INFANT MENTAL HEALTH: DEVELOPMENT OF AN ONLINE LEARNING MODULE FOR PERINATAL HEALTH CARE PROVIDERS

by

© Amy LeBouthillier

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Abstract

Background: Infant mental health refers to the social, emotional, and cognitive well-being of children spanning from preconception to age five. The presence of healthy relationships with sensitive and responsive caregivers is necessary for infant mental health. The period after birth is an important time in the establishment of infant-caregiver relationships. Health care providers working with women and families in the perinatal period can influence this developing relationship and promote sensitive and responsive caregiving behaviours. In turn, sensitive caregiving fosters healthy social, emotional, and cognitive development in the infant, which influences their lifelong health and wellbeing.

Purpose: The purpose of this practicum project is to develop an educational resource for health care providers on infant mental health with an emphasis on practical interventions to foster the infant-caregiver relationship in hospital.

Methods: Research for the educational resource consisted of an integrated literature review, consultations with key colleagues, and an environmental scan of available resources at three select hospitals.

Results: Following consultations, an online learning module was selected as the most appropriate education format. Information gained from the integrative review and consultations was used to develop an evidence-based educational resource.

Conclusion: This learning module is expected to increase health care providers understanding of infant mental health and key interventions to foster the infant-caregiver relationship. It is pending final review by hospital stakeholders prior to implementation.

Keywords: infant mental health, attachment, parent-child relationship.

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Infant Mental Health: Development of an Online Learning Module for Perinatal Health Care Providers

Infant mental health refers to the social, emotional, and cognitive well-being of children that spans from preconception to age five. Over the past several decades there is mounting evidence that an infant's early life experiences shape the trajectory of social and emotional wellbeing through the lifespan (Sameroff, 2010). Additionally, growing evidence from the field of epigenetics suggests maternal experiences before and during pregnancy create epigenetic changes in the newborn which impact brain development and increase the infant's risk for later mental illness (Desocio, 2018). This underscores the need to intervene with caregivers and infants from preconception to the post-natal period and beyond.

Infants create their first relationships with their primary caregivers, and this relationship is often referred to as an attachment relationship. This relationship provides the foundation from which infants begin to learn about themselves and the world around them. When caregivers are attentive and meet the needs of the infant, they are setting the stage for the mental health and wellbeing of the infant. When this relationship is not functioning optimally, when there is disharmony between the infant's cues and the parental response, it can strain the ability of infants and young children to form healthy relationships, experience and manage the full range of emotions, and to learn and develop cognitively (McComish, 2015). The quality of the attachment relationship is a modifiable determinant of infant mental health that has been linked to outcomes in social, emotional, and cognitive development (Newman, Sivaratnam, & Komiti, 2015).

Health care providers at the IWK Health Centre provide specialty care for women and their newborns at various stages from preconception to infancy and beyond. Each care encounter represents an opportunity for health care providers to support the mental health and wellbeing of families and their infants. The aim of this practicum project is to create an educational resource to support health care providers in the promotion of infant mental health during routine care interactions. The target audience of this project is health care providers in the prenatal special care unit, the birth unit, the family newborn care unit, and the neonatal intensive care unit (NICU).

Goals and Objectives

The overall goals for the practicum project were to review the current literature regarding the promotion of infant mental health in the prenatal and newborn period and to use this information to develop educational resources for health care providers in the target care areas. The aim of this work is to improve the ability of health care providers to promote infant mental health through supporting the relationship between the infant and their primary caregiver(s) during routine care interactions. The key practicum objectives were:

1. Review and describe current literature exploring infant mental health promotion in the antenatal and postpartum period. This was accomplished through an integrative literature review.
2. Identify current practices, policies, and resources that are used at the IWK to support the mental health and wellbeing of families during hospitalization of women and infants to identify potential areas for development. This was

accomplished thought consultations, and the completion of the consultation report.

3. Explore resources that may exist in other hospitals. This was accomplished through an environmental scan of several prominent children's hospitals in Canada.
4. Synthesize the learnings and evidence from the information gathering activities noted above to identify and develop a relevant, effective resource to educate health care providers on the promotion of infant mental health in the hospital setting.
5. Demonstrate the advanced nursing practice competencies of research methods, research utilization, and leadership skills through the completion of the practicum project.

Methods

For this practicum project, several methods were used. An environmental scan was conducted to identify resources, policies, and care practices that support the infant-caregiver relationship in hospital. This environmental scan included a review of policies, resources, and care practices at the IWK Health Centre as well as two selected hospitals. Consultations were held with key informants and stakeholders at the IWK Health Centre to inform the direction for this learning resources. Lastly, an integrated literature review was conducted to examine the evidence base for infant mental health promotion in hospital, specifically evidenced-based strategies to foster the infant-caregiver relationship. Findings from these activities were synthesized and used to guide the

development of an online learning module for health care providers at the IWK. Further details of the methods and key findings of the integrated literature review, consultations, and environmental scan are provided in the sections that follow. A brief summary of the online learning module, and next steps for implementation are also discussed. The full integrative literature review, consultation and environmental scan report, and learning module content can be found in appendices A, B, and C respectively.

Summary of the Integrated Literature Review

An integrated literature review was conducted to examine the current body of knowledge and research regarding infant mental health promotion in the hospital setting. An initial review of the literature on infant mental health in the hospital setting did not identify the necessary research to inform an integrative literature review. As such, the focus of the review was adjusted to examine the infant-caregiver relationship in the hospital setting. Given that this relationship is central to infant mental health, this revised approach provided an alternative means of identifying evidenced-based strategies to promote infant mental health in the perinatal period. Please see Appendix A for the full integrated literature review and literature summary tables.

Methods

The literature search was conducted using the CINAHL, MEDLINE Complete, and PsycINFO databases. The search terms used were “infant” AND “attachment”. All results were limited to English language articles published from January 2000 to August. This initial search resulted in 9,810 articles. With additional limiters in place for the type of population studied, and the type of articles, this number was reduced to 91 unique

articles. Titles and abstracts were reviewed, and (n=22) articles were selected for further review, along with (n=5) additional articles found as suggested articles during the literature search. A secondary search was conducted to gain further information on the impact of rooming-in or separation after birth for the healthy full-term population. The CINAHL and MEDLINE databases were searched using the terms “rooming-in” AND “attachment” with no limiters. This search identified (n=33) articles, (n=2) of which were research articles examining attachment outcomes based on variations in hospital care. These were included in the review to provide more information about differing care approaches in the two populations of interest in this review (i.e., healthy infants, and infants requiring intensive care).

A total of 20 articles were screened for inclusion using either the Critical Appraisals Skills Programme (2018) critical appraisal checklist for qualitative studies or the Public Health Agency of Canada’s (2014) critical appraisal tool kit for quantitative studies. Literature was selected that met the following criteria: research article (qualitative or quantitative), hospital setting (e.g., birth units, routine newborn care units, or NICUs), and attachment related outcome (e.g., maternal sensitivity, infant-caregiver interactions, caregiving behaviour). Several topics (e.g., skin-to-skin care) had an abundance of literature, and as such only a selection of articles was included given the time limitations of this review. Preference was given to articles with higher level evidence (e.g., meta-analyses and systematic reviews) and higher quality scores on initial appraisal. A total of 15 articles were selected for inclusion in this review.

Key Results

Three main themes emerged from the integrative review, these were: hospital care influences caregiving, separation and caregiving in the NICU, and attachment interventions. Together, these three themes support the main hypothesis of the review that hospital care influences the infant-caregiver relationship, and that health care providers can act to support this relationship in the hospital setting.

Hospital care influences caregiving. In this first section of the review, five articles were discussed that examined different aspects of hospital care and their influence on the infant-caregiver relationship. Key findings in this section demonstrated that when infants and mothers are separated in the period after birth, there are statistically significant differences in various measures of the child and parent's behavior and interactions up to a year later (Bystrova et al., 2009; Gomes-Pedro, Bento de Almeida, Silveira da Costa, & Barbosa, 1984). Some researchers hypothesize that the distinct hormonal and biological changes in the mother's body after birth represent a critical period in the establishment of caregiving behavior (e.g., Pereira, 2016). A feedback loop is thought to occur where hormonal changes promote caregiving actions, which directly strengthen neural circuits in the brain that further intensify caregiving behavior (Strathearn, 2011). Although these brain changes are seen to occur in non-mothers as well, it is suspected that these changes occur more strongly and rapidly among mothers in response to caregiving, skin-to-skin contact, and breastfeeding in the immediate postpartum period.

There is some evidence that health care providers behaviours, attitudes, and unit policies may affect how quickly parents interact with their infants, and the separation of

infants from their caregivers (e.g., Baylis et al., 2014; Niela-Vilén, Feeley, & Axelin, 2017). Additionally, the use of various types of medical technologies were found to be obstructive to parent's desire to see, touch and participate in the care of their infant (Lantz & Ottosson, 2013). These findings are significant given the importance of early infant-caregiver interaction.

Separation and caregiving in the NICU. Experiences in the NICU such as prolonged hospitalization, separation from caregivers, painful procedures, prematurity and neurological immaturity are potential risk factors to the infants developing brain and infant mental health (Ash & Williams, 2016). This section of the review focused on qualitative research exploring the caregivers experience with having an infant in the NICU. Across studies, the stress and psychological impact of having an infant in the NICU was emphasized by parents. Additionally, the NICU admission caused alterations to the parenting role, and interfered with parental bonding and interaction with their infant. These findings suggest that caregivers of an infant in the NICU face additional barriers to developing a relationship with their infants and require additional support from health care providers.

Attachment interventions. The final section in the literature review focused on evidenced-based actions health care providers can take to foster the developing relationship between caregivers. Interventions identified included promoting skin-to-skin care, educating caregivers about infants needs and cues, and empowering caregivers of infants in the NICU to become active partners in their baby's care. Skin-to-skin care is the intervention best supported by research, with several articles noting positive benefits

to the infant-caregiver relationship. Skin-to-skin care was found to improve mother-infant interactions, lead to increased vocalizations towards the child, maternal bonding, increased caregiving behaviours, and lower maternal depression scores (Cleveland et al., 2017; Shorey, Hong-Gu, & Morelius, 2016). The other interventions are lacking in the evidence necessary to draw firm conclusions regarding their effectiveness, though there is some low-quality evidence to support education interventions. Additionally, there is no evidence that these interventions are harmful in anyway.

Conclusion

Hospital care can have a persistent influence on the dyadic relationship between infants and caregivers. This relationship is foundational for the optimal cognitive, social, and emotional development of the infant and is something with must be promoted and protected. Health care providers must be aware of the importance of this early contact and interaction between infants and caregivers as well as the ways in which hospital care can influence caregiving. Further research is needed to establish evidence-based ways of promoting the psychological wellbeing of infants and caregivers in the postpartum period. With knowledge of practical ways to support caregiving, health care providers can take steps to promote infant mental health from the earliest days of the newborn's life.

Summary of the Consultation and Environmental Scan Report

Consultation and environmental scan processes were conducted with internal stakeholders and external organizations to further guide the development of an educational resource. This was a necessary step to for the following reasons: to better

understand the current practice environments in the target units, to gain support from internal stakeholders, to better inform the content of the educational resource, and to identify any extant educational resources for health care providers on this topic. Please see Appendix B for the full consultation and environmental scan report.

Consultations

Methods. As part of the consultation process, information was gathered from three separate groups: the managerial group (n=3), members of the multidisciplinary infant mental health working group (n=4), and from health care providers working in the target units (n=10). Meetings were held in person or over the phone with the managerial and infant mental health working groups using a semi-structured interview as a guide. An online survey was distributed to health care providers in three of the target units. Content analysis was used to identify trends and themes, and to enable interpretation of the results of the survey and semi-structured interviews.

Key results. The management group was an important stakeholder, and the consultations allowed me to gauge support for this project across different areas of the women's and newborn health program. The goal of this consultation was to identify current areas of strength, areas for improvement, and potential barriers. All managers were aware of unit practices and policies that support the infant-caregiver relationship such as skin-to-skin care, psychological support, infant feeding support, pain management, and caregiver education.

Managers were asked to identify areas for improvement, and several suggestions were made such as: providing all medical care with infant's skin-to-skin or in arms

whenever possible and providing real-time feedback or education regarding infant's cues and caregiving approaches. Potential barriers identified by the managerial group included health care providers' perceptions regarding lack of time, periods of high workload as a result of acuity, volume or staffing, and short duration of stay for healthy moms and infants.

The infant mental health working group is a multidisciplinary group that was formed with the purpose of promoting infant mental health in the women's and newborn health program. They were consulted for their expertise and the integration of their membership across the various target units. Several members of the working group were contacted to gain information on topics to include in the education, current hospital resources, areas for improvement, and possible barriers. The most cited topic to include in the education was the infants need for sensitive and responsive caregiving. They wanted health care providers to know how to demonstrate sensitive and responsive caregiving in their own interactions with infants, and to in turn promote this behaviour among families. Areas for improvement included the need for all health care providers to have a foundation of essential knowledge, skills, and competence. Respondents felt this was necessary to ensure all health care providers are working from an attachment and trauma-informed perspective.

The final consultation participants were health care providers working in the target areas. The goal of this consultation was to better understand the following: their familiarity with the topic, perceived importance of topic, how infant mental health is promoted in their care area, barriers to infant mental health promotion, education topics

of interest to them, and their desired resource format. All responses received were from care providers who identified as nurses. Health care providers reported moderate to high familiarity with the concept of infant mental health, and most health care providers felt it was relevant to their work. Half of the respondents chose to provide examples of how infant mental health was promoted in practice. Barriers identified included lack of time, busy workload, staffing issues, and the need for more education. Barriers specific to the NICU were the primary caregiver(s)' absence and difficulty for health care providers to respond to infants' cues depending on workload demands. Period of caregiver absence are uncommon in the family newborn care unit but are relatively common in the NICU. Respondents in the NICU identified more personal responsibility for supporting infant mental health by responding to infants' cues in a timely manner, although this was not always possible. Respondents felt the most important topics to include in the educational resource were general information about infant mental health, strategies to promote infant-caregiver attachment, and resources and referral services available for families with psychosocial concerns.

A final purpose of the consultations was to determine how the education would be provided. There was unanimous agreement among the managerial team that an online learning module would be the most appropriate format. The management team requested use of an online learning format for its advantages in terms of reach, cost, and consistency with other continuing education initiatives at the IWK Health Centre. Health care providers surveyed as part of the consultation process were most interested in direct education (i.e., an in-person education session). Ultimately the decision was made for the

purpose of this practicum project to create an online learning module to ensure that it would be more broadly accessible than a one-time education session.

Environmental Scan

An environmental scan was conducted concurrently with the consultations. The goal of the environmental scan was to identify existing resources related to the practicum project topic both within and external to the IWK Health Centre. More specifically, the aim of the environmental scan was to find:

- Policies, practice guidelines, or educational resources on the topic of Infant mental health or infant-caregiver attachment within/outside of the IWK Health Centre.
- Print or video resources regarding child development, attachment, or infant mental health, that could be incorporated into the development of the education resource.

Methods. Internal resources were identified through a scan of the IWK Health Centre's online policy website and as part of the consultations noted above. To identify external resources, the NICU at the Mount Sinai Hospital in Toronto and the Stollery NICU at the Royal Alexandra Hospital in Edmonton were contacted by phone. Conversations were had with unit educators to identify any shareable resource or policies. Additionally, to identify print and video resources, the websites for Infant Mental Health Promotion (2019) and the Centre on the Developing Child at Harvard University (2019) were reviewed.

Key results. Clinical educators for the two NICUs were contacted. They were able to identify unit practices and approaches to care (e.g., Family Integrated Care) that support infant mental health, but they had not developed any policies, guidelines, or educational resources for health care providers or families regarding infant mental health, attachment, or promotion of the infant-caregiver relationship.

The two websites were scanned, and three video resources were identified on the Harvard (2019) Centre for the Developing Child website. These videos discussed key concepts related to how early experiences shape brain development, how parents foster this development through interaction, and the impact of toxic stress (Centre on the Developing Child, 2011a, 2011b, 2011c). These videos will be incorporated into the final practicum project pending permission for use from the Harvard Centre for the Developing Child.

Conclusion

The consultation and environmental scan provided critical information in several areas. The identification of barriers to promoting infant mental health was an important outcome of the consultations, and the most commonly reported barriers were a lack of time and education needs. This practicum project hopes to directly address the need for education outlined by all consultation groups. This education project will also emphasize the practical aspects of working with families. The routine care of families can be used as means to foster responsive caregiving and the infant-caregiver relationship without requiring significant time investments.

The results of the consultations and environmental scan also provided a good sense of where the health centre is currently in terms of their support for infant mental health. As identified in the survey, there are at least some health care providers who are aware of ways to support the infant-caregiver relationship. The IWK has policies outlining several practices that are supportive of infant mental health and infant-caregiver attachment. These current practices will be used as a starting point in the discussion of strategies to support infant-caregiver attachment as part of the online learning module. Finally, the consultations have guided the choice of an online learning module as the educational resource format.

Summary of Developed Online Learning Module

The final product of this practicum project was the development of an educational resource for health care providers on infant mental health promotion in the postpartum period. An online learning module was chosen as the learning format for the education in part from management feedback during the consultation process. The IWK Health Centre uses an online learning management system, which is an online tool that allows for the delivery, tracking, and reporting of e-learning content (i.e., online learning modules). It is a preferred method of education in the health centre as it is already well integrated and offers flexibility for learners. Additionally, the online learning module provides flexibility for learners, ensures the continued availability of the education content, and is a cost-effective education solution.

The learning outcomes and topics for the education were developed based on the integrative literature review and consultation feedback from the infant mental health

group and health care providers. The top three topics to include in the education as requested by health care providers surveyed were: general information about infant mental health, strategies to promote infant-caregiver attachment, and resources available for families with psychosocial concerns. Additional topics identified by the infant mental health group were the infants need for responsive and sensitive caregiving and how maternal mental health impacts infants and families.

The content of the learning module was modeled after these key areas and the following learning outcomes were developed: accurately define the terms infant mental health; identify several ways in which hospital care can interfere with the developing relationship between infants and their caregivers; describe three strategies that can be used to foster the infant-caregiver relationship in hospital; identify available resources to connect with if infant-caregiver relationship concerns are identified.

The online learning module will use a multimedia format with the inclusion of educational video clips, text, audio, and images. The learning module is supplied as a PDF format without multimedia functionality for the purpose of submission of this practicum report. The finalized version will be an interactive online learning module available on the IWK health Centre's internal online learning management system. This varied use of multimedia formats is to support different learning styles and to promote learner engagement in the material. Finally, a short quiz is included at the end of the learning module to assess accomplishment of the learning outcomes. Please see Appendix C for images of the online learning modules slides.

