Ana-Clara Caldwell

Capstone 2021

The Use of Technology-Based Resources for Parent Education in the NICU

After enduring pregnancy, having a newborn in the neonatal intensive care unit (NICU) is both stressful and terrifying to new parents.1 Unfortunately, research shows that about 8-10% of babies born in hospitals require hospitalization.2 Families of newborns in the NICU are often in a crisis state and may be feeling disappointment, anger, anxiety, guilt, or a loss of control.3 While feeling these debilitating emotions, parents are often being bombarded with infant care information through pamphlets and bedside teaching, leaving parents feeling overloaded.4 Additionally, due to high levels or stress and increased cortisol levels, many parents may experience diminished learning abilities as stress impairs memory retrieval.1,5 When the child is finally discharged home, parents are often left feeling confused, overwhelmed, hopeless, and alone.

Research has shown that adequate parental involvement is necessary for both the current and future health of the infant.1 Developmental outcomes for infants born preterm rely heavily on the parent-infant relationship and the infant’s capabilities.2 Bowlby’s attachment theory emphasizes that parental self-efficacy, social support, and parental emotional well-being are necessary for establishing early parent-infant bonding.4 A lack of parental bonding with an infant can lead to child developmental concerns and parent-infant attachment issues.4 Unfortunately, there are many barriers to facilitating parent-infant interaction in the NICU making bonding difficult. Many parents perceive the NICU as an intimidating environment.2 Because of this, NICUs should provide space for family support through variety of means, such as educational material and internet resources, to reinforce parent knowledge and confidence in their parenting abilities.6 Bandura stated that parents must feel confident in their ability to perform specific skills and produce desired outcomes to ensure successful parenting.4 Higher levels of parenting self-efficacy are highly associated with better coping responses and parental adjustment, which leads to positive psychological and development outcomes for both parents and infants.4 Parents who are satisfied and feel competent as parents are more motivated to care for, nurture, and communicate with their children.2 In an effort to better understand how to support their preterm infant, parents often search online for parenting advice, health information and social support. 6 However, this information is not always reliable and accurate. Mothers of high-risk preterm infants stated that they lacked confidence in their ability to care for their infant and requested more information prior to hospital discharge.1 These mothers found instruction on interpreting infant cues and participating in routine daily care were the most beneficial.1 By providing families with support and factual information, parents can have a greater control over the situation and increase their sense of parental self-efficacy leading to improved infant care and bonding.2

As technology continues to advance, healthcare is relying more heavily on it. The World Health Organization defines eHealth as the “integration of information and communications technology and electronic processes to facilitate improved communication, delivery of health services, and management of health systems.”3 Recent research has been conducted on the use of technology as an educational and supportive resource. A systematic review conducted by Dol et al. found that parents were not only interested in using eHealth technology, but they found eHealth interventions to be useful and acceptable.3 Technology-based resources can provide parents in the NICU information about the illness, supportive resources available, tips for managing caregiver health, psychoeducation exercises, and online social support.7 These resources could be provided through a mobile application or an internet-based website. Either way, eHealth resources have been shown to improve a number of parental outcomes, including parenting self-efficacy, parental bonding, social support, parental well-being, postnatal depression, postnatal anxiety, and parenting satisfaction.4,7 Parenting self-efficacy is a major determinant of a positive parenting experience.4 It has been shown that educational information is fundamental to enhancing parent’s confidence. As previously mentioned, parental bonding is dependent on high parental self-efficacy and social support.4

Reinforcing the use of technology in parent education, a study conducted by Byrne et al. found that direct and video instruction were significantly more effective than written-pictorial instruction.1 This could be because written-pictorial instruction does not provide adequate dynamic interactions which are important for learning a whole motor task, 1Therefore, technology may be a superior educational tool than written instructional materials alone. Typically, therapists are expected to leave instructional material at the bedside for families and discuss the materials as the families are available. However, the use of technology would allow parents to learn through at their own pace using a variety of instructional tools (ie. pictures, written instruction, video). The use of non-verbal teaching and learning strategies using new educational technology also helps to overcome the barrier of language.2 Importantly, technology-based education provides parents with the flexibility and time to learn. This mode of teaching has no time or place limitation. If parents are feeling overwhelmed and stressed in the NICU environment, they can choose to learn the information in the comfort of their own home without the intensity and distraction of the NICU. It also allows parents to learn and review without fear of being judged for not understanding or feeling constrained by time pressures. Ultimately, this increases the parent’s learning and confidence. Additionally, educational resources prescribed by therapists are evidence-based and parents can be confident in the reliability and validity of the information as opposed to other online resources they may find.

