concept hold its boundaries when integrated with other concepts?

The logical principle involves analyzing whether the concept holds its boundaries when integrated with other related concepts. Concepts related to maternal-infant bonding may include the mother's general mental health or feelings of well-being, caring for the infant or parenting competence, attachment, and the mother-infant relationship. Each of these is discussed with respect to the extant literature.

The literature clearly defined the boundaries between maternal-infant bonding and the mother's mental health by measuring depression and/or anxiety and bonding in the same sample. Studies consistently differentiated depression and anxiety from maternal-infant bonding (Brockington et al., 2001; Klier, 2006; Moehler et al., 2006; Reck et al., 2006). Findings showed that although maternal mental health may have an effect on maternal-infant bonding, it is the mother's emotions and feelings *toward the infant* that specifically denote bonding.

The authors that defined maternal-infant bonding as a behavioral component lacked logical boundaries between the concept and the concept of care for the infant or parenting competence. For example, Cevasco et al. (2008) measured bonding in mothers of preterm infants using a statement such as, "I feel I know how to calm my infant" which also represents, for example, a positive aspect of nursing care; a nurse would know how to calm an infant without bonding to him or her. Therefore, the scale may have failed to differentiate between maternal-infant bonding and quality nursing care. The same could be said for Cernadas et al.'s (2003) observational measure of maternal-infant bonding, which included behaviors that could be considered good parenting behaviors. Since Noorlander et al., (2008) reported discrepancies between maternal-infant interaction as observed by nurses and maternal-infant bonding as reported by mothers, it may be important to differentiate between the concept of maternal-infant bonding and parenting competence.

Although attachment is linguistically confused with bonding, logical boundaries between the concepts are clear. Attachment theory espouses two types of attachment: infant or child attachment, which has to do with the infant's tie to the mother (Kennell and McGrath, 2005), and adult attachment, which is the orientation of the adult toward attachment relationships in general, with regard to levels of anxiety and avoidance (Gunning et al., 2011). The present data sample contained studies that clearly and consistently defined the independence between attachment and bonding (Taylor et al., 2005; Brockington et al., 2006; Figueiredo et al., 2009).

The term "mother-infant relationship" is often used in the psychology literature specifically in those studies that cite the work of Brockington. It seemed clear from his discussion that maternal-infant bonding and mother-infant relationship were considered the same concept. This was not consistent across all the extant literature as many studies differentiated the two concepts. For example, Bienfait et al. (2011) stated that "the mother-infant bond refers to the affective dimension in the mother-infant relationship" (p. 281). Another author stated that bonding influences the maternal-infant relationship (Else-Quest et al., 2003), while another stated that bonding is a consequence of the maternal-infant relationship (Tallandini and Scalembra, 2006). In summary, the conceptual boundaries of maternal-infant bonding are clearly defined with some related concepts (maternal mental health; attachment), and completely blurred with others (care and parenting competence; mother-infant relationship).

Conceptual Components

In order to determine the best estimate of probable truth described in current literature, the conceptual components of the concept of maternal-infant bonding were also examined. The context in which bonding is promoted, those in which it is hindered, and the outcomes of maternal-infant bonding were examined and findings are presented.

Promotion of maternal-infant bonding—Van Bussel and colleagues (2010) asserted that high levels of bonding to the fetus during pregnancy will promote high levels of maternal-infant bonding after delivery. Additionally, support of the woman in labor, either by a doula or a nurse was implicated in the promotion of maternal-infant bonding (Altaweli and Roberts, 2010; IsHak et al., 2011). In the current literature, the most frequently reported

context in which maternal-infant bonding can be promoted required a physical proximity between mother and infant after birth. For example, holding the baby was described as promoting bonding (Crouch, 2002; Charpak et al., 2005; Tallandini and Scalembra, 2006; Altaweli and Roberts, 2010). Additionally, breastfeeding and rooming-in during the immediate postpartum period promoted bonding (Altaweli and Roberts, 2010; Dearman et al., 2012). Figueiredo et al., (2007) also asserted that maternal-infant bonding is stimulated by infant crying, smiling, and visual following. Maternal emotional components are also thought to be able to promote bonding. For example, a positive early attitude of the mother (Wittkowski et al., 2007) and a mother's realistic expectation of the parenting role may promote maternal-infant bonding (Broedsgaard and Wagner, 2005). Examination of the literature revealed that in order to promote maternal-infant bonding, health care providers should attempt to promote not only physical proximity of mother and newborn, but also a positive emotional state of the mother at birth.

