

Impact of an Online Family-Focused Parenting Support Intervention on the Physical Development of Preterm Infants and Parents' Sense of Competence and Care Ability

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Abstract

This randomized controlled trial investigated the effects of an online family-focused parenting support intervention on the physical development of preterm infants and parents' sense of competence and care ability. Participants were randomly assigned to either the intervention group, which received the online support program, or the control group, which received standard care. Preterm infants' physical development was assessed using standardized measures, while parents' sense of competence and care ability were evaluated through self-report questionnaires. Results indicated that infants in the intervention group showed significant improvements in physical development compared to those in the control group. Additionally, parents who participated in the online support program reported higher levels of competence and perceived ability to care for their preterm infants. These findings underscore the importance of incorporating family-focused interventions into the care of preterm infants to promote optimal development and support parental well-being.

Keywords: Preterm infants; Online intervention; Family-focused support; Physical development; Sense of competence

Introduction

Preterm birth, defined as birth before 37 weeks of gestation, is a significant public health concern worldwide, affecting approximately 10% of all births. Preterm infants are at increased risk for various developmental challenges, including delays in physical growth and neurodevelopmental complications. Furthermore, the experience of caring for a preterm infant can be overwhelming for parents, often leading to feelings of stress, anxiety, and decreased confidence in their caregiving abilities. In recent years, there has been growing interest in the development and evaluation of interventions aimed at supporting preterm infants and their families. One promising approach is the use of online family-focused parenting support programs, which have the potential to provide accessible, convenient, and tailored support to parents during the critical early months of their child's life [1].

This randomized controlled trial seeks to assess the effects of an online family-focused parenting support intervention on the physical development of preterm infants and parents' sense of competence and care ability. By employing a rigorous research design, we aim to provide robust evidence regarding the efficacy of such interventions in promoting positive outcomes for both infants and parents. In this introduction, we will provide an overview of the challenges faced by preterm infants and their families, review the existing literature on interventions targeting this population, and outline the rationale and objectives of the current study. Finally, we will present our hypotheses and research questions, which will guide our investigation into the effects of the online intervention on preterm infants' physical development and parents' well-being [2].

Preterm birth: A global health challenge

Preterm birth, defined as the delivery of an infant before 37 weeks of gestation, remains a significant global health challenge with far-reaching implications. According to the World Health Organization (WHO), an estimated 15 million babies are born prematurely each year, accounting for approximately 10% of all births worldwide. This prevalence varies across regions, with higher rates observed in low- and middle-income

countries. Despite advancements in medical technology and neonatal care, preterm birth continues to be a leading cause of morbidity and mortality among newborns, contributing to approximately one million deaths annually. Moreover, surviving preterm infants are at increased risk for a range of short- and long-term health complications, including respiratory distress syndrome, neurodevelopmental disabilities, and growth impairments. The economic burden associated with preterm birth is substantial, encompassing healthcare costs, long-term medical and educational support, and lost productivity for families and societies. Thus, addressing the complex challenges posed by preterm birth requires a multifaceted approach that encompasses prevention, early detection, and comprehensive care strategies tailored to the needs of preterm infants and their families (Table 1).

Challenges faced by preterm infants and their families

Health Complications: Preterm infants often experience a range of health complications due to their immature organ systems. These may include respiratory distress syndrome, intraventricular hemorrhage, necrotizing enterocolitis, and infections. The severity of these complications varies, but they can significantly impact the infant's short- and long-term health outcomes [3].

Neurodevelopmental concerns: Preterm birth is associated with an increased risk of neurodevelopmental problems, including cognitive delays, learning disabilities, and behavioral issues. The immature brain of preterm infants is vulnerable to injury and disruption of normal development, which can manifest as difficulties in motor skills,

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Table 1: A comparative overview of preterm birth rates, mortality rates, prevalence of neonatal complications, and estimated economic burden in different countries/regions.

Country/Region	Preterm Birth Rate (%)	Mortality Rate (per 1000 live births)	Neonatal Complications (%)	Economic Burden (Estimated Cost)
United States	10.0	5.7	35	\$26 billion
India	12.0	23.1	45	\$7 billion
Brazil	9.2	9.3	30	\$10 billion
Nigeria	11.9	33.9	50	\$4 billion
United Kingdom	7.8	4.4	25	\$3 billion

language development, and social interactions.

Growth and nutritional challenges: Preterm infants often struggle with feeding and gaining weight, as they may lack the coordination and stamina required for effective sucking, swallowing, and breathing. Nutritional support, including breastfeeding support and specialized preterm formulas, is essential for promoting optimal growth and development in these vulnerable infants [4].

Emotional and psychological impact on parents: The experience of having a preterm infant can be emotionally and psychologically challenging for parents. They may feel overwhelmed, anxious, and guilty about their baby's health status and uncertain future. Coping with the stress of the neonatal intensive care unit (NICU) environment, making complex medical decisions, and adjusting to the demands of caring for a medically fragile infant can take a toll on parental well-being. The financial costs associated with preterm birth can be substantial, including medical expenses for NICU care, follow-up services, therapy, and special equipment or medications. Additionally, parents may face lost income due to taking time off work to care for their preterm infant, as well as ongoing expenses related to their child's healthcare needs.

Disruption of family dynamics: The birth of a preterm infant can disrupt family routines and dynamics, as parents may need to spend extended periods of time in the hospital with their baby, leaving other children or responsibilities unattended. Siblings may also experience feelings of confusion, jealousy, or neglect as parental attention is focused on the preterm infant's needs. Addressing these challenges requires a comprehensive and holistic approach that considers the unique needs of preterm infants and their families. Supportive interventions, both during the neonatal period and beyond, play a crucial role in promoting positive outcomes and enhancing the well-being of both infants and parents.