Advanced Practice Nursing Competencies

This practicum project has provided an opportunity to demonstrate advanced practice nursing competencies developed throughout this Master of Nursing program. The Canadian Nursing (CNA) is a national professional association for nurses that has developed guidelines regarding advanced practice nursing in Canada (CNA, 2008). This practicum has allowed me to demonstrate advanced practice nursing competencies in the areas of research, leadership, and consultation and collaboration.

Research

The CNA (2008) notes that research is an essential skill of an advanced practice nurse. Nurses must be able to "critique, interpret, apply and disseminate evidence-based findings" (CNA, 2008, p.24). The practicum project has allowed me to review available evidence, critique it, and to apply the evidence in the development of an educational resource. The CNA (2008) emphasizes that advanced practice nurses must "contribute to nursing and the health-care system by disseminating new knowledge through formal and informal channels" (p.24). This resource will be disseminated to health care providers locally and made publicly available through the Memorial University of Newfoundland research repository. Additionally, a manuscript outlining key aspects of the project will be written and submitted for publication.

The CAN (2008) also notes that nurses must be able to "evaluate current practice at individual and system levels in light of research findings" (p.24). After conducting an integrated literature review, consultations were held to better understand current practice at the IWK Health Centre. The findings were compared against best available evidence

identified by a review of available research. This has allowed me to identify practices supported by evidence as well as several areas for growth.

Leadership

The CNA (2008) notes that advanced practice nurses should be "advocating for individuals, families, groups, and communities in relation to treatment, the health-care system and policy decisions that affect health and quality of life" (p.24). Infants are a vulnerable population that cannot advocate for themselves. A goal of this practicum project is to advocate for the patients and families in the women's and newborn program to ensure the care provided is developmentally supportive, with the aim of improving long-term neurodevelopmental outcomes for patients.

Another advanced practice nursing skill is in "identifying the learning needs of nurses and other members of the health-care team and finding or developing programs and resources to meet those needs" (CNA, 2008, p.24). Through consultations with stakeholders, I have gained a better understanding of the learning needs of health care providers in relation to current evidence. I have developed the online learning module as part of the practicum project as an educational resource to meet these identified learning needs.

According to the CNA (2008) advanced practice nurses must be competent in "developing and articulation a vision for nursing practice" (p.25). The practicum project has allowed me to demonstrate leadership skills by articulating a vision for nursing practice that is developmentally supportive and considers the mental health needs of

hospitalized infants. This is especially important as infants are a vulnerable population and unable to advocate for themselves.

Consultation and Collaboration

The CNA (2008) states that advanced practice nurses are expected to be able to consult and collaborate with colleagues at varying levels and across sectors. As part of this practicum project I engaged in consultations with colleagues both within my organization and across the country. Consultations were done with colleagues from varying disciplines with the goal of improving care delivery at the IWK Health Centre. The CNA (2008) notes that advanced practice nurses engage in quality-improvement initiatives with colleagues, which has been demonstrated in this project. This practicum project has allowed me to demonstrate these advanced practice nursing skills and has further prepared me to take on advance practice nursing roles.

Next Steps

The learning module will be further reviewed by members of the infant mental health working group and the management team. This is to ensure the content of the online learning module is consistent with other education initiatives and that it meets the needs of stakeholders. Once revisions are completed, the learning module will be submitted to the IWK Health Centre's elearning developer with the Learning and Development department for final formatting into the online learning format. The learning module will then be available for ongoing review and revisions. This will be done in response to learner feedback, as part of the IWK Health Centre's regular education review process, and as needed based on new knowledge or research.

The final part of the practicum project is dissemination. A manuscript for publication will be drafted detailing the results from the literature review, consultations process, and the creation of the online learning module. This is an important step for this topic given the gaps in the literature on infant mental health promotion in the hospital setting. The final practicum report will be submitted to Memorial University of Newfoundland to be uploaded onto the online research repository, making it freely available for download.

Conclusion

This introduction summarizes each of the steps leading to the development of an educational resource for health care providers on the topic of infant mental health in perinatal hospital care. An integrative literature review was conducted to examine how health care providers can promote infant mental health in the hospital setting. This review provided evidence that what happens in hospital can have lasting implications for the infant-caregiver relationship. It also identified steps health care providers can take to have a positive impact on the developing infant-caregiver relationship. Consultations and an environmental scan were conducted to examine policies and practices across the IWK women's and newborn health program. This was also done to identify extant resources that could be adapted in the development of an educational resources. Several policies and practices at the IWK Health Centre were identified that are supportive of the infant-caregiver relationship. These included a skin-to-skin care policy, 24-hour rooming-in, infant pain management policies, and a neuroprotective developmentally supportive care

guideline for infants in the NICU. An online learning module was developed to share important information from these activities and about infant mental health.

Although the topic of infant mental health has a substantial body of literature surrounding it, there is a relative paucity of information on supporting infant mental health during hospitalization. This concept seems to be gaining ground, particularly in the NICU setting where there are increased risks for alterations in the development of the infant-caregiver relationship. Further research in this area could help broaden our evidence base for supportive interventions. Through the implementation of this online learning module, it is my hope that health care providers will gain an a better understand of infant mental health, it's importance, and how the care provided in hospital can have a lasting impact on these infants and families.

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Appendix A

An Integrative Literature Review on Infant Mental Health in the Hospital Setting: A Focus on Infant-Caregiver Attachment

Amy LeBouthillier

Memorial University of Newfoundland

Abstract

Introduction: There is increasing awareness of the importance of sensitive, and responsive caregivers in shaping the mental, emotional, and physical wellbeing of infants throughout their life. Postpartum hospital care can support or hinder the development of the infant-caregiver relationship, impacting the quality of both caregiving interactions and infant attachment.

Aims: This review aimed to identify both the factors that contribute to infant-caregiver attachment in hospital, and the evidenced based strategies that promote this attachment.

Methods: An integrative literature review was conducted to examine what is known about the influence of hospital care on infant-caregiver interactions and to identify evidence-based strategies to promote contingent caregiving behaviour. The CINAHL, MEDLINE Complete, and the PsycINFO databases were searched for qualitative and quantitative literature. A total of fifteen articles were included in this review.

Results: Three main themes were identified: hospital care influences caregiving, separation and caregiving in the NICU, and attachment interventions. Hospital practices such as separation of mother and baby and nursery care were identified as affecting infant-caregiver interactions. Interventions such as skin-to-skin and teaching caregivers about infants' cues supported the infant-caregiver relationship. Caregiving in the NICU created additional barriers for parenting.

Conclusion: This review provided evidence that hospital care can have lasting implications for the infant-caregiver relationship. Armed with this knowledge, health care

providers and administrators can take action to promote the healthy development of the infant-caregiver relationship in the postpartum period.

Keywords: infant mental health, attachment, parent-child relationship.

An integrative literature review on infant mental health in the hospital setting:

A focus on infant-caregiver attachment

Over the past several decades there is mounting evidence that an infant's early life experiences shape the trajectory of cognitive, social, and emotional development and wellbeing through the lifespan (Sameroff, 2010). This interdisciplinary field of research, policy development, and practice is referred to as infant mental health. The major determinant of an infant's mental health is the quality of the relationship an infant has with its caregiver, which develops overtime as caregivers respond to and meet the needs of their infant (Clinton, Feller, & Williams, 2016). This relationship between the infant and their caregiver is often referred to as an attachment relationship. The period from birth to three years is a period of rapid growth and development and there has been increasing emphasis on early intervention for infants and caregivers during this time. Despite this interest, little work has been done on supporting infant mental health and attachment with infants and caregivers in the hospital setting. It has not been well examined in the literature how hospitalization, either routine or specialized, impacts the developing infant-caregiver relationship or influence caregiving behaviours. The postpartum period represents an opportune time to work with families to promote sensitive and responsive caregiving, that will help shape the mental health and wellbeing of the infant and family.

Hospital care can promote or interfere with the developing relationship between infants and caregivers. This is especially true for infants and families receiving intensive medical care. With appropriate knowledge of the importance of attachment, as well as

barriers and facilitators, health care providers and hospital administrators can take steps to provide care in ways that support and foster the developing relationship between infants and caregivers. This literature review will show that hospital care influences how parents interact with their infants, that parents of infants in the neonatal intensive care unit (NICU) face additional challenges to developing a relationship with their infant, and that hospital administrators and a skilled health care workforce can to address these issues through structural and practice changes.

Background

The concept of infant-caregiver attachment has its theoretical roots in the work of John Bowlby (1956, 1969) who postulated that all infants needed to form close, emotional bonds with their mothers. He believed attachment was a biologically driven phenomenon that fostered proximity between infants and mothers, thus increasing chances of survival. The absence of maternal care (i.e. maternal deprivation) was believed to have lifelong negative consequences for the infant's cognitive, social, and emotional wellbeing (Bowlby, 1956, 1969).

Bowlby's initial work was built upon by Mary Ainsworth who studied attachment styles of young children with their primary caregivers. The strange situation experiment was conducted with infant-caregiver dyads to observe the children's behaviour in response to the departure and return of a caregiver in the presence of a stranger (Ainsworth & Wittig, 1969). Infants were said to be securely attached when they explored freely, showed distress on the departure of their caregiver, and were comforted by the caregivers return. Attachment styles are thought to develop as a behavioural

adaptation in response to the quality of caregiving received. Caregiving was conceptualised by Ainsworth (1967) using the term maternal sensitivity, which describes the mother's ability to correctly interpret and respond to an infants' cues and needs. Correlational evidence links sensitive caregiving to secure attachment (Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002; Pederson et al., 1990). Sensitive and responsive caregiving is associated with beneficial emotional and social outcomes throughout the lifespan (Raby, Roisman, Fraley & Simpson, 2015). In contrast, adverse experiences such as abuse, neglect and other forms of toxic stress are especially detrimental to an infant's development and their mental health (Franke, 2014).

Human and animal research has shaped our understanding of how maternal caregiving works on a neurobiological level through changes in the brains of mothers. Pereira (2016) notes that successful mothering is dependent on the mothers' ability to "link sensory cues with the underlying needs of the young, and to promptly, and contingently respond to match their evolving needs" (p. 24). This is analogous to the concept of maternal sensitivity proposed by Ainsworth four decades ago. Pereira notes research into the neuroplasticity of the maternal brain shows that numerous brain pathways and structures associated with the cognitive, motivational and affective aspects of caregiving undergo significant changes and reorganization in the post-partum period. Oxytocin is one hormone that has been widely studied for its role in attachment formation after birth; however, there are many hormones and neurotransmitters that mediate maternal neural changes. The human brain is primed by these various substances to promote neural adaptation to the new role of caregiving. These changes promote

increased attentiveness to infants' cues, and in turn, responding to these cues promotes increases in caregiving behaviours, serving as a positive feedback loop that helps to establish sensitive and responsive caregiving (Pereira, 2016). Rogers and Bales (2019) note that the neurological adaptations to parenthood among fathers and alloparents (e.g., foster parents, grandparents) has received less attention in the literature. They note that although fathers do not experience the same pregnancy related neural cascades that mothers do, there is still evidence to suggest fathers experience brain changes in response to caring for their infants. In order to promote these advantageous adaptations, caregivers need to be able to receive sensory feedback from their infant and respond to their infant's cues. This can only happen when caregivers and infants have ample access to each other.

While hospital-based maternity care has many benefits in terms of safety for mother and baby, the potential impacts of hospital-based care on infant-caregiver attachment after birth are not well defined. Mother-infant separation during both routine and specialized hospital care remains a potential threat to infant-caregiver attachment. In areas where hospital-based care is not the norm, this separation does not always occur (Jordan & Davis-Floyd, 1993). In contrast, at least periodic separation is a common occurrence in many western hospitals. The practice of newborn nurseries where infants are cared for by nurses used to be a common practice to facilitate mothers rest and recovery and medical monitoring of newborns. Over the past several decades, there has been increasing adoption of rooming-in, a term used to describe when mothers and infants stay together in the same room. This now common practice throughout Canada, with 95% of newborn units allowing rooming-in for at least 19 to 24 hours per day

(Public Health Agency of Canada [PHAC], 2012). During routine hospital care of newborns across Canada, the average time a newborn spends with their mothers has been increasing. The PHAC (2012) notes that infants spent an average of 22.6 hours with their mothers in 2006, up from 15.7 hours in 1993.

Though this is now commonplace for healthy newborns, rooming-in remains the exception in the care of infants in the NICU. Rooming-in 24 hours a day for the duration of an infant's stay was only possible in 8% of Canadian NICUs (PHAC, 2012). Studies examining the effects of preterm birth on attachment are mixed, with some studies finding no difference between infants born at term (e.g., Korja, Latva, & Lehtonen, 2012), and some finding lower rates of secure attachment in preterm infants (e.g., Ruiz, Piskernik, Witting, Fuiko, & Ahnert, 2018). This suggests the impact of preterm birth and hospitalization on attachment security are not yet well understood, and there are likely other unidentified variables at play. The cumulative effects of prematurity, medical complications, adverse experiences, separation from caregivers, and parental distress may contribute to impaired attachment sometimes seen in this population.

The provision of care in the hospital has a direct impact on the interactions and proximity of the infant and caregivers, particularly among the intensive care population. Proximity and reciprocal interaction are necessary to foster adaptation to the caregiving role. Given the link between the quality of caregiving and long-term health outcomes for these infants, it is worth a close examination of how hospital care—for better or worse – influences the establishment of this integral and essential relationship. This review aims

to further the understanding of the impact of hospitalization on infant-caregiver attachment and interactions with the goal of advancing practice in this area.

Methods

An initial review of the literature on infant mental health in the hospital setting was conducted using the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and MEDLINE Complete databases using the search term “infant mental health”. The search was limited to literature published from January 2000 until June 2019 and available in the English language. The search resulted in 502 unique articles. Titles and abstracts were reviewed, and eight articles were found that discussed infant mental health in the hospital setting. These articles contained expert opinion on infant mental health in the hospital setting with no research articles identified. Although the topic of infant mental health hasn’t explicitly been explored in the hospital setting through research, the goal of infant mental health promotion is to support the social, emotional and cognitive wellbeing of the child through the attachment relationship(s) with caregivers. The promotion of this attachment relationship during hospitalization in the perinatal period has been studied. As such, a decision was made to focus the literature review on the infant-caregiver relationship as an evidenced based means of promoting infant mental health in the hospital setting.

A second literature search was conducted using the CINAHL, MEDLINE Complete, and the PsycINFO databases. The search terms used were “infant” AND “attachment”. All results were limited from January 2000 to present (August 2019) and in English language. This initial search resulted in 9,810 articles. Given time constraints for

this project, additional limiters were used for each database as follows: CINAHL database limited to inpatient population and research articles; MEDLINE Complete database limited to research articles, systematic reviews and population age all infants (birth to 23 months); The PsycINFO database limited to inpatient population. This search resulted in 91 unique articles. Titles and abstracts were reviewed, and (n=22) articles were selected for further review, along with (n=5) additional articles found as suggested articles during the literature search. In these articles, there was limited information on the impact of rooming-in or separation after birth for the healthy full-term population. An additional search of the CINAHL and MEDLINE databases was done using the search terms “rooming-in” AND “attachment” with no limiters. This search identified (n=33) articles, (n=2) of which were research articles examining attachment outcomes based on variations in hospital care. These were included in the review to provide more information about differing care approaches in the two populations of interest in this review (i.e., healthy infants, and infants requiring intensive care).

A total of 20 articles were screened for inclusion using one of two critical appraisal tools. Qualitative research articles were appraised using the Critical Appraisals Skills Programme (CASP) critical appraisal checklist (CASP, 2018). Quantitative research was appraised using the PHAC (2014) critical appraisal tool kit. Given resource and time limitations it was not possible to include every identified piece of literature. Literature was selected that met the following criteria: research article (qualitative or quantitative), hospital setting (e.g., birth units, routine newborn care units, or NICUs),

and attachment related outcome (e.g., maternal sensitivity, infant-caregiver interactions, caregiving behaviour).

The intention behind this review was to gain a broad understanding of potential factors which may influence attachment development in hospital. For this reason, preference was given to examining a range of different ideas over any specific topic in depth. Several topics (e.g., SSC) had an abundance of literature, and as such only a selection of articles were included given the time limitations of this review. Preference was given to articles with higher level evidence (e.g., meta-analyses and systematic reviews) and higher quality scores on initial appraisal. A total of 15 articles were selected for inclusion in this review.

Results

Three main themes emerged from this review: hospital care influences caregiving, separation and caregiving in the NICU, and attachment interventions. First the potential impacts of hospital care on infant-caregiver interaction will be discussed. Consideration will then be given to issues specific to families of infants in the NICU. Lastly, how health care providers can intervene to support and promote attachment will be discussed. Together, these three themes will support the main hypothesis of this review that hospital care influences the early infant-caregiver relationship and that with this knowledge, health care providers can take action to support this relationship. Please see Appendix A1 for the literature summary tables.

Theme 1: Hospital Care Influences Caregiving

Early contact and rooming-in. Gomes-Pedro, Bento de Almeida, Silveira da Costa, and Barbosa (1984) conducted a randomized controlled trail to examine the impact of early mother-infant contact on later maternal and infant behaviours. Although previous studies had found positive effects for early contact, the authors of this study wanted to standardize the post-intervention conditions in an attempted to isolate contact after birth as the main between group variable. Participants were randomized to either the intervention group (n=30) or control group (n=30). All infants in the study were briefly separated from their mothers to undergo routine medical examinations. In the intervention group, clothed infants were returned to their mothers and placed on their mother's chest for 30 minutes before infants were brought to the nursery. In the control group, the infant was briefly shown to the mother before being brought to the nursery. At 6 hours of age, infants from both groups were returned to their mothers' rooms and remained with them in their rooms until discharge.

Gomes-Pedro et al. (1984) assessed infant and maternal outcomes. Infants were assessed at three different times (2-6 hours, 3 days, and 28 days) using the Brazelton Neonatal Behavioral Assessment Scale (BNBAS) which assessed infants on four dimensions: interactive processes, motor processes, organizing processes related to state control, and organizing processes relate to physiological response to stress. The first two initial infant observations were conducted in hospital without the mother and the last observation was conducted at home with the mother present. By the second and third assessments, intervention infants were found to have significantly higher scores on interactive processes. The mothers' behaviour was assessed two ways: during a 15-

minute observation of the mothers feeding the infant, and during the last infant assessment. Assessors developed an observation scoring system on affectional behaviour, proximity, care of the newborn and attention. For both observations, the observers were blinded to the dyad's intervention assignment. Mothers in the intervention groups scored higher on several assessment items on day 28 including: affectionate behaviour (t_{58} =2.58, $p<0.01$) frequency of vocalisations (t_{58} =2.12. $p<0.05$) and cleaning the infants face (t_{58} =2.33, $p<0.025$). During the BNBAS assessment of the infants at 28 days, mothers in the intervention group were more likely to respond to their infants' cries compared to the control group (χ^2=4.27, df=l, $p<0.05$). Even with the small group sizes, the authors found significant effects from the intervention. These findings provide moderate quality evidence that 30 minutes of contact versus brief visualization only during in the first 6 hours of an infant's life can have a lasting effect on maternal behaviours up to one month later.