Hindrance of maternal-infant bonding—Authors that treat maternal-infant bonding disorders most often cited physical and/or emotional separation of the mother from the infant around the time of birth as the primary cause of bonding disorders (Madrid, 2005; Klier, 2006; Madrid et al., 2006). They reported that physical separation of mother and infant may impair bonding, such as after a premature birth (Broedsgaard and Wagner, 2005) or as a result of maternal incarceration (Chambers, 2009). A non-vaginal or traumatic delivery can also make bonding between mother and infant difficult (Sharan et al, 2001; Karacam and Eroglu, 2003; Madrid et al, 2006; Cevasco, 2008; Giustardi et al, 2011), and this was linked to decreased maternal exposure to oxytocin during the birth process (Feldman and Eidelman, 2007; IsHak et al, 2011). Maternal physical complications may make maternal-infant bonding more difficult, and were associated with higher rates of bonding disorders, however, Madrid (2005) reported that mothers in his study who demonstrated high trait resilience overcame physical separation to bond with their infants.

Emotional separation of the mother and the newborn also has the potential to impair maternal-infant bonding. This may occur through a variety of reasons, for example, an unwanted pregnancy or finding out a baby is not the desired gender (Brockington, 2004; Sevil and Coban, 2005). A traumatic event around time of delivery was also associated with bonding impairments. Maternal mental health may also be a hindrance to the development of maternal-infant bonding (Reck et al, 2006). Finally, infant characteristics, such as being unhealthy, having a difficult temperament, or sleep problems, can also make bonding more difficult (Brockington, 2004; Broedsgaard and Wagner, 2005; Figueiredo et al., 2007; Figueiredo et al, 2009; Bienfait et al, 2011; Hairston et al, 2011).

Outcomes of maternal-infant bonding—The importance of maternal-infant bonding lies in the outcomes that occur. Maternal-infant bonding facilitates improvement in the mother's parenting skills (Madrid, 2005; Figueiredo et al, 2007; Altaweli and Roberts, 2010). Maternal-infant bonding was also helpful for the survival and development of the infant (Sharan et al, 2001) and may form the foundation for the infant's later attachments as well as the basis for the child's sense of self (Madrid et al., 2006). One study specifically showed that maternal-infant bonding may prolong breastfeeding duration (Cernadas et al, 2003). Van Bussel and colleagues (2010) caution, however, that maternal-infant bonding is no guarantee of a future healthy mother-infant relationship, nor a promise of healthy child development. Furthermore, many authors described the outcomes of impaired bonding in vague terms and/or referenced the work of Brockington and colleagues (2001). According to Brockington, impairments in bonding have "potentially serious effects on the long-term mother-child relationship, and on child development. It occasionally leads to child abuse or neglect" (2001, p. 133). The specific outcomes of bonding problems were rarely addressed in this data sample, except as described in a treatment case by Madrid (2005) who found that

treatment of maternal-child bonding disorders resulted in elimination of asthma symptoms and by Hairston and colleagues (2011) who found that impaired maternal-infant bonding was related to problems with externalizing behaviors at 18 months of age.

Discussion

Limitations of this concept analysis are related to the nature of the studies chosen for inclusion. The search strategy for this concept analysis excluded studies that examined only bonding during pregnancy, bonding in non-human subjects, and bonding in fathers or other caregivers. Future examination of these additional contexts of bonding will allow the development of a more comprehensive understanding of the construct.

The purpose of this concept analysis was to describe the current state of the science with regard to the concept of maternal-infant bonding. The summative conclusions based on current literature revealed two key issues in the development of the concept of maternal-infant bonding since the work of Klaus and Kennell (1976).