A study conducted by Shorey et al. (n=118) evaluated the effects of eHealth resources on parents of infants in the NICU.4 The parents in the intervention group were provided with two telephone-based educational sessions and access to an eHealth app.4 The mHealth app provided knowledge-based content through video and audio recordings, as well as an online discussion forum which created a social support system among parents.4 The online forum provided parents with a sense of community and improved perceived social support.4 In this study, parents in the control group took three months to reach the same level of parental self-efficacy as those in the intervention group with access to the mobile app achieved within the first month.4 Additionally, the control group experienced a large decrease in parenting satisfaction scores, whereas the intervention group showed an increase. The research shows that virtual informational and educational support increases satisfaction for parents of infants in the NICU.2,4 Lastly, parental well-being and quality of life improves with the use of eHealth resources. Parents report a decrease in stress, depressive symptoms, anxiety, and relationship problems.4,7 This decrease in negative symptoms is imperative as they have been associated with low involvement, low efficacy and low parenting satisfaction.4

Although eHealth resources provide numerous benefits, there exist several related barriers and concerns with regard to its use and accessibility. First, it is important to acknowledge that the use of eHealth resources at home limit the opportunity for feedback and correction from a therapist. Also, it is difficult to ensure equal access to mobile technology.8 Families from low-income households have less access to the Internet on their mobile devices.8 Additionally, patients with limited health literacy are less likely to own and have the skills to use a mobile phone for health-related purposes.8 Furthermore, individuals with low health literacy are less likely to adhere to medications, have poorer health status, and face increased health care costs. 8 The use of technology makes accessibility more complex with users needing a certain level of e-health literacy.8 E-health literacy refers to the ability to “find, understand, and assess health information obtained from electronic means and use the acquired information for addressing health issues”.8 The familiarity and knowledge of using mobile health apps is variable among individuals. Using technology as a resource compounds both general health literacy and usability skills. Additionally, when compared with whites, racial and ethnic minority groups are less likely to use technology for health information.8 Understanding these trends, e-Health resources should strive to achieve a large range of user access by considering all health literacy levels and various cultural and linguistic needs. The use of mobile health apps have also been shown to improve health literacy among patients because they help users achieve a better understanding and education related to health.8

Research has shown that the use of technology as a resource for parent education and social support can lead to numerous positive outcomes.2 By improving parental self-efficacy and social support, parents experience an easier transition into parenthood.2 The improvements in parental bonding, parenting satisfaction, and parenting competence and decrease of negative symptoms help parents feel more motivated to care for and nurture their infant.2 This ultimately leads to improved child development and patient outcomes.2 Parents have reported positive feedback and state that the technology is easy to use and is beneficial.6 Technology-based interventions are relatively new, but the limited research demonstrates that it can have a great impact on the future of patient care in the NICU when delivered in a manner that is accessible to diverse users.

Bibliography

1. Byrne EM, Sweeney JK, Schwartz N, Umphred D, Constantinou J. Effects of instruction on parent competency during infant handling in a neonatal intensive care unit. *Pediatr Phys Ther*. 2019;31(1):43-49. doi:10.1097/PEP.0000000000000557

2. Kadivar M, Seyedfatemi N, Mokhlesabadi Farahani T, Mehran A, Pridham KF. Effectiveness of an internet-based education on maternal satisfaction in NICUs. *Patient Educ Couns*. 2017;100(5):943-949. doi:10.1016/j.pec.2016.11.005

3. Dol J, Delahunty-Pike A, Anwar Siani S, Campbell-Yeo M. eHealth interventions for parents in neonatal intensive care units: a systematic review. *JBI Database System Rev Implement Rep*. 2017;15(12):2981-3005. doi:10.11124/JBISRIR-2017-003439

4. Shorey S, Ng YPM, Ng ED, et al. Effectiveness of a Technology-Based Supportive Educational Parenting Program on Parental Outcomes (Part 1): Randomized Controlled Trial. *J Med Internet Res*. 2019;21(2):e10816. doi:10.2196/10816

5. Vogel S, Schwabe L. Learning and memory under stress: implications for the classroom. *NPJ Sci Learn*. 2016;1:16011. doi:10.1038/npjscilearn.2016.11

6. Anwar Siani S, Dol J, Campbell-Yeo M. Impact of Parent-Targeted eHealth on Parent and Infant Health Outcomes: A Scoping Review. *J Perinat Neonatal Nurs*. 2017;31(4):332-340. doi:10.1097/JPN.0000000000000265

7. Lorca-Cabrera J, Grau C, Martí-Arques R, Raigal-Aran L, Falcó-Pegueroles A, Albacar-Riobóo N. Effectiveness of health web-based and mobile app-based interventions designed to improve informal caregiver’s well-being and quality of life: A systematic review. *Int J Med Inform*. 2020;134:104003. doi:10.1016/j.ijmedinf.2019.104003

8. Kim H, Goldsmith JV, Sengupta S, et al. Mobile Health Application and e-Health Literacy: Opportunities and Concerns for Cancer Patients and Caregivers. *J Cancer Educ*. 2019;34(1):3-8. doi:10.1007/s13187-017-1293-5

.