Thirty-five years later, Bystrova et al. (2009) examined the benefits of early contact and rooming-in due to the lack of widespread adoption of these practices throughout Russia at the time of their research. They aimed to examine the long-term effects of hospital care on the quality of mother-infant interactions at one-year follow-up. They conducted a randomized controlled trial and looked at variables in type of mother-infant contact in the period after birth and during the rest of the hospital stay. Four separate intervention groups were created: (1) SSC after birth and rooming-in; (2) holding dressed infant after birth and rooming-in; (3) nursery care after birth and during hospital stay (i.e., no rooming-in); and (4) nursery care after birth, and later rooming-in.

Infants in each group were assigned to either a clothing group, or a swaddling condition which was in place for the duration of the hospital stay with the exception of group 1 which engaged in SSC immediately postpartum before assuming the assigned apparel condition. Additionally, it was noted if infants began to nurse during the early contact period to assess for effects of early nursing on caregiving. All infants in the study had 25 minutes of routine medical care before initiation of the study protocol (as per medical norms in the country). Drop out rates at 1-year follow-up were 30%, with no significant differences between groups. Bystrova et al. took 5 -minute recordings of mother-child interactions during free play and another during a structured play activity when the child was 12 months old. Items from the Parent-Child Early Relational Assessment (a reliable and validated tool) were used to assess mother and child affective responses during these interactions. Statistical analysis of the data was conducted using multivariate analysis of covariance and analysis of covariance.

Bystrova et al. (2009) found that compared with the infants in close contact with their mothers (groups 1 and 2), infants who were separated early from their mothers (groups 3 and 4) were significantly more dysregulated and irritable ($F_{1,121} = 6.93$, $p = 0.010$) and showed less mutuality/reciprocity ($F_{1,121} = 9.05$,$p = 0.003$) during the structured play interaction. These effects were strongest among all the SSC care group (1) whether they had nursed or not, then second strongest for infants in the non-SSC holding group (2) who had nursed. The authors suggest that SSC may be the main mediator of observed effects at 12-month follow-up, but that nursing may compensate for a lack of SSC (potential due to effects on maternal hormones). Infants in the SSC group has less

irritability and emotional dysregulation versus the nursery care group (Fisher's PLSD, $p = 0.011$) and the reunion group (Fisher's PLSD, $p = 0.026$). They also showed more mutuality/reciprocity versus the nursery care group (Fisher's PLSD, $p = 0.025$) and the reunion group (Fisher's PLSD, $p = 0.019$). Notably, infants who received rooming-in care after an initial period of nursey care (group 4) did not have assessment scores that varied significantly from the nursery care group.

Bystrova et al. (2009) also identified another interesting correlation that mothers of infants in the swaddled apparel condition showed less maternal involvement and responsiveness ($F_{1,119} = 4.88$, $p = 0.027$). Although it is not possible to draw conclusions from this correlational data, one plausible explanation for this finding offered by the authors is that swaddling decreasing infant signaling and thus impedes the typical reciprocity found in mother-infant interactions. The lasting effects of this care difference further supports the notion of a sensitive period in which reciprocal interactions may help promote maternal caregiving behaviours.

Taken together, these two studies suggest that maternal-infant contact after birth, preferably SSC, is associated with lasting positive effects on infants, and mother-infant interactions. The good news is that these practices have becoming increasingly utilized in postpartum hospital care across Canada, especially as it pertains to rooming-in (PHAC, 2017). Non-separation of mothers and infants is an approach recommended and adapted by many hospitals for its apparent benefits in breastfeeding initiation and maintenance (World Health Organization, 2017). Despite the many benefits to this approach, both

studies identified that mothers and infants were routinely separated even during the experimental conditions of maternal-infant contact.

Hospital routines. Two studies in this review identified that unit routines have an impact on mothers and infants. Niela-Vilén, Feeley, and Axelin (2017) examined factors that influence the practice of SSC in the two hours after birth. The qualitative descriptive study recruited 14 health care providers (nurses or midwives) responsible for caring for mothers in the immediate post-partum period. These nurses and midwives were asked to make note of each mother-infant separation in the two hours after birth and to identify the reason for the separation. The nurses and midwives were asked to make brief audio recordings at the time of each separation on a cell phone application developed for the study. These events were recorded by health care providers over a period of 20 working shifts.

The study resulted in the generation of multiple data points, which were audio recorded moments of closeness or separation. Thematic analysis was used by the authors to identify themes in the qualitative data. There were several important findings from this study. One finding was that it was the health care providers in the hospital who were responsible for initiating many of the moments of separation and closeness (e.g., placing baby skin to skin, or taking the baby from mom for care interventions) and the authors noted that participants rarely identified parents as the initiators of separation from their infants.

The theme, aiming for closeness, was used by the Niela-Vilén et al. (2017) to describe their finding that the nurses and midwives in the study aimed to keep mother and

baby together, ideally in skin to skin contact. The nurses and midwives in the study identified that SSC after birth was a routine practice that they were expected to promote. The main reasons for separation identified in the study included routine care (e.g., assessment of vitals, weighing, or measuring head and length), safety of the infant (e.g., mother falling asleep) or due medical concerns with the infant. Niela-vilén et al. noted that routine assessments of infants were typically delayed by the participants until after the first feeding, at which time the mothers were offered something to eat, and a chance to shower which often led to a separation event between mother and infant.

This study was identified as a pilot study, and the single hospital enrollment was a limitation of the study. This hospital already incorporated SSC as a routine intervention after birth, and the delay of separation until after the first feeding may not be as commonplace in other hospital settings. Also, health care providers participating in the study may have been more likely to promote closeness as a result of the additional awareness and accountability. Regardless, the finding that health care providers are the main factor determining if infants are together or separated from their mothers is an important finding that is likely transferable across similar settings.

In another descriptive exploratory study, Baylis et al. (2014) examined when first-time events occurred between caregivers (n=81) and their infants treated in two hospital NICUs as part of a larger longitudinal study. The authors were aware of several differences in NICU A compared to NICU B including earlier adoption (and more experience with) using SSC, more positive health care provider views of SSC, and the opportunity to stay overnight in the NICU. The authors anticipated that differences in unit

routines and practices would impact the timing of when parents had first-time interactions with their infants. Survey data was collected that asked parents when they experienced various events with their infants. This survey was collected at discharge and as such is subject to recall bias.

Findings from Baylis et al.'s (2014) study showed that immediately after birth, only 1/3rd of parents were able to hold their infant's skin to skin with no significant difference between the two NICUs. Just over half of all mothers (53%) and fathers (61%) touched their infant in the delivery room prior to transport to the NICU. While most fathers (98%) saw their infant in the delivery room, only 67% of mothers did. This finding was significant between units, with NICU A having a higher number of mothers who saw their infant in the delivery room compared to NICU B (87% vs 58%, p=0.045) with no difference between fathers.

Other findings from the study showed that most mothers touched, made eye contact with, kissed, and held their infants within two days. Mothers in NICU A were quicker to become involved in caregiving activities (changing diapers, cup feeding, managing temperature) compared with NICU B. Although this study design cannot attribute causation to the noted differences between NICU A and NICU B and the timing of first-time events between caregivers and their infants, it does provide some evidence that inter-unit differences in health care providers attitudes, practices, and policies may act to hinder or facilitate parental interaction with their infant. Additionally, given what has been discussed already regarding the benefits of early mother-infant contact versus

separation the finding that only 30% of parents were able to hold their infant's skin to skin after birth is troublesome.

Medical technology. The use of medical technology presents another potential factor that influence parental interaction with their infants in the hospital setting. Lantz and Ottosson (2013) used a cross-sectional survey with 65 questions to examine parental perceptions of the following medical technologies: incubators, respiratory support, monitoring devices, phototherapy devices, feeding tubes, and infusion therapy. Parents were asked to identify how obstructive each medical technology was to the perceived possibility of seeing, touching, or participating in the care of, their infant. A consecutive sample of 248 parents were recruited from any of five local NICUs in a region of Sweden. Data was analysed using multiple regressions and t-tests. All technology they studied apart from feeding tubes were perceived by parents as barriers to seeing, touching, and participating with their infants. Feeding tubes were only perceived as a barrier to feeding. The level of perceived obstruction varied based on type of medical technology as well as several demographic variables. Certain medical technologies were more likely to be perceived as a barrier to physical contact than to seeing their infant, and these were monitoring ($t = -3.06$, $p = 0.003$), phototherapy ($t = -3.88$, $p < 0.001$) and infusion ($t = 2.74$, $p = 0.007$). No significant differences were found for other medical technologies being perceived as more obstructive in any one area over another. Demographic variables associated with increased perceived obstruction from physical contact with their infants while in incubator care included being a mother and having previous parenting

experience. The authors note that the effect sizes for these explanatory variables were small.

In summary, Lantz and Ottosson (2013) suggest that medical technology, although necessary, can have repercussions on the developing infant-caregiver attachment due the creation of additional barriers to seeing and touching their infants. They advocate for increased awareness within the medical team regarding the impact of medical technology on infant-caregiver interactions and propose that medical teams develop individualized care plans with parents to assist them in holding/touching, seeing, and nursing their infants. The authors also argued that health care providers should consider the category of parent (i.e., the explanatory variables) as identified in the study when deciding the potential impact of a given medical technology on a parent. Given the small effect sizes, and the descriptive nature of this study (i.e. correlation only) I disagree with this interpretation. I would argue that a more reasonable approach is that medical technology be acknowledge as a potential barrier and that steps should be taken to assess the impact of medical technology on the caregivers perceived ability to act on their desired level of interaction with their infant.

The articles in this section provide evidence that hospital routines and practices contribute to the initial contact between infants and caregivers. Medical technology was identified as an unexpected factor that impairs caregivers perceived ability to interacted with their infants. It has been shown that early contact in the period after birth leads to significant improvements in maternal caregiving behaviours up to one year later. It was also identified that in routine that health care providers in the birth unit have a lot of

control over when mothers and infants are together or separated. If health care providers do not have a good understanding of the importance of this first contact, they may act in ways that prematurely separate infants from caregivers in situations are not medically urgent. This underscores the need for education for health care providers on the benefits of early contact and potential barriers in hospital care. Hospital administrators are also responsible for fostering changes to unit cultures in routines to protect this important time between infants and caregivers.

Theme 2: Separation and Caregiving in the NICU

Having a baby born preterm or with medical complications requiring intensive care is a stressful and at times traumatic experience for parents. Caregivers of infants hospitalized in the NICU are at an increased risk of stress, fatigue, sleep disturbances, anxiety, depression, and other mental health concerns compared to parents of infants not admitted to the NICU (Busse, Stromgren, Thorngate, & Thomas, 2013). This is important as stress and mental illness have been shown to have a detrimental effect on infant-caregiver interactions (Kingston, Tough, & Whitfield, 2012).

Given the importance of connection and interaction between infants and parents, it is worth considering the potential impacts of intensive care on this population, especially since there are approximately 40,000 infants born who require intensive care annually in Canada in their first 28 days of life (Fallah et al., 2011). Several authors have used qualitative methods to examine the parental experience of having an infant in the NICU. A qualitative descriptive study by Mäkelä, Axelin, Feeley, and Niela-Vilén (2018) examined parents' experiences during moments of closeness and separation from their

infants. The aim of their study was to understand how parents develop a bond with their infants in the NICU. The study had 23 parent participants (mothers n=18 and fathers n=5) of an infant admitted in a level III NICU. Parents used a phone application to record their experiences during self-identified moments of closeness or separation with their infants. These closeness and separation stories (n=141, range = 6 to 21 responses per participant) were then analysis using inductive thematic analysis.

The three themes identified by Mäkelä et al. (2018) were rollercoaster of closeness and separation, bonding moments, and disrupted dyadic relationship. Parents in their study identified alternating moments of closeness and separation as generating an emotional rollercoaster. Mäkelä et al. noted that parents had to actively work to feel close to their infants, and that this required support from health care providers. They also note that parents desired to be physically close to their infants, holding, stoking or providing SSC. Aside from physical contact, parents valued being present to provide care (i.e., being able to meet their babies needs), and having quiet moments alone with their infant. Mäkelä et al. also noted that parents reported feeling close to their infants during reciprocal interactions (e.g., eye contact, infant vocalizations). This is consistent with the studies on neurobiological adaptations that suggest engaging in reciprocal interactions (i.e., interpreting and responding to an infant's cues) makes neural connections that promote caregiving (Pereira, 2016). Disruptions in the normal dyadic relationship were identified by Mäkelä et al. in their analysis of separation stories. Factors contributing to the disruptions were physical distance, mothers being cared for on a separate maternity unit, other responsibilities in the parent's life (e.g., work, siblings), the infant's medical

condition, and the hospital routines. While not all factors are modifiable, how care is provided in the hospital setting directly impacts several of these factors including the separation of infant and caregiver, lack of integration of NICU and maternity care, and hospital routines.

Al Maghaireh, Abdullah, Chan, Piaw, and Kawafha (2016) conducted a systematic review of qualitative studies exploring parental experiences in the NICU and used thematic analysis to describe the results. Their review included nine studies with various methods (i.e., semi-structured interviews, interviews, self-reporting, and focus group with interviews). Their search strategy was well done, and they utilized the CASP critical appraisal tool (CASP, 2018). Unsurprisingly, they found the stress of having a hospitalized infant was a recurrent theme in the reviewed literature. Al Maghaireh et al. found that this stress arose from several factors including feelings of fear, disruptions to a family routine, and alterations in parenting roles. They found these feelings were exacerbate by poor communication with health care providers, a lack of information, loss of control, and loss of contact with their infant. Feelings of stress were described by parents as “a sense of pressure, tension, and nervousness” (Al Maghaireh et al., 2016, p. 2749). They found breastfeeding in the NICU was described as very stressful for mothers. Given that many infants in the NICU may have feeding difficulties as a result of prematurity or may require parenteral nutrition only, it is not surprising that breastfeeding in the NICU is seen as stressful for parents. Additionally, stress itself may have detrimental effects on lactation (production and expression) leading to a negative cycle (Lau, 2001).

Al Maghaireh et al. (2016) noted that parents reported experiencing a range of negative psychological and emotional health consequences of having a baby admitted to the NICU. They note parents reported feeling a lot of emotions such as shame, fear, worry, anxiety, and sadness. They also found parents frequently reported depressive symptoms such as frequent crying, insomnia, and feelings of isolation. In contrast, the authors also noted that some parents described their experiences in the NICU positively, with parents speaking about the welcoming environment of the NICU, support received from NICU health care providers, and the time they spent with their infants. This suggests differences in health care provider approach and the unit environment may be able to influence parent's experience of having a baby in the NICU (Al Maghaireh et al., 2016). It is important to note that stress in itself also has the potential to disrupt mother-infant interaction and the development of reciprocity (Gale, Flushman, Heffron, & Sweet, 2004).

So far in this review, the focus has largely been on the maternal experience of caregiving. The experience of fathering in the NICU has been receiving more interest in the literature. Ireland, Khashu, Cescutti-Butler, van Teijlingen, and Hewitt-Taylor (2016) conducted a systematic narrative review to examine the experience of fathers in the NICU. They found that fathers shared many of the same experiences that mothers did, with both parents having a strong need to receive information, experiencing stress, and negative impacts to their psychological wellbeing. There were some key differences, and Ireland et al. noted that many fathers return to work while their baby is in the NICU, resulting in a range of perceived meanings in fathers. They reported some fathers had

increased distress on returning to work while others viewed work as a helpful distraction. Individual differences in fathers' desires to be involved in the care of their infants were noted by Ireland et al., and it is possible this influences how a father experiences returning to work. Differences in genders roles also contribute to how fathers react to having a baby in the NICU. Although studies show that both mothers and fathers experience stress and strong emotions, fathers are more likely to hide these emotions (Ireland et al., 2016).

Gender roles and cultural expectations may play a part in how fathers react, with many men noting a need to be strong for the infant's mother (Fisher et al., 2018). Indeed, fathers may feel less free to express themselves emotionally and as a result, may receive less support from health care providers in the NICU. Consistent with this idea, Ireland et al. (2016) found that fathers often described themselves as being treated like a secondary parent, receiving less information and support than mothers. This is possibly a reflection of the preference given to the mother-infant dyad seen both in practice and in the literature. Overall, fathers' experiences of having an infant in the NICU are marked by stress and negative impacts to emotional and psychological wellbeing as it is with mothers. Societal expectations of fathers may impact how they express these feelings, and thus the support they receive.

These three studies identified that for caregivers, having an infant in the NICU is characterized by repeated episodes of separation, and that this caused significant distress for both mothers and fathers. Caregivers identified moments where they felt close to their infants, such as when participating and care and holding or touching their infant. These

studies also identified that health care providers influenced how parents felt regarding their infants stay in hospital, with poor communication and a lack of information exacerbating caregivers' negative feelings. Fathers experienced many of the same negative emotions and distress as mothers to having an infant in the NICU. Importantly, they may be less likely to express their feelings and they still require support from health care providers. Having an infant in the NICU creates additional barriers to caregivers being close with and caring for their infants. This leads us to the last theme of the review which is a discussion of what health care providers can do to support attachment in the postpartum period.

Theme 3: Attachment Interventions

The importance of keeping parents and infants together has been established as an important step in promoting mother-infant attachment and caregiving behaviours. In addition to this approach, we will discuss the evidence base for other interventions in the postpartum period that can be used to foster sensitive caregiving behaviours.

SSC. Of all the interventions reviewed, SSC has the largest body of evidence. In full term infants, the term SSC is typically used to describe the practice of holding a diapered infant upright on a caregiver's (usually mother's) bare chest. The term kangaroo care is also used with preterm infants to reference the same way of holding an infant skin to skin. The term kangaroo mother care is used by the World Health Organization to describe a combination of care practices for preterm infants that includes SSC, exclusive breastfeeding (with additional supplements only if medically indicated), and early discharge (World Health Organization, 2003). For the purpose of this review, SSC will be

used to refer to the practice of SSC with both full term and preterm infants. The term kangaroo mother care will be used in reference to the combination of care practices noted above.