First, maternal-infant bonding was most often described in terms of the maternal feelings and emotions toward her infant. This definition was supported by operationalizations of maternal-infant bonding that measured only affective components of the mother-infant relationship, which were from the mother's perspective. Those authors who defined maternal-infant bonding in terms of behavioral components were more likely to suffer from an unclear operationalization or ill-defined boundaries between the concept and other similar concepts. Behavioral components of maternal-infant bonding that were unique to the concept were not found in this data sample.

Second, examination of the literature revealed a widespread interchangeable use of the terms mother-infant attachment and mother-infant relationship with maternal-infant bonding. Confusion of the terms attachment and bonding is most concerning because attachment describes a body of literature that is well-known and highly utilized, with meaning that is not consistent with the definitions provided for bonding; therefore, attachment is not an acceptable surrogate term for bonding.

Examination of the current literature revealed that the concept of maternal-infant bonding has evolved since the early work of Klaus and Kennell (1976). Little evidence was found in support of the original assertion that close contact between mother and infant in the first hour after birth is *essential* to successful bonding. Additionally, Klaus and Kennell (1976) described bonding in terms of both affective and behavioral domains, which continues in the literature today. However, this multifaceted definition of bonding has led to inconsistencies between and within studies, as well as blurring of boundaries between maternal-infant bonding and other related concepts. The results of this analysis reveal that the evolution of the science of maternal-infant bonding has added positively to our knowledge of the process; however, it has also produced inconsistencies.

Theoretical Definition

The theoretical definition of the concept of maternal-infant bonding based on integration of the current scientific literature is as follows:

Maternal-infant bonding is a maternal-driven process that occurs primarily throughout the first year of a baby's life, but may continue throughout a child's life. It is an affective state of the mother; maternal feelings and emotions toward the infant are the primary indicator of maternal-infant bonding. Behavioral and biological indicators may promote maternal-infant

bonding or be an outcome of maternal-infant bonding, but are not sufficient to determine the quality of maternal-infant bonding nor are these indicators unique to the concept.

Conclusion

The concept of maternal-infant bonding is found in psychology, sociology, nursing and medical literature. Despite widespread use of the concept, maternal-infant bonding is at times superficially developed and remains vulnerable to confusion with the concepts of attachment, mother-infant relationship, and parenting competence. Limited evidence exists to support a behavioral component unique to maternal-infant bonding.

According to Janice Morse, whose work served as the backbone for principle-based concept analysis, if a concept with an enormous body of literature, rich descriptions, and established instruments appears confusing and murky upon closer inspection, concept clarification is necessary (Morse, 1995). This concept analysis offered a preliminary clarification of the concept of maternal-infant bonding through analysis of the current literature. However, further examination will be necessary in order to provide adequate clarification for clinical and research purposes. Specifically, research is needed to address the lack of evidence for a behavioral component of maternal-infant bonding including clarification of which behaviors uniquely identify maternal-infant bonding. Furthermore, the role of biological factors in the development and progression of maternal-infant bonding should be examined. The negative outcomes of impaired maternal-infant bonding for women and children should also be examined further by clinical research studies that address specific outcomes. The literature examined from the last decade provides scarce evidence of definite negative consequences of impaired maternal-infant bonding for the mother and the child. As such, it may be important to directly examine the relationship between maternal-infant bonding and infant attachment. A search of the extant literature failed to reveal any study of the effect of maternal-infant bonding disorders on infant attachment. Lastly, extension of the concept analysis to include maternal-fetal bonding, paternal-infant bonding, and bonding in non-human species may be essential to expanding the current knowledge and understanding of the concept of bonding.

Although the theoretical definition of maternal-infant bonding in this concept analysis should be considered preliminary, the results may have implications for practice disciplines including midwifery. It may be important for midwives to consider that the feelings and emotions of a mother toward her infant are complex and may not necessarily be fully reflected in her outward behavior. Furthermore, midwives should be aware that impairments in maternal-infant bonding may not be limited to women with mental health disorders or those who experienced difficult or traumatic births. Along with clinical judgment, the use of the PBQ or MIBS may be appropriate to help midwives identify women at risk for impaired bonding. Thus, the results of this concept analysis should be utilized as a preliminary guide to the clinical recognition of maternal-infant bonding and to promote the advancement of the concept through further research.

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Figure 1.
Search Strategy