Cleveland et al. (2016) conducted a systematic review examining the effects of maternal SSC, touch, and/or massage on full term newborns and their caregivers. Their review included a total of 40 articles, 33 on SSC and 7 on infant massage. No articles were identified on infant touch. The length of time the infants received SSC varied across studies which limited the ability to make strong conclusions. The authors found some evidence of a dose-dependent effects with a positive relationship identified between the length of time in SSC and more effective breastfeeding. As with previous studies discussed, these authors also concluded that the immediate period after birth was a sensitive period for SSC with positive effects on breastfeeding initiation, faster expulsion of the placenta, and enhanced bonding. The length of time the infants were held in SSC after birth ranged from 20 minutes to 2 hours, with most researchers recommending at least 1 hour of immediate and uninterrupted SSC after birth (Cleveland et al., 2016). Positive effects found for infants included improvements in thermoregulation, decreased stress response, attenuated pain responses, increased interactions with their mothers (and increased cueing/vocalizations), increased rates of breastfeeding initiation, and rates of exclusive breastfeeding. Cleveland et al. also found additional benefits for mothers included decreased levels of stress reactivity (decreased salivary cortisol levels) and increased maternal bonding and attachment behaviours. Statistical analysis associated with these findings and the analysis of evidence quality was not evident in the review by

Cleveland et al., which limits the ability to appraise findings without examining individual studies.

Conde-Agudelo and Díaz-Rossello (2016) conducted a systematic review of kangaroo mother care for low birth weight infants. Their review was conducted as a Cochrane systematic review, and as such utilized high-quality methods. The primary outcomes examined in their review were decreased mortality at discharge or 40-41 weeks corrected gestational age (post-menstrual age), decreased rates of sepsis, nosocomial infections, hypothermia, lower respiratory tract disease, and severe illness. The secondary outcomes of their review examined the impact of kangaroo mother care on mother-infant attachment or interaction, which were the outcomes of interest for the purpose of this review. Included studies varied in how they assessed mother-infant attachment and interaction outcomes. Results of one included study (Neu, 2010), showed compared to infants in the control group (n=23) infants who received kangaroo mother care (n=22) showed greater symmetrical co-regulation (intervention mean scores 35.73, SD=4.87 versus control mean of 19.35, SD=4.61, mean difference [IV fixed, 95% confidence interval - 16.38 [13.61, 19.15]) and less asymmetric co-regulation (intervention mean scores 32.63, SD=5.45 versus control mean of 50.94, SD=5.17, mean difference [IV fixed, 95% confidence interval -18.31 [-21.42, -15.20]) with their mothers in the still-face procedure at six months compared with controls (Conde-Agudelo, & Díaz-Rossello, 2016). Another finding of their review was that infants who received kangaroo mother care had higher attachment scores at three-month follow-up (n=50, mean scores 24.46,

SD=1.64) compared to controls (n=50, 18.22, SD=1.79, mean difference [IV fixed, 95% confidence interval], 6.24[5.57, 6.91]).

Long-term effects of SSC. A small number of studies examined the long-term effects of SSC compared to standard care (in an incubator or cot). Feldman et al. (2014) conducted a 10-year follow-up with 73 preterm infants who received SSC against 73 case matched controls who received standard incubator care. Infants in the intervention group received one hour of SSC per day for 14 days. Intervention mothers were found to provide more attachment behaviour across the postpartum period. Intervention effects on mother-child interaction were assessed for gaze, affection, vocalization and touch at three intervals (term age, 3 months, and 6 months of age). The proportion of time mothers engaged in attachment behaviour was significantly higher for intervention mothers (0.53, SD = 0.23) than control mothers (0.44, SD = 0.21; F=8.60, p = .006) averaged from observations at newborn, 3 months, and 6 months of age. Intervention mothers showed greater mother–child reciprocity at 10 years. Reciprocity scores were higher for intervention mothers (3.67, SD =.61) compared to control mothers (3.38, SD=.66; F=5.97 p=.017). Limitations of this study included the lack of true randomization (which the authors felt was not possible due to ethical reasons). To minimize potential confounders, case matched controls were excluded if there was evidence of social risk or neurological impairment. Although there are methodological limitations, this is the first longitudinal study to provide evidence on the long-term effects of SSC on the preterm infant's physiological systems.

Fathers. Shorey, Hong-Gu, and Morelius (2016) conducted an integrative literature review to examine the infant and paternal outcomes of infant SSC by fathers. The review included twelve studies (10 quantitative and 2 qualitative) with both preterm and full term populations included. Infant outcomes for temperature (for preterm and full term infants) showed that infants had better heat conservation when engaging in SSC with fathers, than if they received cot or incubator care, and that there was no significant difference between temperature stability with infants receiving SSC from mothers or fathers. Analysis of biophysical markers with preterm infants showed no difference between SSC with mothers or fathers with respect to oxygen consumption, carbon dioxide production, energy expenditure, heart and respiratory rates, and arterial saturation. Additionally, full term infants who had SSC with fathers compared to those receiving incubator care or cot care were found to have higher blood glucose level and increased energy conservation. SSC with fathers was also found to have positive impacts on infant behaviour compared to infants cared for in cots including being calmer, reaching drowsy state sooner, and less crying. Compared to SSC with mothers, infants settled sooner and cried less when receiving SSC with fathers.

In their review, Shorey et al. (2016) also identified several paternal outcomes. Qualitative analysis with preterm infants showed that SSC by fathers helped facilitate parental role attainment for fathers, and increased father's sense of being in control. SSC by fathers was also shown to improve infant-father interactions in both preterm and full term infants. Father engaging in SSC with their full term infants were found to talk to their infants more. Fathers engaging in SSC with preterm infants showed more caring

behaviours and increased sensitivity to their infants. These fathers also reported less stress, less anxiety, and better relationship quality with their spouse. Biophysical markers showed decreased cortisol levels and increased levels of oxytocin in response to providing SSC to their preterm infant.

Limitations to the findings by Shorey et al. (2016) included a lack of homogeneity in outcome measures which made meta-analysis of the outcomes in the included studies impossible. Results instead were presented as a narrative review. Still, the findings of this review provided medium quality evidence showing that SSC with fathers has many of the same benefits of SSC with mothers and was not associated with any negative effects (aside from delayed first feeding in the immediate postpartum period). SSC with fathers provides an additional strategy to promote positive interactions and attachment between infants and their fathers. These findings are important as the ongoing care of infants after the postpartum period is not only with mothers. Health care providers should strive to foster connection between infants and all caregivers. The findings that the practice is safe and beneficial provide support for its routine incorporation into practice.

Education. Research has shown that caregiver sensitivity and responsiveness in early childhood is associated with improvements in the child's cognitive, emotional, and social development (Raby, et al., 2015). Several identified studies had aimed to improve infant-caregiver interactions by educating parents regarding infant's cues, abilities, and effective parental responses. Specific intervention programs identified were heterogenous and included the Newborn Behavioral Observation system (NBO; Barlow, Herath, Torrance, Bennett, & Wei, 2018), the Neonatal Behavioral Assessment Scale (NBAS;

Barlow et al., 2018) and video interaction guidance for preterm infants (Hoffenkamp et al., 2015).

All interventions aim to demonstrate the infant's communicative abilities and attempts to make their needs know their caregivers. Facilitators direct the caregiver's attention to the infant and help promote understanding of these communication attempts, with the aim of improving caregivers understanding and fostering sensitive caregiving responses. The NBAS and NBO both include a demonstration of infant's neurobehavioural abilities, with the NBO being a shorter version of the NBAS that was adapted specifically for use as a clinical tool with parents (Barlow et al., 2018). Video interactive guidance instead utilizes video captured interactions between infants and caregivers as a teaching tool to explain infant's behaviour and appropriate caregiving responses.

A systematic review and meta-analysis by Barlow et al. (2018) examined the effects of the NBO and NBAS. Their analysis included seven studies with 304 participants. The setting for these studies included hospital, clinics, and at the patient's home. Results from their meta-analysis showed a significant medium-sized different between the intervention and control groups (SMD−0.53, 95% CI −0.90 to −0.17). Further analysis of programs individually showed non-significant effect for the NBAS (−0.49, 95% CI −0.99 to 0.00) and a large and significant effect for the NBO (−0.69, 95% CI −1.18 to −0.20). Subgroup analysis showed the between group difference in effect size was non-significant. The authors note that the studies included in their review were all deemed to be at high-risk of bias, and therefore the quality of the evidence was rated as

low. The authors suggest further, well designed research studies are needed to better understand the effects of the NBO and NBAS interventions.

Hoffenkamp et al., (2015) examined the effects of video interaction guidance on the quality of parent-infant interactions. The study took place in seven maternity units and two NICUs in seven Netherlands hospitals. 150 infants born at less than 37 weeks gestation were included in the study, along with their caregivers (150 mothers, and 144 fathers). Infants were randomized to the control intervention of usual care (n=75) or video interaction guidance (n=75). For the intervention, interactions between parents and infants were video recorded over 15 minutes on three separate occasions during the first week of life. These videos were then shortened to highlight moments of infants' communication and parental responses. The shortened videos were reviewed with parents the day after the recording as used as a teaching tool to illustrate the infants' communication attempts and to explore parental responses in a non-judgemental way.

The study and follow-up assessments were completed by 90% of participants with no significant differences between the intervention and control groups. Parents' behaviour during care interactions with their infants were assessed using video recordings of infant-caregiver interactions. The behaviour was scored using an adapted version of a validated tool to assess for parental sensitivity, intrusiveness, and withdrawal behaviours. These assessments were done at baseline, mid-intervention (after video two sessions), 3 weeks, and 6-month follow-up. Trends were modeled over time and adjusted for gestational age, parity, and parent education level. Cohen's *d* was used to identify the effect size between groups. Hoffenkamp et al., (2015) note the intervention group had

increased maternal sensitivity at mid-intervention (Cohen's $d = 0.24$) and 3 weeks (Cohen's $d = 0.35$) and increased paternal sensitivity mid-intervention (Cohen's $d = 0.58$) and 3 weeks (Cohen's $d = 0.54$). They also found the intervention group had decreases in withdrawal behaviour among mothers mid-intervention (Cohen's $d = 0.31$) and at 3 weeks (Cohen's $d = 0.44$), and in fathers mid-intervention (Cohen's $d = 0.60$). There were no significant differences between groups on degree of parental intrusiveness, suggesting additional interventions are needed to target this outcome (Hoffenkamp et al., 2015). There were no significant differences between groups at 6-month follow-up for any variable. The study design was strong and provides medium quality evidence that this brief intervention can increase parental sensitivity and decrease withdrawing behaviour in the first 3 weeks after birth.

It is not possible to make firm practice recommendations given the low quality of evidence in many of the included studies. Overall, these findings suggest that parental education may be an effective, brief intervention that can be utilized to improve the quality of caregiver-infant interactions. Importantly, there were no reported harms from these interventions. Parental education regarding infants' cues and responsive caregiving is possible as a stand-alone intervention or incorporated into routine care and represents one potential method of improving infant-caregiver attachment. These studies add to the evidence that hospital-based interventions can have an effect on parental behaviour and support the developing relationship between infants and caregivers.

Empowerment. One last intervention that was identified in the literature is empowerment. Parents of infants requiring intensive care face additional barriers like

frequent separation, medical technology, emotional distress, and an intimidating environment. Parents of infants in the NICU often feel as though they do not have agency and defer to the opinion of the medical team who are viewed as experts (Read & Rattenbury, 2018). Knowledgeable as they may be, the medical team is no substitute for the involved presence of the infant's family. Without their engagement and presence, all other attachment interventions are not possible. Given the known benefits of parental involvement with their infants discussed this far in the review, it is worth examining how NICU health care providers can foster this involvement and interaction between infants and their parents in this complex context.

To help answer the question of parental engagement, Herbst and Maree (2006) conducted a qualitative study to examine how parents can be empowered in the NICU to foster attachment, bonding, and caregiving. This was examined using a qualitative approach, with information collected from both parents and nurses. Parents valued being adequately prepared for seeing their baby in the NICU, receiving a proper orientation to the NICU, being a partner in their care through informed and shared decision making, participating in baby care, having open and trusting relationships with health care providers, having adequate privacy, receiving quality nursing care, and being prepared for discharge (Herbst & Maree 2006).

Fleck (2016) notes that nursing care is recognized as an important intervention for minimizing maternal anxiety and improving caregiving interactions between mothers and infants. She also explains that the NICU environment is not conducive to mothering or having mothers providing care to their infants, and that nurse are able to mitigate this

through helping to orient the mother to both the NICU and her baby. Still, Herbst and Maree (2006) noted that several barriers have been identified that impair NICU health care providers' ability to empower parents. These include negative health care provider views towards parental involvement in care, a perceived lack of time, a lack of knowledge, and high workload/staffing issues (Herbst & Maree, 2006). This highlights the need to not only support parents, but also to support health care providers in order to support families. These findings outline how nurses and parents both perceive parental care in the NICU and describe how parents can be engaged and empowered to be present and provide care to their infants in this setting. This is essential to the wellbeing and development of the infant, supports the idea that health care providers actions directly impact parenting in the hospital setting.

Discussion

Three themes emerged from this review, hospital care influences caregiving, separation and caregiving in the NICU, and attachment interventions. Together these findings support the hypothesis that hospitalization can have a direct influence on how caregivers interact with their infants. There are many implications of this review. First, hospitals need to review their routines and policies to support the non-separation of infants and caregivers as much as possible. This includes protected time doing SSC after birth. Health care providers working with infants and children in the postpartum period must be aware of the benefits and potential lasting consequences of infant-caregiver separation, especially in the immediate post-partum period. NICUs are beginning to explore and adopt innovative approaches to foster this important contact such as 24 hour

a day rooming-in, and the provision of post-partum maternity care in the same unit to avoid separating mothers and infants. While not yet widespread, these approaches have the potential to have a positive impact on infant mental health in this vulnerable population.

NICU parents need additional support from health care providers to help them navigate the challenges of this care setting. This is true of fathers as well who may be less likely to openly acknowledge their distress. Other interventions to promote caregiving in the hospital setting included education regarding infant's communication and responsive caregiving. These approached all require specific training, and the evidence at this time is limited. Further research is needed to determine the potential effectiveness of these programs. In the absence of this research, health care providers can take steps to promote sensitive caregiving by encouraging SSC, keeping caregivers and infants together, providing support and encouragement to caregivers, and taking time to help caregivers notice and interpret their infant's cues.

Conclusion

Infant mental health in an important area of health promotion, and the provision of post-partum hospital care can have a persistent influence on the dyadic relationship between infants and caregivers. This relationship is foundational for the optimal cognitive, social, and emotional development of the infant and is something with must be promoted and protected. As health care providers, we must be aware of the importance of this early contact and interaction between infants and caregivers as well as the ways in which hospital care can influence caregiving. Armed with this knowledge, and practical

ways to support caregiving, health care providers can take steps to promote infant mental health from the earliest days of the newborn's life.

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Appendix A1

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
Theme 1: Hospital Care Influences Caregiving				
Authors: Baylis, R., Ewald, U., Gradin, M., Hedberg Nyqvist, K., Rubertsson, C., & Thernström Blomqvist, Y. Year: 2014. Title: First-time events between parents and preterm infants are affected by the designs and routines of neonatal intensive care units.	Design: Descriptive exploratory study. Part of a larger longitudinal study with questionnaires. Objective: The authors of this paper report on the timing of first-time events for caregivers with their infants in two separate NICUs to understand barriers and facilitators to parents-infant interaction. Participants: 81 infants and their parents (81 mothers and 79 fathers)	The study looked at the timing of first-time events for parents (e.g., holding their infants, providing baby care, holding their infant skin to skin) at two NICUs. Previous research found NICU A staff had more positive views of kangaroo mother care, and initiated KMC earlier. Parents can stay overnight in NICU A on cots next to their infants' incubators throughout the course of admission. NICU B does not provide sleeping spaces for all parents and has a small number of parent rooms used for parents of infants who are nearing discharge.	Prior to NICU admission: •Only 30% of parents held their infant after birth in the delivery/operating room (25% did so STS). •61% of fathers and 53% of mothers touched their infant prior to transfer to the NICU. •98% of fathers and 67% of mothers saw their infant in the delivery/operating room. •Infants were transferred to the NICU in the arms of either parent 27% of the time •The number of mothers who saw their infant in the delivery room was significantly higher for NICU A compared to NICU B (87% vs 58%, p=0.045). In the NICU: significant differences found between NICUS in the length of time before mothers	Descriptive study critical appraisal tool (PHAC, 2014). Study design: Weak. Study quality: Medium. Participants: Moderate. Data collection: Strong. Instruments: Moderate. Ethics: Strong. Statistics: Moderate.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			and fathers engaged in the following care: held their baby skin to skin, began cup feeding, controlled baby's temperature, and changed diapers. Parents identified important moments for them were: •providing independent caregiving. •breastfeeding/feeding the infant. •staying together at the NICU. •infant no longer requiring medical technology. •meeting family members. •leaving the NICU. Preliminary evidence that staff behaviours, attitudes, and unit policies may impact how quickly parents are able to interact with and be close with their preterm infants. Further research needed.	
Authors: Bystrova, K., Ivanova, V., Edhborg, M.,	Design: Randomized controlled trial.	Four different interventions: Group I infants were placed skin-to-skin	Compared with the infants in close contact with their mothers (groups 1	Analytic study critical appraisal

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
Matthiesen, A.-S., Ransjö-Arvidson, A.-B., Mukhamedrakhimov, R., … Widström, A.-M. Year: 2009. Title: Early contact versus separation: Effects on mother-infant interaction one year later.	Objective: to examine the effects of early contact (skin-to-skin or dressed) versus separation (brief or prolonged) on mother-infant interactions during the infants first year of life. Participants: 176 mother-infant dyads randomized to one of four intervention groups.	with their mothers after birth and stayed together (i.e., roomed-in) while in the maternity ward. Group II infants were dressed and placed in their mothers' arms after birth and roomed- in with their mothers in the maternity ward. Group III infants were kept in the nursery both after birth and while their mothers were in the maternity ward. Group IV infants were kept in the nursery after birth (for 2 hours), but roomed-in with their mothers in the maternity ward the rest of the stay.	and 2), infants who were separated early from their mothers (groups 3 and 4) were significantly more dysregulated and irritable ($F1,121 = 6.93$, $p = 0.010$) and showed less mutuality/reciprocity ($F1,121 = 9.05$,$p = 0.003$) Infants in the SSC group has less irritability and emotional dysregulation versus the nursery care group (Fisher's PLSD, $p = 0.011$) and the reunion group (Fisher's PLSD, $p = 0.026$). They also showed more mutuality/reciprocity versus the nursery care group (Fisher's PLSD, $p = 0.025$) and the reunion group (Fisher's PLSD, $p = 0.019$). Notably, infants who received rooming-in care after an initial period of nursey care (group 4) did not have assessment scores that varied	tool (PHAC, 2014). Study design: Strong. Study quality: Medium. Population and sample: Moderate. Internal validity: Moderate. Control of confounding: Strong. Control of analysis: Strong.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			significantly from the nursery care group.	
Authors: Gomes-Pedro, J., Bento de Almeida, J., Silveira da Costa, C., & Barbosa, A. Year: 1984. Title: Influence of early mother-infant contact on dyadic behaviour during the first month of life.	Design: Randomized controlled trial. Objective: To see if early mother-infant contact influences dyadic behaviour in the first month of life Setting: a single maternity unit in Portugal with at home-follow-up. Participants: Consecutive sample of 60 mothers (30 in control group, 30 in intervention group)	All infants had routine medical care lasting around 15 minutes after birth. Intervention infants were returned to their mothers for 30 minutes of contact before being brought to the hospital nursery. Mothers in the control group were briefly shown there baby before the infant was taken to the nursery. All infants (control and intervention group) remained in the nursery until 6 hours of age when they were returned to their mothers and stayed in with their mothers in their hospital room for the remained of the hospital stay.	Mothers in the intervention groups scored higher on several assessment items on day 28 including: affectionate behaviour ($t58 = 2.58$, $p<0.01$), frequency of vocalisations ($t58 = 2.12$. $p<0.05$), and cleaning the infants face ($t58 = 2.33$, $p<0.025$). During the BNBAS assessment of the infants at 28 days, mothers in the intervention group were more likely to respond to their infants' cries compared to the control group ($\chi2=4.27$, df=l, $p<0.05$).	Analytic study critical appraisal tool (PHAC, 2014). Study design: Strong. Study quality: Medium. Population and sample: Moderate. Internal validity: Moderate. Control of confounding: Strong. Control of analysis: Strong.
Authors: Lantz, B., & Ottosson, C. Year: 2013. Title: Parental interaction with infants treated with medical technology.	Design: Cross-sectional survey. Used a questionnaire specifically developed and validated for this study. Objective: To understand	Survey given to parents after consent to participate obtained at discharge. Survey consisted of 65 questions over three sections: Demographics, parental perceptions regarding their NICU stay, and questions	Findings: Variables associated with differences in parents perceived level of obstruction were gender, education level, infant's gestation, experience as parents, and	Descriptive study critical appraisal tool (PHAC, 2014). Study design: Weak.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
	how parents perceive medical technology in NICU as a barrier to their desired interaction with their infants. Setting: 5 NICUs. Participants: Consecutive sample of 248 parents.	regarding medical technology. Response rate was 60.5% (248/410). Different medical technologies were assessed for parents perceived obstruction to seeing, touching, and participating with their infant.	availability of accommodations in the NICU. All medical technology (except for feeding tubes) were associated with obstruction in all domains (i.e., to parent's desire to see, touch and participate in the care of their infant). Feedings tubes only found to be obstructive to desire to nurse their infants. These findings are significant considering the potential impact of parental obstruction on the developing infant-caregiver attachment relationship that is dependent on interaction. Authors felt staff should address medical technologies in the care plan and address them differently with different groups of parents based on study results (e.g., technology more obstructive to parents with prior parenting	Study quality: High. Participants: Moderate. Data collection: Strong. Instruments: Strong. Ethics: Strong. Statistics: Strong.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			experience). Based on the descriptive nature of the study, there is insufficient evidence to make practice recommendations.	
Authors: Niela-Vilén, H., Feeley, N., & Axelin, A. Year: 2017. Title: Hospital routines promote parent-infant closeness and cause separation in the birthing unit in the first 2 hours after birth: A pilot study.	Design: Qualitative study. Objective: To examine factors influencing parent-infant closeness and separation in the two hours after birth from the perspective of health care providers. Participants: 14 hospital staff (either nurses or midwives) caring for mother immediately after birth.	The nurses and midwives made note of every separation and reconnection between infants and caregivers during the two-hour period after birth. Notes were made by the nurses and midwives using audio recordings on a study phone application. They detailed the rationale for the separations and reunifications in real time as they were caring for the families. These audio recordings were	The nurses and midwives in this study all aimed to keep infants together with their parents. Parents rarely initiated moments of separation. Separations were mostly initiated by health care providers for various reasons including: Routine medical care, medical concerns for the infant, safety concerns with mothers (e.g., sedation, or falling asleep). Separation for routine medical care was typically delayed by the nurses and midwives until after the infants first feeding.	Qualitative checklist (CASP 2018). Clear aims: Yes. Appropriate methodology: Yes. Appropriate design: Yes. Appropriate recruitment strategy: Yes. Appropriate data collection: Yes. Researcher-participant relationship addressed: Unclear. Ethics addressed: Yes.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
				Appropriate data analysis: Yes. Clear findings: Yes.
Theme 2: Separation and Caregiving in the NICU				
Authors: Al Maghaireh, D. F., Abdullah, K. L., Chan, C. M., Piaw, C. Y., & Al Kawafha, M. M. Year: 2016. Title: Systematic review of qualitative studies exploring parental experiences in the Neonatal Intensive Care Unit.	Study Design: Systematic review of qualitative studies. Objective: Thematic analysis of parental experiences in the NICU. Study included (n=9). Methodologies: Semi-structured interviews (n=4), interviews (n=3), self-reporting (n=1), and focus group and interview (n=1). Search strategy: Six databases searched, and citations reviewed.	Studies were assessed individually by the authors using the Critical Appraisal Skills Program (CASP, 2018) qualitative check list. Thematic analysis was conducted on the data from the included studies, coded and presented a frequency table.	All identified themes reported in table format with identification of individual studies contributing to themes. Three overarching themes were identified across the examined literature: •Stress of hospitalization, •Alteration in parenting role •Impact on psychological and emotional health The infant-caregiver attachment (and parental bonding) were identified in several included studies. It was suggested that infant-caregiver attachment is affected by alterations in normal parenting roles, and the	Qualitative checklist (CASP 2018). Clear aims: Yes. Appropriate methodology: Yes. Appropriate design: Yes. Appropriate recruitment strategy: N/A Appropriate data collection: Yes. Researcher-participant relationship addressed: N/A Ethics addressed: N/A

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			psychological, physical, and emotional impacts of having a hospitalized newborn.	Appropriate data analysis: Yes. Clear findings: Yes.
Authors: Mäkelä, H., Axelin, A., Feeley, N., & Niela-Vilén, H. Year: 2018. Title: Clinging to closeness: The parental view on developing a close bond with their infants in a NICU.	Design: Qualitative study. Objective: To explore how parents develop a close bond with their infants in the NICU. Participants: 23 parent participants (mothers n=18 and fathers n=5) of an infant admitted in a level III NICU	Participants took audio recordings on a smart phone application that described moments of closeness and moments of separation with their infants. These closeness and separation stories were analysed using thematic analysis.	Parents in the NICU face a repeating cycle of closeness and separation throughout the stay in hospital. Parents note that moments of separation from their infants were the most difficult and emotional moments during the NICU stay. Authors noted that bonding can occur when staff support moments of closeness between infants and parents.	Qualitative checklist (CASP 2018). Clear aims: Yes. Appropriate methodology: Yes. Appropriate design: Yes. Appropriate recruitment strategy: Yes. Appropriate data collection: Yes. Researcher-participant relationship addressed: Unclear. Ethics addressed: Yes.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
				Appropriate data analysis: Yes. Clear findings: Yes.
Authors: Ireland, J., Khashu, M., Cescutti-Butler, L., van Teijlingen, E., & Hewitt-Taylor, J. Year: 2016. Title: Experiences of fathers with babies admitted to neonatal care units: A review of the literature.	Design: Systematic narrative review of qualitative research. Objective: To examine the experiences of fathers of infants admitted to the NICU.	Literature search identified 186 articles, 74 articles were selected for closer review, and 27 articles were selected for included in the final review. These articles were examined using a thematic analysis approach to identify major themes.	Four major themes were identified from the review: stress and anxiety, information, gender roles, and emotions. The researchers noted similarities between mothers and fathers such as the desire to receive information, experiencing stress, and negative impacts to their psychological wellbeing They found individual variation in how fathers experience having a baby in the NICU: •About half of fathers shared their emotions with their partners, while the other half do not. •Some fathers found returning to work stressful,	Qualitative checklist (CASP 2018). Clear aims: Yes. Appropriate methodology: Yes. Appropriate design: Yes. Appropriate recruitment strategy: N/A. Appropriate data collection: Yes. Researcher-participant relationship addressed: N/A. Ethics addressed: N/A.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			others found it helpful. •Fathers also varied in their individual desire to be involved in the care of their infants. Fathers may be more likely to hide their emotions, and thus receive less support from nursing staff. The researchers found that the health care providers relationships with Fathers helped to foster the developing infant-caregiver relationship.	Appropriate data analysis: Unclear. Clear findings: Yes.
Theme 3: Attachment Interventions				
Authors: Barlow, J., Herath, N. I., Torrance, C. B., Bennett, C., & Wei, Y. Year: 2018. Title: The Neonatal Behavioral Assessment Scale (NBAS) and Newborn Behavioral Observations (NBO) system for supporting caregivers and	Design: Meta-analysis/systematic review. Objective: To review the use of the Newborn Behavioral Assessment Scale (NBAS) and the Newborn Behavioral Observation system (NBO) for improving parent and	The NBAS/NBO is an intervention designed to teach caregivers about infants' capabilities in a way that promotes sensitive caregiving. Demonstration of infant reflexes and behaviours (e.g., parental voice recognition shown through infant turning head in response to parental speech).	Findings: For outcome of interest, 7 studies (304 participants) were combined for a meta-analysis of effects of NBO/NBAS on infant-caregiver interactions. Significant, medium-sized difference between intervention and control groups (SMD−0.53, 95% CI −0.90 to −0.17; very low-quality	Literature review critical appraisal tool (PHAC, 2014). Methodology quality: High. Study results: Weak. Assessment of applicabili

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
improving outcomes in caregivers and their infants.	child outcomes. 16 RCTs included 13 studies assessed the NBAS 3 assessed the NBO Participants: 851 randomized participants between included studies. included preterm infants or newborns aged 4-12 weeks. Predominately low-risk, first time caregivers.		evidence), with moderate heterogeneity (I2 = 51%). Subgroup analysis of NBO and NBAS found: •Medium but non-significant effect for the NBAS (−0.49, 95% CI −0.99 to 0.00, 5 studies) and high levels of heterogeneity (I2 = 61%) •Large, significant effect for NBO (−0.69, 95% CI −1.18 to −0.20, 2 studies), and no heterogeneity (I2 = 0.0%). •Subgroup differences between NBO and NBAS did not reach significance. All studies were deemed to be high risk of bias. Evidence from the review shows very low-quality evidence that these interventions may improve parent-infant interactions. Further research is needed (and currently	ty: Moderate. Overall conclusion: Medium quality.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			underway) to understand the potential effectiveness of these programs.	
Authors: Cleveland, L., Hill, C. M., Strauss Pulse, W., Condo DiCioccio, H., Field, T., & White-Traut, R. Year: 2017. Title: Systematic review of skin-to-skin care for full-term, healthy newborns.	Design: Systematic Review Objective: To determine the effect of STS mother–infant holding, touch, and/or massage on full-term, healthy newborns and their primary caregivers Included a total of 40 articles (33 on STS care and 7 on infant massage)	Interventions: STS care was defined as a caregiver holding an infant in only a diaper, on her bare chest. Length of time of the intervention varied between study. The infant massage intervention was not consistent across studies.	Findings: Effects of STS care on infant-caregiver interactions were found in 4 studies with the following results: Mothers who did STS care spoke positively about the impact of STS care on bonding; showed more quality interactions and positive talk towards their child at a 1 year follow-up; had increased vocal interactions between caregiver and child and between parents. A small number of studies on infant massage showed positive effects for improved mother-infant interactions, bonding, and reductions in maternal depression. STS care was recommended for all health, full-term newborns due to the host of	Literature review critical appraisal tool (Public Health Agency of Canada [PHAC], 2014). Methodology quality: Moderate Study results: Moderate Assessment of applicability: Strong Overall conclusion: Medium quality

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			other benefits report. There was some evidence of effectiveness of STS in supporting infant-caregiver interactions.	
Authors: Conde-Agudelo, A., & Díaz-Rossello, J. L. Year: 2016. Title: Kangaroo mother care to reduce morbidity and mortality in low birthweight infants.	Design: Meta-analysis / systematic review. Objective: To determine if Kangaroo mother care is an effective alternative to convention neonatal care of low birthweight infants 21 studies included. Participants: a total of 3042 infants between studies.	Outcomes: Mother-infant attachment and mother-infant interaction were secondary outcomes examined as part of the review. Three studies reported on mother-infant attachment. One study reported on mother-infant interaction.	One study examined outcomes from the nursing child assessment feeding scale, and then analysed each of the nine items by time interval (1-2 days, 3-14 days, and longer than 14 days after birth) and by NICU admission (yes or no). between the KMC group (n=50) and the control group (n=50). Positive effects were found for the KMC group in: Mothers feelings of worry and stress –Trial started 1-2 days of age Maternal sensitivity – Trial started at age > 14 days Infant responsiveness – Trial sarted at age > 14 days	Literature review critical appraisal tool (PHAC, 2014). Methodology quality: Strong. Study results: Moderate. Assessment of applicability: Moderate. Overall conclusion: Medium quality.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			Effects (mean differences) were small. Infants who received KMC had higher attachment scores at three-month follow-up. Mean attachment scores were 24.46 (SD 1.64) in KMC group versus 18.22 (SD 1.79) in the control group. Mean difference (IV, fixed, 95% CI) 6.24 [5.57, 6.91]. Infants showed greater symmetrical co-regulation (and less asymmetric) with their mothers in the still-face procedure at six months. (1 study, very small mean differences).	
Authors: Feldman, R., Rosenthal, Z., & Eidelman, A. I. Year: 2014. Title: Maternal-preterm skin-to-skin contact enhances child physiologic organization and cognitive control	Design: Prospective cohort study with matched controls. Objective: To determine the long-term effects of maternal-preterm contact on infants'	Intervention: One hour of STS care per day for 14 days. Case-matched control: Caregivers who did not engage in STS care. Most controls were from a hospital sites that had not yet implemented STS care as a standard intervention, thus minimizing other confounders	There was a group effect for mother-child relationship across the 10-year span of the study (Wilks's $F_{2,112}$ = 6.71, p=.002, Eta^2 =.107). Intervention mothers provided more attachment behaviour across the postpartum period.	Analytic study critical appraisal tool (PHAC, 2014). Study design: Moderate. Study quality: Medium.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
across the first 10 years of life.	physiological systems. Participants: 73 preterm infants and 73 case-matched controls who received standard incubator care. Intervention: 14 days, 1 hr daily of maternal-newborn skin-to-skin contact.	associated with families who chose not to do STS care.	Intervention effects on mother-child interaction were assessed for gaze, affection, vocalization and touch at three intervals (term age, 3 months, and 6 months of age). The proportion of time mothers engaged in attachment behaviour was significantly higher for intervention mothers (0.53, SD = 0.23) than control mothers (0.44, SD = 0.21; F=8.60, p = .006) averaged from observations at newborn, 3 months, and 6 months of age. Intervention mothers showed greater mother–child reciprocity at 10 years. Reciprocity scores were higher for intervention mothers (3.67, SD =.61) compared to control mothers (3.38, SD=.66; F=5.97 p=.017).	Population and sample: Moderate. Internal validity: Moderate. Control of confounding: Strong. Control of analysis: Strong.
Authors: Herbst, A., & Maree, C.	Design: Qualitative (focus group	Two parent focus groups conducted (with different	Results used to develop practice	Qualitative checklist

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
Year: 2006. Title: Empowerment of parents in the neonatal intensive care unit by neonatal nurses.	with content analysis). Objective: To determine what parents needs are with respect to being empowered to participate in the care of their infant in the NICU. Participants: 22 parents (12 mothers and 10 fathers) split into two focus groups. 20 nurses as part of the second phase workshop. Inclusion criteria for parents: Able to speak English or Afrikaans. Gave informed consent to participate. Inclusion criteria for nurses: neonatal nurse for at least one year. Attendance voluntary.	participants in each). Independent interviewer using the following guiding questions: • How would you describe a parent that is empowered in NICU? • Can you make some practical suggestions on how to empower parents? Following data analysis, results reviewed with a group of nurses to identify solutions to parents needs.	guidelines on the following items: • preparation of parents prior to admission of their babies to the NICU. • orientation of the parents on admission or as soon as possible. • informed decision-making by the parents. • participation of parents in the basic care of their babies. • emotions experienced by parents. • communication and the building of trusting relationships. • creating a therapeutic environment and privacy. • preparation for discharge. • parents' perception of the quality of nursing care. • the relevance of optimal management of the NICU. Methodology not typically used for generating transferable results, however	(CASP 2018). Clear aims: Yes. Appropriate methodology: Yes. Appropriate design: Yes. Appropriate recruitment strategy: Unclear. Appropriate data collection: Yes. Researcher-participant relationship addressed: Unclear. Ethics addressed: Yes. Appropriate data analysis: Yes. Clear findings: Yes.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
			efforts to triangulate the data aid in the transferability of results. Authors suggest guidelines are general enough to be adapted to other NICU settings.	
Authors: Hoffenkamp, H. N., Tooten, A., Hall, R. A. S., Braeken, J., Eliëns, M. P. J., Vingerhoets, A. J. J. M., … Van Bakel, J. A. Year: 2015. Title: Effectiveness of hospital-based video interaction guidance on parental interactive behavior, bonding, and stress after preterm birth: A randomized controlled trial.	Design: Randomized Controlled Trial Objective: To determine the effectiveness of hospital-based video interaction guidance in improving the infant-caregiver relationship amongst parents of preterm infants. Participants: 150 families (150 infants, 150 mothers, and 144 fathers). Setting: seven maternity units and two intensive care units in seven different hospitals in the Netherlands.	Both groups received standard hospital care which encourages parental participation in the care of their preterm infant and the active promotion of the developing infant-parent relationship. Intervention: The treatment group received video interaction guidance which consisted of three recording and review sessions during the first week of life. Video of parent-infant interactions during caregiving were recorded for 15 minutes. These videos were reviewed to identify moments of infants trying to initiate connection with their parents and the parent's responses to these contact attempts. These moments were edited into a shorter video which was reviewed with parents using a	Compared to the control group, the intervention group had higher scores for maternal sensitivity at mid-intervention (Cohen's d = 0.24) and 3 weeks (Cohen's d = 0.35) and increased paternal sensitivity mid-intervention (Cohen's d = 0.58) and 3 weeks (Cohen's d = 0.54). The intervention group had lower scores showing decreased withdrawal behaviour among mothers mid-intervention (Cohen's d = 0.31) and at 3 weeks (Cohen's d = 0.44), and in fathers mid-intervention (Cohen's d = 0.60). There were no significant	Analytic study critical appraisal tool (PHAC, 2014). Study design: Strong. Study quality: Medium. Population and sample: Strong. Internal validity: Moderate Control of confounding: Strong. Control of analysis: Strong.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
	Inclusion criteria: Infant born less than 37 weeks gestation and parental Dutch language comprehension.	trained facilitator. The goal was to promote and/or reinforce responsive caregiving. Outcomes: video recordings of infant-parent interactions were used to quantify parental interactive behaviour. Video tapes for the intervention were used to assess parent behaviour at 1 day postpartum and 6 days postpartum. An additional recording of parent behaviour was done at one month postpartum (for follow-up only and not as part of the intervention). Assessment was done using an adapted validated scale that identifies parental sensitivity, parental intrusiveness, and parental withdrawal.	differences between groups on degree of parental intrusiveness. There were no significant differences between groups at 6-month follow-up for any variable	
Authors: Shorey, S., Hong-Gu, H., & Morelius, E. Year: 2016. Title: Skin-to-skin contact by fathers and the impact on infant and paternal outcomes: an integrative review.	Design: Integrative literature review. Objective: Summarize research on father-infant SSC on infant and paternal outcomes. 12 studies included (10	STS care by fathers, with varying times of initiation and length of duration. Statistical results from individual studies not reported by the review author.	Paternal outcomes: •Significantly increased oxytocin levels and significantly reduced cortisol levels during and after STS care. •Enhanced paternal role attainment, with fathers feeling more in control and able to hand	Literature review critical appraisal tool (PHAC, 2014). Methodology quality: Moderate. Study results: Moderate.

Author, Year and Title	Study design	Interventions/Outcomes examined	Key findings	Appraisal Scores
	quantitative and 2 qualitative).		unexpected situations (first-time fathers of preterm infants). •Facilitated better paternal interaction with their infants •Increase vocal communication with term infants •Increased caring behaviours with preterm infant Infants: •Reduced cortisol at one month follow up compared to controls. •Increased vocal interaction with STS care.	Assessment of applicability: Strong. Overall conclusion: Medium quality.

Appendix B

Consultation and Environmental Scan Report

Amy LeBouthillier

Memorial University of Newfoundland

Consultation and Environmental Scan Report

Infant mental health (IMH) refers to the social, emotional, and cognitive well-being of children that spans from preconception to age five. Over the past several decades there is mounting evidence that an infant's early life experiences shape the trajectory of social and emotional wellbeing through their lifespan (Sameroff, 2010). Additionally, advances in epigenetic research shows that adverse maternal experiences before and during pregnancy can trigger epigenetic changes in the newborn which impact brain development and increase the infant's risk for later mental illness (Desocio, 2018). Infant mental health is developed through their relationship with the primary caregivers. This infant-caregiver relationship is referred to as an attachment relationship. The quality of this relationship is a modifiable determinant of IMH that has been linked to outcomes in social, emotional, and cognitive development (Newman, Sivaratnam, & Komiti, 2015).

The purpose of this practicum project is to develop an infant and family mental health promotion educational resource for nurses and other health care providers to increase their knowledge and behaviours to optimize infant-caregiver attachment during routine hospital care. The goal of the resource is to contribute to an improved hospital experience for infants and families through effective, ongoing health care provider support for infant-caregiver attachment that aligns with the program's current trauma informed approach to care. Consultations and an environmental scan with internal stakeholders and external organizations were conducted to further guide the development of the educational resource. This was a necessary step to better understand the current practice environments in the target units, to gain support from internal stakeholders, and

to better inform the content of the educational resource. The results of the consultation process and environmental scan are presented and discussed in this report.

Part One: The Consultation Process and Findings

Consultations were carried out with key individuals in the women's and newborn health program of the IWK Health Centre during the month of August 2019. The objectives for the consultation were:

1. To identify current practices, resources, and policies available that support infant-caregiver relationships in the women's and newborn health program. This was to help identify areas of strength as well as any gaps that needed to be addressed.
2. To identify perceived challenges or barriers to implementing an attachment-based approach to care. Efforts will be made to address these barriers and concerns in the development of the education, which in turn may increase acceptance of the education and recommendations for practice.
3. To collect ideas from health care providers about the kinds of information, practice supports, and the education format (e.g., in-service, online learning module) they would like to receive. Emphasis can then be placed on areas which health care providers feel are most important for their practice.

Participants and Sources of Information

The consultation process consisted of gathering data from three internal target groups. The first target group was the managerial group (n=5), which consisted of the director and the managers in the women's and newborn health program. Responses were

received from (n=3) respondents (participation rate of 60%). Short meetings in person or by telephone were requested by hospital e-mail (See Appendix B1) with follow-up by telephone if no response was received. A semi-structured interview (see Appendix B2) was used to guide the discussion.

The second target group was the IWK's interdisciplinary IMH working group (n=6), with responses received from (n=4) members (67% response rate). This working group is co-chaired by a child and adolescent psychiatrist with expertise in IMH and the professional practice leader for social work. The interdisciplinary group (psychiatry, social work, and nursing) meets every two weeks to discuss practice issues around IMH. Social workers for every target care area are represented in the IMH group. As such, they are an invaluable source of knowledge around current practices, knowledge, and resources in each care area. Consultation requests were sent by hospital e-mail (see Appendix B3). Request for feedback on several key items were sent to participants for feedback (see Appendix B4).

The third consultation group was health care providers working in the inpatient care areas that are the target of the education. Health care providers were invited to participate in the consultation process through an anonymous online survey sent to them by hospital e-mail by unit managers. Due to management feedback, the survey was not distributed widely to all health care providers in these care areas as initially intended. Survey distribution was at the discretion of managers in the individual units. Requests were made to managers in four care areas (Family Newborn Care Unit [FNCU], neonatal intensive care unit [NICU], Birth Unit, and Prenatal Special Care Unit) to distribute the

survey by e-mail to a convenience sample of 10 respondents. Response were received from managers in three care areas: FNCU, NICU, and Prenatal Special Care Unit. As the end of the survey period was ending, no responses had been received from the NICU, or the Prenatal Special Care Unit. An additional convenience sample of (n=5) NICU nurses were invited to participate in the survey in-person and were sent an e-mail link with the electronic survey to their hospital e-mail. No further efforts were made at this time to increase responses from the Prenatal Special Care Unit as a decision was made to focus the efforts of this project on the care areas working with neonates and their families (i.e., FNCU, NICU and Birth Unit). Efforts to contact the Birth Unit manager were unsuccessful. A total of 35 e-mail surveys were sent to health care providers in difference care areas (NICU, n=15; FNCU, n=10; Prenatal Special Care Unit, n=10). Survey response rates were 50% for FNU, 33% for NICU, and 0% for the Prenatal Special Care Unit. The survey remained available for 14 days after being distributed. In total ten nurses responded to the survey. See Appendix B5 for the sample e-mail with link to the survey and Appendix F for a list of survey questions.

Data Collection and Management:

Research ethics board approval was not required for the consultations as the project was within the scope of continuous quality improvement (see Appendix B6). Participants were contacted by hospital by e-mail and given a description of the project and purpose of the consultation process. All requests for consultations were voluntary, and this was explained to participants. Respondents were made aware that steps would be taken to safeguard anonymity and the data obtained. For correspondence, only hospital e-

mail was used which has additional measures to safeguard data. For consultations with the managerial group and the IMH working group, notes were taken by hand. At the conclusion, main points were repeated back to the participants for confirmation of information collected. This data was transferred to a word document and main points are summarized below.

The online survey did not collect names or e-mails of participants. There was one potentially identifying survey question about the participants professional role (e.g., nursing, physician, allied health professional). The question was made optional as it could be identifying for some care areas that have minimal allied health providers. Survey data is secure within google forms under the university Gmail® account. Data exported to Microsoft® Office Excel is stored on my personal computer that is password protected. No personal identifiers were collected unless individuals chose to disclose their discipline as noted above. This data will not be presented at the individual level, nor will data be presented separately for disciplines with a small number of employees.

Data Analysis

The written notes from the semi-structured interviews with the management and the IMH groups were typed and organized by question. Content analysis was the method used to identify consistent themes. Any current organizational resource identified by the participants was obtained and reviewed as part of the environmental scan for possible incorporation into the practicum project. Survey data were converted into an excel document to allow for further analysis. As the survey included both quantitative and qualitative data, descriptive statistics and content analysis were used to identify trends

and themes, and to enable interpretation of the results.

Consultation Findings and Survey Results

Management Group

The management group responded positively to the proposed education project, and they all stated that IMH and infant-caregiver attachment were important areas for consideration in the provision of care. They also identified current practices and polices in place that support infant-caregiver attachment including: skin-to-skin care (IWK Health Centre, 2014; IWK Health Centre and Nova Scotia Health Authority, 2018), psychological support for families (by nursing or social work), teaching moments about infants attempts to communicate, direct education about sensitive approaches to caregiving, infant feeding support (i.e., baby friendly designation), and practices to minimize stress or pain (IWK Health Centre, 2011; IWK Health Centre 2019)

Participants were asked to identify areas for improvement in how the infant-caregiver relationship is supported in their care area. Some areas identified included providing more medical care (e.g., assessments) with infants in caregivers arms to reduce infant stress. Respondents noted that this was often done for painful procedures, but not always for routine assessments or admission assessments which can also be stressful for newborns. It was also noted that health care providers could do a better job modeling and educating parents about infants' cues during all routine care interactions.

The management team was also asked to identify what potential barriers (if any) might impact their teams' efforts to support the infant-caregiver relationship. The biggest barrier identified was a lack of time. Managers noted that workloads could be heavy at

times, which could be due to a combination of staffing levels and high acuity/census. Interestingly, managers also noted that many approaches to support the-infant caregiver relationship do not require significant time investments on behalf of health care providers and can be incorporated into routine care. Another challenge identified was the length of stay, with quick admissions and discharges being typical for healthy newborns (e.g., typically under 48 hours for vaginal delivery). health care providers working with parents and newborns have a lot of education and teaching to cover in short amount of time on important topics such as feeding, baby care, safe sleep, proper use of car seats, and falls prevention.

When asked about the method of education provision, there was agreement that online learning modules had many advantages such as the ability to reach a larger number of health care providers, convenience, cost-effectiveness, and their completion is trackable. Managers noted that online learning modules have greater benefits as they can remain accessible indefinitely instead of for the duration of this project only.

IMH Group

Important topics for health care provider education. The need for responsive and sensitive caregiving was identified as an important area for health care provider education. One respondent noted that research evidence makes a clear link between the quality of infant-caregiver relationships and infant's brain development, as well as the regulation of emotions and stress "it's not an optional thing –babies need sensitive caregivers". Other respondents felt health care providers could benefit from a greater understanding of how maternal mental health impacts infants, and the differences

between attachment (i.e., the infant's relationship with caregivers) and bonding (i.e., parental attributions/feels of attachment towards the child). Respondents felt that health care providers had a responsibility to provide care to infants in responsive ways, and to promote this responsiveness in caregivers.

Current practices, resources or policies. Participants identified a range of ways IMH is supported in the women's and newborn health program. These included promotion of breastfeeding, skin-to-skin care, rooming in for families. One respondent noted there had been steps taken to develop a parent resource manual on the topics of infant-caregiver attachment (not yet finalized), with the intention of later creating educational resources for health care providers. Several policies were identified, and they are discussed as part of the environmental scan.

Area for improvement. One participant identified the need for all health care providers to have a foundation of essential knowledge, skills, and competence so that all providers are working from an attachment and trauma-informed perspective. Another respondent identified coordination of care between units as an area for improvement. This is especially true when infants and mothers are being cared for separately as it can create challenges and barriers to mothers spending time with their infants. Additionally, the promotion of maternal mental health was felt to be an area in which health care providers can make improvements.

Potential challenges or barriers to change. A lack of time was acknowledged by the participants as a barrier frequently reported by health care providers. Still, participants felt that time was not the true issues as promoting sensitive and responsive

caregiving does not require a significant investment in time. One participant noted that health care providers need to “slow down and see what is in plain sight”, and another noted that health care providers needed “appreciation for the small moments of connection that can build a strong foundation of support for families”.

Survey Data

The survey collected information on two demographic questions (area of work and professional role) and six questions related to IMH: familiarity with topic, perceived importance of topic, how IMH is promoted in their care area, barriers to IMH promotion, education topics of interest, and desired resources. A total of 10 participants responded to the survey (total response rate of 29%, ranging from 0-50% by care area). It is important to note that the survey data is subject to bias due to lack of random sampling. Additionally, the margin of error would be significant given the small sample size relative to the population of health care providers in these care areas. There are also risks of social desirability effects increasing positive responses, and the inclusion of suggestions for several questions may have increased this. For these reasons, firm conclusions cannot be drawn regarding the survey results, but they are still useful feedback in the ongoing development of this education resources.

Demographics. All participants identified as nurses. The request was made for managers to forward to survey to health care providers (e.g., nurses, physicians, and allied health staff). As survey recipients were chosen by management, it is not possible to determine which professionals were ultimately provided the survey. Participants were employed most often in the FNU (n=5) or the NICU (n=5).

Familiarity with IMH. A definition of IMH was provided to health care providers prior to this question to clarify what is meant by the term IMH (see appendix B7). Participants rated their responses on a 5-point Likert scale ranging from 1 (not familiar) to 5 (very familiar). Response ranged from 3-5 indicating moderate to very high self-reported familiarity with IMH (see Figure 1).

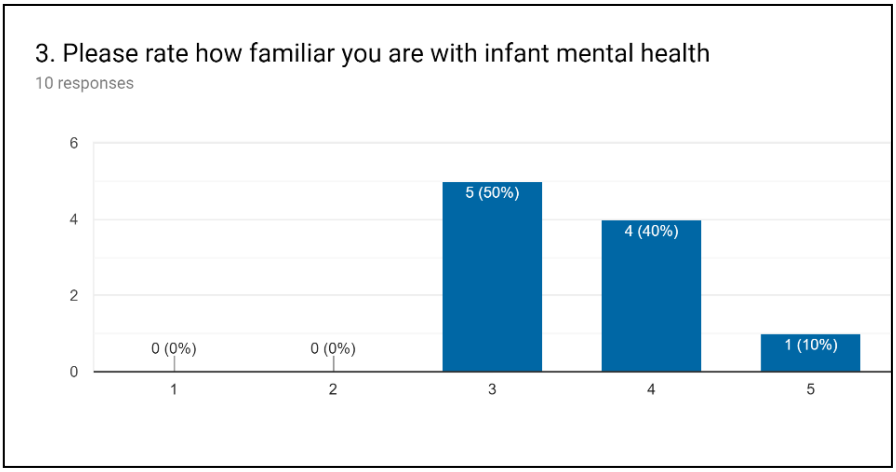

Figure 1. Participant familiarity with infant mental health

Relevance of IMH promotion in everyday practice. Participants rated their responses on a 5-point Likert scale ranging from 1 (not at all relevant) to 5 (very relevant). Responses ranged from 2-5, with 50% of participants rating IMH as 5 (very relevant) and 90% rating the relevance of IMH as a 4-5 (see Figure 2).

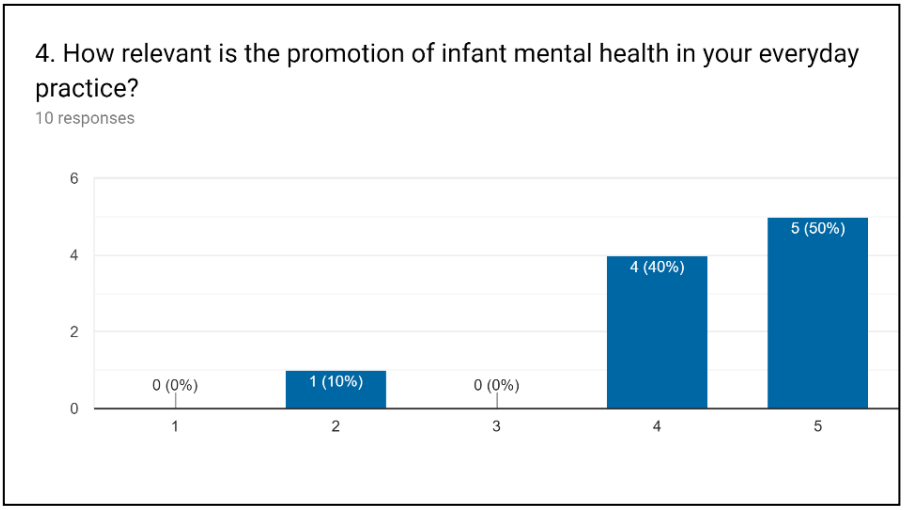

Figure 2. Perceived relevance of IMH in practice of participants

Is infant mental health promoted in your care area. This question was provided as an optional response, and a total of seven survey participants provided a free-text response. IMH was felt to be promoted by the majority of those who responded (n=5). Participants felt IMH was promoted through the following ways: education on normal periods of infant crying; coping skills; fostering caregivers independence in caring for their infant; use of quiet periods to give families a time to bond; supportive measures for painful procedures (e.g., swaddling, skin-to-skin, sucrose). Measures specific to the NICU population were also identified included a clustered care approach (to promote uninterrupted sleep for sick/preterm infants), skin-to-skin care and positive touch. Although responses were obtained evenly from both FNU (n=3) and NICU (n=4), all responses from participants in the NICU felt IMH was promoted in their care area. In contrast, one participant from FNCU felt it was only "somewhat promoted" but that this could be improved, and one other FNCU participant felt it did not often come up with the healthy newborn population that is in hospital for only 12-36 hours. These differences

might be understood in relation to differences in patient populations, length of stay, and the recent provision of IMH education days to health care providers in the NICU. It was evident from the management consultations and existing policies that there are efforts to promote IMH in the FNCU, but perhaps the links between these efforts and their potential impact on IMH or infant-caregiver attachment are not as clear for health care providers in the FNCU.

Barriers to promoting infant mental health. This question was provided as an optional response, and all ten survey participants provided a free-text response. The most commonly cited barriers were a lack of time, issues with staffing, or busy work assignments (any response n=7; lack of time n=4; staffing issues n=3; busy patient assignments n=2) and the need for more education (n=6). Additionally, a NICU participant spoke about the difficulty in providing responsive care to infants in the NICU who are present without their caregivers, noting infants' cues (e.g., crying) may not be responded to quickly depending on the nurse's work assignment. Another NICU respondent discussed feeling some supportive approaches were outside of their control (e.g., skin-to-skin care if parents unavailable) and that the need for emergency procedures at times interferes with providing comfort care.

Topics for further learning. Participants were asked about which topics they would like to learn more about, and provided with a list of possible options, as well as an option to report their own suggestions in free text. Participants could select any number of items. Responses in order of number of responses included: General information about infant mental health (n=8), strategies to promote infant-caregiver attachment (n=8),

resources and referral services available for families with psychosocial concerns (n=8), coping with work-related stress, burnout or compassion fatigue (n=7), and how to deal with challenging behaviours (n=7).

Preference for type of learning resource. Participants were asked about which type of resource they would prefer to have developed for their care area (see Figure 3.). All survey participants responded to this question with the following preferences: direct staff education (n=4), self-directed learning (n=2), policy or practice guideline (n=2), patient education handouts (n=1). The remaining participant used the other option and stated that they would prefer both direct education and patient education handouts be developed (n=1). Although the management has requested the development of an online learning module, it is possible to develop the project as a toolkit, with a combination of online learning and printable resources for use with families.

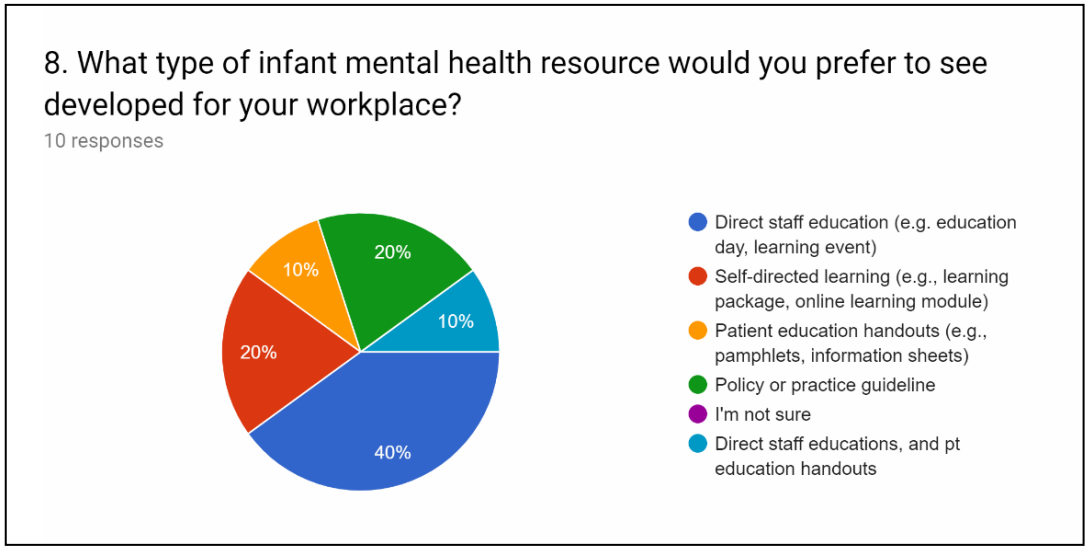

Figure 3. Participant preference for format of education or educational resource

Consultation Conclusions and Implications

These consultations provided critical information in several areas. The format of the education project was dependent on support from the management team. Although there was interest from survey participants in having direct education, this was not supported by management for the purpose of this project. Instead, the management team requested use of an online learning format for its advantages in terms of reach, cost, and consistency with other continuing education initiatives in the health centre. The identification of barriers was an important outcome of the consultations. The biggest barriers identified were lack of time and education needs. This project hopes to directly address the need for education outlined by all consultation groups. This education project will also emphasize on the practical aspects of working with families, and how routine care events can be used as springboard to foster responsive caregiving and the infant-caregiver relationship without requiring significant time investments (the most reported barrier).

The results of the consultation plan also provided a good sense of where the health centre is currently in terms of their support for infant mental health. Findings from the consultations with management and infant mental health groups, and survey results highlight that at least some health care providers are aware of some benefits of supporting infant-caregiver attachment and evidence-based strategies to promote it. This is likely related to the ongoing efforts of the infant mental health group in promoting this important topic in their care areas over the past few years. This is important because the open and accepting attitudes of health care providers regarding this topic has implications for how well this education will be received, valued, and used. Consultations from the

IMH working group provided expertise and insight into the dynamics of the various care areas. Information they provided was used to inform the direction of the literature review (i.e., infant-caregiver attachment relationship as a modifiable determinant of IMH) and in determining the specific topics to include in the development of the educational resource.

Part Two: The Environmental Scan

In addition to the consultations, steps were taken to identify existing resources related to the practicum project topic both within and external to the IWK Health Centre. The two main objectives of the environmental scan were to identify:

- Policies, practice guidelines, or educational resources on the topic of IMH or infant-caregiver attachment within/outside of the IWK Health Centre.
- Print or video resources regarding child development, attachment, or IMH, that could be incorporated into the development of the education resource.

Participants and Sources of Data

A range of sources were used to meet the environmental scan objectives. The first was a review of IWK Health Centre's policies using the health centre's online policy website (see IWK Health Centre, 2010). The second strategy was to connect with leading hospitals in the area of infant and family mental health. The literature review conducted for this project yielded very little critical examination or research of IMH specifically in a hospital setting with neonates. The infant-caregiver relationship has received more attention in the literature, particularly in the NICU setting; however, there were still no reviews identified that examined attachment promotion strategies during initial hospitalization. With this in mind, the decision was made to conduct a focused external

environmental scan with two Canadian NICUs chosen for their work in the area of family intervention and mental health supports.

Mount Sinai Hospital in Toronto is home to Canada's largest NICU and is a leader in family centered care. They developed a family integrated care model that has shown to improve outcomes for infants and their caregivers. They also operate a website that promotes family integrated care in the hospital setting and offers tools for health care providers interested in adapting such an approach. The second NICU chosen was the Stollery NICU at the Royal Alexandra Hospital in Edmonton. IMH professionals (psychologists and psychiatrists) have been working collaboratively with health care providers in the NICU to support families. These two NICUs were chosen as exemplars given their leadership in these areas.

To identify print and video resources, two websites were chosen for review. Infant Mental Health Promotion (2019) is a not for profit organization operating within the Hospital for Sick Children in Toronto. Their mandate is to promote optimal IMH outcomes through partnering with community organizations, developing best practices, education, training, sharing information, and advocacy work. The Centre on the Developing Child at Harvard University (2019) publishes and promotes evidenced-based information on child development and includes written content and videos of topics relevant to the discussion of IMH.

Data Collection and Management

This project did not require review by the Health Research Ethics Review Board (See checklist in appendix B6). The internal IWK policy website was reviewed for

policies that supported in infant-caregiver attachment, and policies identified by individuals during the consultation process. Relevant policies were reviewed to examine how current recommended practices align with evidence on promoting attachment. Copies of policy documents were saved to a password protected personal computer. Clinical educators for each of the two NICUs identified above were contacted by telephone. They were given details regarding the project and how any obtained information would be used. The educators were asked whether the units had any developed policies, practice guidelines or education material for health care providers on the topics of IMH or infant-caregiver attachment. (see appendix B8 for guiding script of telephone call). Notes were typed during the phone calls for accurate record keeping. Websites were reviewed and searched using key phrase such as: attachment, infant mental health, stress, toxic stress, hospital, and resilience. Typed records were kept regarding resources found and website links to the information.

Findings

The IWK Health Centre has several policies that were identified as relevant to supporting infant-caregiver attachment and infant-mental health. Two policies were related to the provision of skin-to-skin care, one for healthy term infants (IWK Health Centre & the Nova Scotia Health Authority, 2018) and one for infants in the NICU (IWK Health Center, 2014). Two policies were focused on pain, including general pain management (IWK Health Center, 2019), and the use of sucrose for painful procedures in infants under 12 months of age (IWK Health Center, 2011). The last identified policy was a NICU specific policy on neuroprotective developmental care (IWK Health Center,

2014). It can be understood from these policies that the IWK supports the use of skin-to-skin care, which is an evidenced-based strategy to improve infant-caregiver attachment. The neuroprotection and pain management policies demonstrate that the IWK also strives to provide care that is protective of the preterm infants' developing brain and nervous system using best available evidence. Importantly, parental presence with their infant is emphasized in the neuroprotective developmentally supportive care policy (IWK Health Centre, 2016). By reviewing these policies, I have a better understanding of which practices are expected of health care providers and supported by management. In the further development of this project, links can be made back to existing policies as needed.

In the consultation process with external hospitals, no educational resources or policies related to general information on IMH or infant-caregiver attachment were identified by either NICU. Both NICUs reported that although not addressed in a stand-alone way, there is emphasis on family centred care practices through programs utilized in their NICU. These programs were the Family Integrated Care program (discussed in the literature review) and the Newborn Individualized Developmental Care and Assessment Program. The IWK has taken steps to adopt Family Integrated care practices and has participated in family integrated care pilot studies (O'Brien et al., 2018). The Newborn Individualized Developmental Care and Assessment Program is a specific program with controlled training and certification processes. The IWK uses their own model of developmental care as outline in the neurodevelopmental policy (IWK Health Centre, 2016) which is based on Altimier and Phillips's (2013) Neonatal Integrative Developmental Care Model. The purpose of this project was not to alter current

approaches to developmental care in the NICU, therefore no further resources were gathered from these consultations.

A review of the Infant Mental Health Promotion website led to the identification of a *Position paper of the IMHP task force on vicarious trauma in the workplace* (IMHP, 2004) The risk of vicarious trauma and the need to support health care providers has been identified in both the literature review and in the consultation process with health care providers at the IWK Health Centre. The IMHP position paper identified suggestions for managing the impacts of vicarious trauma in professionals working with high-risk families (IMHP, 2004). Their recommendations will be incorporated into the discussion of coping with work related stress, compassion fatigue, and vicarious (secondary) trauma as part of the online learning module that will be developed during the next practicum course. Although the website provides educational videos for individuals and organizations who work with families, there is a fee to access these resources. As such, it was not possible to use any of their information videos as part of the practicum project.

In reviewing the Centre on the Developing Child website run by Harvard University, several useful items were found. A highly relevant three-part video series was identified:

1. Experiences build brain architecture. (Centre on the Developing Child, 2011a)
2. Serve and return interaction shapes brain circuitry. (Centre on the Developing Child, 2011b)
3. Toxic stress derails healthy development. (Centre on the Developing Child, 2011c)

The website offers a standard electronic request for permission to use form for their web content including videos. A request for permission to include these videos for use in an online learning module was submitted and is awaiting confirmation. If approved, videos may be used in an unaltered state only. These videos would be useful for the project as they are brief (1-2 minutes each) and discuss key concepts related to how early experiences shape brain development, how parents foster this development through interaction, and the impact of toxic stress. These concepts will be addressed in the development of the project, but the use of various multimedia formats may increase understanding an interest in the learning module.

Environmental Scan Conclusion

Results from the environmental scan showed that the IWK has policies outlining several practices that are supportive of IMH and infant-caregiver attachment. In this project it is important to first recognize the work that is currently being done every day by health care providers in these care areas, and the practice leaders who worked to incorporate and promote evidence-based initiatives. These current practices will be used as a starting point in the discussion of strategies to support infant-caregiver attachment as part of the online learning module. If permission is granted by the Centre on the Developing Child to use the proposed videos, they will be embedded into the online learning module and used to enhance the learning experience.

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Appendix B1

Request for Consultation E-mail – Management Group

Dear (Name of recipient),

My name is Amy LeBouthillier and I am a registered nurse at the IWK Health Centre. I am working on a project examining infant mental health promotion in healthcare as part of a Master of Nursing program at Memorial University Newfoundland. The goal of this work is to develop an educational resource for health care providers to support infant mental health promotion in the women's and newborn health program at the IWK. I am seeking input into the project from the management team in the women's and newborn health program.

The goal of this consultation is to:

- To gauge support for this type of education
- Better understand current practices and resources
- Identify what challenges or barriers may exist to incorporating infant mental health promotion into everyday practice
- Obtain feedback on what learning format(s) would be most acceptable to staff and management.

I am hoping to set up a brief meeting (15-20 minutes), either in-person or by telephone to discuss the project and obtain feedback that will be used in the development of the educational resource.

If you would be willing to discuss this project, please reply to this e-mail with a time you are available and your preference to meet in-person or to be contacted by telephone.

Thank you for your anticipated support,

Amy LeBouthillier

Appendix B2

Semi-Structured Interview – Management Group

Thank you for taking the time to discuss this project with me. I am a registered nurse at the IWK, with five years of experience in the mental health and addictions program and more recently in the NICU since January 2019. I am very passionate about infant mental health, which is the social, emotional, and cognitive well-being of children from preconception to age five. Infant mental health develops through an infant's attachment relationships with their primary caregiver(s) and is strongly influence by the quality of this relationship. This is a critical period for brain development and early experiences have been shown to have a lasting impact on physical and mental health throughout the lifespan. In the women's and newborn health program, I feel there are a lot of opportunities during routine care interactions to support this developing relationship. I am hoping to develop an educational resource to promote knowledge of infant mental health and how the attachment relationship can be promoted in practice. There are a few questions I am hoping to ask you, but first do you have any questions you would like to ask?

- Do you feel education in this area would be of value to staff in your care area?
- What is currently offered in hospital to promote infant-caregiver attachment (e.g., policies, resources, or care practices)?
- Do you feel there are any areas for improvement? Please explain.
- What do you see as potential challenges or barriers to clinical staff incorporating infant mental health promotion in their practice?
- What kind of learning format do you think would be most acceptable to your and your staff (e.g., print resources, online learning module, in-services session)?
- Is there anything else you would like to know about the project, or that you feel would be helpful for me to know?

Appendix B3

Request for Consultation E-mail – IMH Group

Dear (Name of recipient),

My name is Amy LeBouthillier and I am a registered nurse at the IWK Health Centre. As you know, I am working on a project examining infant mental health promotion in healthcare as part of a Master of Nursing program at Memorial University Newfoundland. The goal of this work is to develop an educational resource for health care providers to support infant mental health promotion in the women's and newborn health program at the IWK. I am seeking input into the project from members of the infant mental health working group.

The goal of this consultation is to:

- Better understand current practices and resources
- Identify areas for improvement
- Identify what challenges or barriers may exist to incorporating infant mental health promotion into routine practice
- Identify which topics are most important to include in the education

I am hoping to set up a brief meeting (15-20 minutes), either in-person or by telephone to discuss the project and obtain feedback that will be used in the development of the educational resource.

If you would be willing to discuss this project, please reply to this e-mail with a time you are available and your preference to meet in-person or be contact by telephone.

Thank you for your anticipated support,

Amy LeBouthillier

Appendix B4

Semi-Structured Interview – IMH group

Thank you for taking the time to discuss this project with me. I am a registered nurse at the IWK with five years of experience in the mental health and addictions program and more recently I have been working in the NICU since January 2019. As part of a Master of Nursing program I am developing an educational resource for health care providers focused on the promotion of infant mental health within the IWK's women's and newborn health program. As you are aware, the perinatal period represents an opportunity to support infant mental health and the attachment relationships between infants and caregivers. I believe there are a lot of opportunities during routine care interactions for health care providers to support this developing relationship. There are a few questions I would like to ask you, but first do you have any questions you would like to ask?

1. What do you think is most important for health care providers (nurses, physicians, allied staff) to learn about infant mental health? What topics?

2. What is currently offered in your care area (if applicable) to promote infant-caregiver attachment (e.g., policies, resources, or care practices)?

3. What areas would you like to strengthen or change within the women's program?

4. What do you see as potential challenges or barriers to staff incorporating infant mental health promotion in their practice?

Appendix B5

Request for Consultation E-mail – Health Care Providers

Dear colleagues,

My name is Amy LeBouthillier and I am a registered nurse at the IWK Health Centre. I am working on a project examining infant mental health promotion in healthcare as part of a Master of Nursing program at Memorial University Newfoundland. The goal of this work is to develop resources to support infant mental health promotion at the IWK. I am seeking input into the project from care providers throughout the women's and newborn health program.

The goal of this consultation process is to:

- Learn what health care providers think about infant mental health
- Identify what challenges or barriers may exist to incorporating infant mental health promotion into everyday practice
- Obtain feedback about what kinds of supports would be most helpful to staff

I am requesting your participation in an anonymous online survey. Participation is entirely voluntary and should require less than five minutes of your time. The survey will be open for two weeks, from (TBD) until (TBD). You can fill out the anonymous google forms survey here.

If you have any further questions about the survey or the project please do not hesitate to contact me at amy.lebouthillier@mun.ca

If the hyperlink above does not work, please copy and paste this link into your browser https://docs.google.com/forms/d/e/1FAIpQLSdLVAAl85zjwJDSTU-8lbj8PriXByHGjbd9tjL4BxUKn5wMBg/viewform?usp=sf_link

Thank you for your support,

Amy LeBouthillier

Appendix B6

Health Research Ethics Authority Screening Tool

	Question	Yes	No
1.	Is the project funded by, or being submitted to, a research funding agency for a research grant or award that requires research ethics review		✓
2.	Are there any local policies which require this project to undergo review by a Research Ethics Board?		✓
	IF YES to either of the above, the project should be submitted to a Research Ethics Board. **IF NO** to both questions, continue to complete the checklist.		✓
3.	Is the primary purpose of the project to contribute to the growing body of knowledge regarding health and/or health systems that are generally accessible through academic literature?		✓
4.	Is the project designed to answer a specific research question or to test an explicit hypothesis?		✓
5.	Does the project involve a comparison of multiple sites, control sites, and/or control groups?		✓
6.	Is the project design and methodology adequate to support generalizations that go beyond the particular population the sample is being drawn from?		✓
7.	Does the project impose any additional burdens on participants beyond what would be expected through a typically expected course of care or role expectations?		✓
LINE A: SUBTOTAL Questions 3 through 7 = (Count the # of Yes responses)		**0**	
8.	Are many of the participants in the project also likely to be among those who might potentially benefit from the result of the project as it proceeds?	✓	

9.	Is the project intended to define a best practice within your organization or practice?	✓	
10.	Would the project still be done at your site, even if there were no opportunity to publish the results or if the results might not be applicable anywhere else?	✓	
11.	Does the statement of purpose of the project refer explicitly to the features of a particular program, organization, or region, rather than using more general terminology such as rural vs. urban populations?	✓	
12.	Is the current project part of a continuous process of gathering or monitoring data within an organization?	✓	
LINE B: SUBTOTAL Questions 8 through 12 = (Count the # of Yes responses)		**5**	
	SUMMARY **See Interpretation Below**		

Interpretation:

- If the sum of Line A is greater than Line B, the most probable purpose is **research**. The project should be submitted to an REB.
- If the sum of Line B is greater than Line A, the most probable purpose is **quality/evaluation**. Proceed with locally relevant process for ethics review (may not necessarily involve an REB).
- If the sums are equal, seek a second opinion to further explore whether the project should be classified as Research or as Quality and Evaluation.

These guidelines are used at Memorial University of Newfoundland and were adapted from ALBERTA RESEARCH ETHICS COMMUNITY CONSENSUS INITIATIVE (ARECCI). Further information can be found at: http://www.hrea.ca/Ethics-Review-Required.aspx.

Appendix B7

General Health Care Providers Online Survey Questions

Infant Mental Health Survey

Please help us learn more about you

1. In which unit do you work most often?
    - Family Newborn Unit
    - Prenatal Special Care Unit
    - Neonatal Intensive Care Unit
    - Perinatal Centre
    - Birth Unit
    - Other: (free text for response)

2. What is your role? (optional)
    - Nurse
    - Physician
    - Allied Health
    - Other: (free text for response)

Experience with Infant Mental Health

Infant mental health refers to the social, emotional, and cognitive well-being of children from preconception to age five. It develops through an infant's relationships with their primary caregivers and is strongly influenced by the quality of these relationships. Early experiences have been shown to have a lasting impact on physical and mental health throughout the lifespan.

3. Please rate how familiar you are with infant mental health (Likert Scale: 1= not very familiar and 5= very familiar)

Not very Familiar	1	2	3	4	5	Very Familiar

4. How relevant is the promotion of infant mental health in your everyday practice? (Likert Scale: 1= not at all relevant and 5= very relevant)

Not at all relevant	1	2	3	4	5	Very relevant

5. Do you believe infant mental health is promoted in your care area? If so, please explain: (free text for response)

6. Are there any barriers to promoting infant mental health in your care area (e.g., lack of staff education, not enough time)? If so, please explain: (free text for response)

7. What topic(s) would you like to learn more about? Check all that apply.
    - General information about infant mental health
    - Strategies to promote infant-caregiver attachment
    - How to deal with challenging behaviours
    - Resources and referral services available for families with psychosocial concerns
    - Coping with work-related stress, burnout, or compassion fatigue
    - I'm not sure
    - Other: (free text for response)

8. What type of infant mental health resource would you prefer to see developed for your workplace?
    - Direct staff education (e.g. education day, learning event)
    - Self-directed learning (e.g., learning package, online learning module)
    - Patient education handouts (e.g., pamphlets, information sheets)
    - Policy or practice guideline
    - I'm not sure
    - Other: (free text for response)

Thank you!
Your participation is greatly appreciated. If you have any further questions or comments, please direct them to Amy at amy.lebouthillier@mun.ca.

Appendix B8

Example Telephone Request – Outside hospital NICUs

Hello,

My name is Amy Lebouthillier and I am registered nurse employed at the IWK Health Centre's Neonatal Intensive Care Unit in Halifax. As part of a Master of Nursing program, I am looking to develop an educational resource for staff in our hospital regarding infant mental health and supporting infant-caregiver attachment in the neonatal period. As part of this project I am reaching out to other hospitals to see if they have any policies or educational resources related to promoting infant-caregiver attachment or infant mental health that they would be willing to share. These would be used for the purpose of developing an online learning module for health care providers at the IWK. Does your unit currently provide education on these topics or have any educational resources available?

Thank you for your time

Appendix C

Online Learning Module Images

Infant Mental Health

SUPPORTING INFANT CAREGIVER ATTACHMENT IN THE PERINATAL PERIOD

Learning Objectives

Upon successful completion of this module, learners will:

I. Accurately define the terms infant mental health.

II. Identify several ways in which hospital care can interfere with the developing relationship between infants and their caregivers.

III. Describe three strategies that can be used to foster the infant-caregiver relationship in hospital.

IV. identify available resources to connect with if infant-caregiver relationship concerns are identified

What is Infant Mental Health?

Infant mental health has been defined as:

"the developing capacity of the child from birth to 5 years of age to form close and secure adult and peer relationships; experience, manage, and express a full range of emotions; and explore the environment and learn—all in the context of family, community, and culture." (Cohen, Oser, & Quigley, 2012, p. 1)

Infant mental health can be described as the optimal social, emotional, and cognitive development of a child.

What Shapes Infant Mental Health?

Both genetics and experiences play a role in infant mental health.

An infant's early experiences and their relationship with primary caregiver(s) are widely considered the most important factors influencing infant mental health after birth.

(Zeanah & Zeanah, 2019)

Improving the quality of the infant-caregiver relationship is the focus of infant mental health intervention in the early years.

Why is Infant Mental Health Important?

What happens during a child's early years is critical in influencing the trajectory of cognitive, emotional, and social development throughout the lifespan.

Research into childhood experiences has found an association between adverse childhood experiences (ACES) and a host of mental and physical health problems in adulthood such as: obesity, cardiovascular disease, cancer, substance use disorders and suicide. This effect is dose-dependent, with a greater number of ACES being associated with increased risk of mental and physical health problems.

(Felitti et al., 1998)

Brain Development in the Early Years

Link to video: https://www.youtube.com/watch?v=VNNsN9IJkws

(Centre on the Developing Child, 2011a)

Key Points

- Conception to three years of age is a crucial period of rapid brain development.
- Experiences during this time shape how the infants' brain develops.
- Repeated experiences help strengthen connections in the brain for social, emotional, and cognitive skills that are necessary for everyday life.

More About Experiences

We know that experiences help shape the infants developing brain, but how does this happen?

Link to video:https://www.youtube.com/watch?v=m_5u8-QSh6A&t=8s

(Centre on the Developing Child, 2011b)

Key Points

- Infants learn by engaging in reciprocal interactions with their caregivers, called serve-and-return interactions.
- These interactions help infants learn about themselves, the world around them, and aids in healthy brain development.
- Infants need responsive caregivers!

Pause and Reflect

Can you think of a time when you saw parents engaging in serve-and-return interactions?

What might this look like with a newborn compared to older infants pictured in the previous video?

The Impact of Stress and Toxic Stress

Link to video: https://www.youtube.com/watch?v=rVwFkcOZHJw

(Centre on the Developing Child, 2011c)

Key Points

- Experiencing stress in the presence of supportive and responsive caregivers helps infants learn to manage and regulate their emotions. It is a normal, and healthy part of development.
- Toxic stress is caused by significant or prolonged stress in the absence of protective relationships to buffer the experience.
- Toxic stress impedes normal brain development and can have lifelong consequences.

Pause and Reflect

What does infant mental health have to do with hospital care of families in the prenatal period?

Can Hospital Care Influence the Infant-Caregiver Relationship?

Yes!

Research has found that differences in hospital care practices can influence parent and child behaviour in the months and years after hospitalization.

Care practices such as rooming in and the use of skin-to-skin care have been found to have a significant impact on parent and child behaviours such as the:

- Responsiveness of parents to their infants
- Amount of parental affectionate behavior
- Infants level of irritability and emotional dysregulation

Some difference were identified at one month, one year, and even ten years of age.

What happens in hospital matters!

(See Bystrova et al., 2009; Gomes-Pedro, Bento de Almeida, Silveira da Costa, & Barbosa, 1984; Feldman, Rosenthal, & Eidelman, 2014)

Supporting Infant-Caregiver Relationships in Hospital

Proximity and closeness

Skin-to-skin care

Infants cues

Supporting Infant-Caregiver Relationships in Hospital

Pause and Reflect

What are some actions in your current practice that support the infant-caregiver relationship?

At the IWK there are many care practices that help support the development of the infant-caregiver relationship. Some examples of these practices include 24 hour rooming in of newborns with their family and the promotion of skin-to-skin care.

IWK Health Centre Policies

Here are some IWK policies that support infant mental health or the infant-caregiver relationship:

IWK - 8665 - Kangaroo care: Skin-to-skin contact in the NICU

IWK - 1745 & NSHA MC-NB-001 - Skin to skin contact (SSC) for healthy term infants

IWK - 8664 - Neuroprotective developmentally supportive care guidelines

IWK - 1519 - Pain management policy

IWK - 20.36 - Oral sucrose administration for minor procedural pain management in infants less than or equal to 12 months of age

(IWK Health Centre, 2011, 2014, 2016, 2019; IWK Health Centre & The Nova Scotia Health Authority, 2018)

Supporting Infant-Caregiver Relationships in Hospital

There are many ways to support infant mental health and the infant-caregiver relationships in hospital. Important first steps are keeping mother and baby together, and minimizing separation as much as possible. This can be accomplished through:

- ❑ Routine skin-to-skin care after all births.
- ❑ Delaying unnecessary medical procedures.
- ❑ Performing infant medical care with baby in a caregivers arms whenever possible.
- ❑ Encouraging skin-to-skin care as often as possible during the hospital stay.
- ❑ Promoting breastfeeding and following the practices of the baby friendly hospital initiative.

What is Skin-to-Skin Care?

Skin-to-skin care is used to describe a caregiver (mothers, fathers, or other caregivers) holding an infant wearing only a diaper upright on their bare chest.

Blankets are placed around the infants back to help the infant stay warm, and hats may also be used.

For further information on this care practice, please see the IWK and NSHA LMS module titled: *Skin to Skin Contact (SSC) for healthy term Infants*

Infant Cues

Several different programs have been developed to help orient caregivers to the unique abilities, cues, and needs of newborn infants. (e.g., NCAST keys to caregiving, or newborn behavioural observation)

What these programs have in common is a goal of helping caregivers to better understand their newborns. Although specific programs have a place in care delivery, health care providers can help parents understand their infants by providing education and reinforcing responsive caregiving during all care interactions.

This can be as simple as describing what an infant might be trying to communicate and discussing behavioral cues with caregivers.

What might this newborn be communicating?

Communication with Caregivers

Communication strategies

Supporting mothers' mental health

Identifying concerns

Getting extra support

Basic Communication Tips

- It is not just what you say, it is also how you say it.
- Be mindful of tone of voice, volume, and pace of the conversation.
- Most communication is non-verbal in nature.
- Be aware of personal space, which varies between cultures.
- Try to be at the same level and avoid standing over someone while talking.
- Use open body language.

Open-ended versus closed questions

A closed question is a direct and simple question that can be answered in very few words such as yes or no.

An open question is broader and invites someone to share their feelings or thoughts. These questions usually result in longer, more detailed answers.

Both types of questions are important and have different usages

	Closed Question	Open Question
When to Use It	You need a quick response. The information you need is straightforward. To help establish a rapport.	You are seeking information about feelings or opinions. To encourage someone to reflect.
Type of Answer	Simple. Answered in a few words.	More detailed. Contains subjective information such as feelings, thoughts, opinions.
Example	Are you tired this morning?	How are things going with your baby?

Empathy and Validation

Empathy is the ability to understand the viewpoint of another.

Validation is a response that recognizes the individuals experience and it is a powerful communication tool.

Validation is not the same as agreeing.

Validation helps to:

Establish a therapeutic relationship

Communicate acceptance of the individual and their feelings

Normalize the experience of difficult emotions during the perinatal period

Help the individual manage and process their emotions

Examples of Validating statements

- "That sounds really ____ (e.g., hard, difficult, scary, upsetting) for you"
- "No wonder you are feeling ___"
- "You're trying really hard"
- "you're feeling very worried about ___"
- "I'm sorry that happened to you"
- "What can I do to help?"

Invalidating Statements:

Unhelpful Communication Approaches

- Minimizing: "Oh, it's not really that bad"
- Rationalizing - "You just had a baby, so you are going to be sore"
- Blaming - "Well if you took your medication on time you would probably feel better"
- Finding the silver lining - "At least..."
- Fixing - "You should try..."
- Assuming - "I know how you feel"

Notice What is Going Well

It is also important to take the time to notice and reinforce positive behaviour. This helps foster new caregivers confidence in their ability to navigate the transition to parenthood.

"She really seems to like it when you __"

"He is looking right back at you, he really wants to connect with you"

"I can see you are really picking up on her cues"

Maternal Mental Health

The perinatal period is a time of great transition in responsibility, roles, and physiology. Combined these stressors create a period where women are more vulnerable to mental health problems and are also more likely to be victims of intimate partner violence. (Carter & Kostaras, 2005; Martin et al., 2004)

Research has shown that untreated maternal mental health problems in the perinatal period negatively impacts mothers, families, and infant development. Early recognition, support, and treatment are important in protecting the health and wellbeing of families. (Junge et al., 2017)

What You Can Do

Although your time with families may be brief, there are some things that you can do to make the most of it:

- Provide education on what to expect (i.e. "baby blues") and what is not normal (e.g., prolonged feelings of sadness, difficulty caring for themselves or the baby, or thoughts of harming self or others). Provide this education to as many caregivers as possible.
- Providing education to parents on normal newborn crying. Periods of inconsolable crying are normal and not a reflection of poor parenting. Normalize the frustration of having an infant who won't stop crying and discuss coping strategies and safety.
- Encourage families to participate in public health home visitations for extra support after discharge.
- Teach families about where else to access support if needed (e.g., family doctor, public health well baby clinics, mental health mobile crisis team, or local emergency departments).

When to Get Extra Support

Although many women may not experience acute problems during the hospital stay, it is important to know how to get extra support if you have concerns during hospitalization.

Red flags might include: not meeting the infants needs despite education and support, hostile behaviour towards the infant, concerns regarding intimate partner violence.

If you have concerns that cannot be managed directly with the family, discuss your concerns with a charge nurse, physician, or social worker.

Remember that any concerns regarding the safety of the infant or other children are required by law to be reported to child protection services with the Department of Community Services of NS.

See the mothers mental health toolkit (Macdonald & Flynn, 2012) for more information on supporting mothers mental health.

Considerations for Special Care Areas

Supporting infant mental health in:

Prenatal Special Care Unit

Neonatal Intensive Care Unit (NICU)

Prenatal Special Care

Did You Know

Infant mental health is influence by factors occurring prior to conception, throughout pregnancy, and after birth. Significant stress during pregnancy has been found to contribute to fetal brain changes, increasing the risk of emotional dysregulation and mental illness in later years. (Desocio, 2018)

Being diagnosed with a medical condition during pregnancy is a stressful experience for women and their families.

It is often associated with lifestyle modifications such as hospitalization or bedrest which may result in financial stress, role strain, and fears regarding the wellbeing of their baby.

Strategies for Supporting Families

Hospitalization can be isolating for families at a time when they are at an increased need for psychological support.

Encourage families to express how they are feeling and acknowledge that hospitalization can be a difficult and stressful experience.

Encourage families to reach out to their social network for psychosocial support. Peer support with other women in hospital is another potential avenue of support for hospitalized women.

Families may also need support with financial concerns, arranging care for older children, or other responsibilities. It is important to ask about how they are managing, and to connect them to other supports (e.g., social work) when needed.

NICU

Families in the NICU may face additional barriers compared to families cared for on the Family Newborn Unit including:

- Separation after birth
- Longer hospital stays
- Invasive medical procedures
- The use of obstructive medical technology
- Painful and/or stressful medical care and handling
- Prematurity and a premature brain
- Higher rates of breastfeeding difficulties
- Increased parental psychological distress

Developmental Care

Preterm infants have an immature nervous systems, and may experience normal handling as stressful. Developmental care approaches currently used in the NICU (e.g., clustered care, cycled lighting, noise reduction, positioning) may seem very foreign to caregivers.

Caregivers of infants with complex medical needs require additional support from health care providers to gain confidence in interacting with their newborns. This includes a good orientation to the NICU environment and the medical equipment, along with education on the unique care needs of preterm infants.

Family Integrated Care

Family integrated care (FICare) is an approach to care delivery that integrates families as partners in their baby's care. Parents are encouraged to stay with their infants as much as possible, and to provide much of the infant's care (e.g., diaper changes, bathing, checking temperatures, mouth care, moving SpO_2 sensors)

Early research shows that this care model decreases parents stress, improves weight gain, decreases the length of hospitalization, and increases exclusive breastfeeding rates at discharge. (O'Brien et al., 2018)

Although FICare has not yet been studied for its effects on the infant-caregiver relationship, it is a very promising intervention that has the potential to empower caregivers and increase the frequency of positive infant-caregiver interaction.

Other Considerations - Supporting Families

Although not always possible, keeping infants and caregivers together and encouraging skin-to-skin care are important interventions for preterm infants.

Single room care provides parents an opportunity to stay close to their infants and facilitates caregiver's involvement in care. Not all caregivers will choose to stay in hospital with their newborn. Ensure families have received information on the benefits of their involvement in the care of their newborn.

Medical technology can pose a barrier to interacting with their infants, and parents may have fears about handling their infants or causing harm. They may need additional support to feel comfortable interacting with their infants.

Having a baby in the NICU can be an unexpected and frightening experience. Parents and caregivers need the support of the health care team.

Conclusion

What happens to newborns and their families while in hospital can influence the quality of their interactions after discharge. This in turn influences an infant's cognitive, social, and emotional development. The perinatal period represents a unique opportunity to help foster the infant-caregiver relationship from the very start. Health care providers have an important role to play, and can support families by keeping infants together with their caregivers, managing pain, encouraging skin-to-skin care, and by teaching parents how to respond sensitively to their infants' cues.

Thank You

Thank you for your interest in infant mental health and your participation in this learning module.

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Quiz

What is Infant Mental Health?

Select the best answer

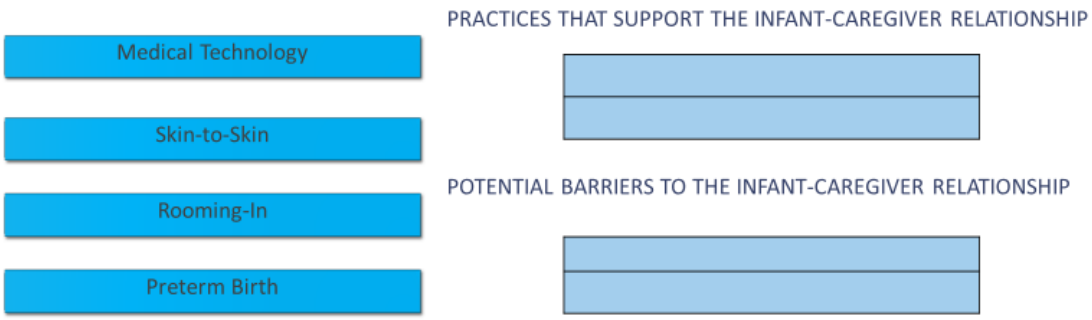
- ❑ The absence of a diagnosed mental illness in early childhood.
- ❑ The social, emotional, and cognitive well-being of children from preconception to age five.

That's Correct

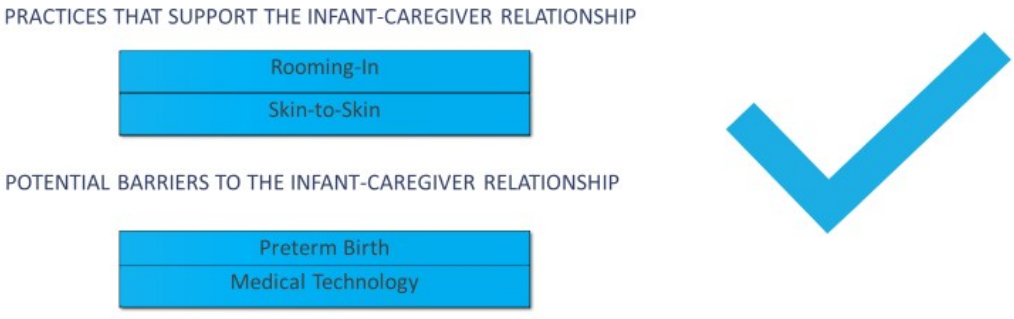
Mental illnesses are not often diagnosed in this age group. Infant mental health is better understood as the social, emotional, and cognitive well-being of children from preconception to age five.

Interventions for infant mental health are focused on promoting and supporting the conditions which promote optimal development (i.e., a secure caregiving environment and the presence of sensitive and responsive caregivers).

Drag and Match



That's Correct



Thank You

Note: To exit this learning module correctly and to receive credit for completion, please close this window by pressing the x in the top right hand corner of this screen.