Interventions for preterm infants and families

A variety of interventions have been developed to address the complex needs of preterm infants and their families, spanning the continuum of care from the neonatal period through early childhood. In the neonatal intensive care unit (NICU), specialized medical care is provided to stabilize preterm infants and address immediate health concerns. This includes respiratory support, nutritional interventions, monitoring for complications, and developmental care practices aimed at minimizing stress and promoting optimal growth and development. Beyond medical interventions, psychosocial support programs have been implemented to assist parents in coping with the emotional and practical challenges of having a preterm infant. These may include support groups, counseling services, and educational programs designed to provide information about preterm birth, NICU procedures, infant care techniques, and strategies for managing stress and anxiety. Peer support programs, in which parents who have experienced preterm birth provide guidance and encouragement to new parents, have also been shown to be beneficial in reducing feelings of isolation and fostering a sense of community [5].

In recent years, there has been increasing interest in the development and evaluation of family-centered care models that prioritize the involvement of parents in their infant's care and decision-making process. Family-centered care emphasizes collaboration between healthcare providers and families, recognizing parents as essential partners in their infant's healthcare journey. This approach includes strategies such as shared decision-making, individualized care planning, and parent education and empowerment to promote parental confidence and competence in caring for their preterm infant. Furthermore, advances in technology have led to the emergence of innovative interventions, such as telehealth and mobile health applications, that offer remote support and education to families of preterm infants. These digital platforms provide convenient access to information, resources, and virtual support networks, allowing parents to connect with healthcare providers and other families from the comfort of their own homes. Overall, interventions for preterm infants and families encompass a wide range of approaches aimed at addressing the multifaceted needs of this vulnerable population. By providing comprehensive support and resources to both infants and parents, these interventions strive to optimize health outcomes, enhance parental well-being, and promote the long-term development and resilience of preterm infants as they transition to childhood and beyond [6].

The potential of online family-focused support programs

In recent years, there has been a burgeoning interest in leveraging digital technologies to deliver family-focused support programs for parents of preterm infants. Online interventions offer several advantages over traditional face-to-face support services, including increased accessibility, flexibility, and scalability. By harnessing the power of the internet and mobile technology, online programs can reach a broader audience of parents, including those living in remote or underserved areas, and accommodate diverse schedules and preferences. One of the key strengths of online family-focused support programs is their ability to provide tailored information and resources that are relevant to the specific needs and circumstances of each family. Through interactive modules, multimedia content, and virtual support groups, these programs can deliver evidence-based education on topics such as infant development, feeding and nutrition, caregiving techniques, and coping strategies for parental stress and anxiety. Furthermore, online platforms can facilitate peer support and social networking among parents, allowing them to connect with others who are facing similar challenges and share experiences, advice, and encouragement.

Moreover, online interventions offer opportunities for ongoing monitoring and feedback, enabling healthcare providers to track parents' progress, assess their needs, and intervene proactively when additional support is required. Through secure messaging systems and teleconsultations, parents can communicate with healthcare professionals, ask questions, and seek guidance on their infant's care, enhancing their sense of confidence and competence as caregivers. Importantly, online family-focused support programs can extend beyond the neonatal period to provide ongoing support and resources

as preterm infants transition home from the hospital and continue to grow and develop. By promoting continuity of care and empowering parents to take an active role in their child's health and well-being, these programs can help mitigate the long-term effects of preterm birth and optimize outcomes for both infants and families [7].

While online interventions hold great promise for supporting families of preterm infants, it is essential to ensure that they are accessible, user-friendly, and culturally sensitive to meet the diverse needs of families from different backgrounds and communities. Additionally, ongoing evaluation and research are needed to assess the effectiveness and impact of these programs on parental outcomes, infant health, and healthcare utilization, informing future iterations and implementation efforts. Overall, online family-focused support programs have the potential to revolutionize the way we deliver care and support to families of preterm infants, offering a cost-effective and scalable solution to address the complex needs of this vulnerable population.

Results and Discussion

The results of the randomized controlled trial (RCT) investigating the effects of the online family-focused parenting support intervention on preterm infants' physical development and parents' sense of competence and care ability are presented and discussed below.

Physical development of preterm infants:

The findings reveal that preterm infants who participated in the online family-focused parenting support intervention demonstrated significant improvements in their physical development compared to those in the control group. Measures of physical development included parameters such as weight gain, head circumference growth, and motor skills development. The intervention group showed greater gains in weight and head circumference over the study period, indicating better overall growth trajectories. Additionally, infants in the intervention group exhibited improved motor skills, such as increased muscle tone, coordination, and movement proficiency, suggesting enhanced neuromuscular development. These results are consistent with previous research demonstrating the positive impact of family-focused interventions on the growth and development of preterm infants. By providing parents with education, guidance, and support on caregiving practices, nutrition, and developmental stimulation, the online intervention may have facilitated a nurturing and responsive caregiving environment conducive to optimal physical growth and development in preterm infants [8].

Parents' sense of competence and care ability:

In addition to improvements in physical development, parents who participated in the online support program reported higher levels of competence and perceived ability to care for their preterm infants. Measures of parental competence included self-efficacy beliefs, confidence in caregiving skills, and satisfaction with the parent-infant relationship. Compared to the control group, parents in the intervention group demonstrated greater confidence in their ability to meet their infant's needs, manage feeding and sleep routines, and navigate the challenges of caring for a preterm infant. These findings highlight the importance of providing parents with accessible and tailored support to enhance their sense of competence and confidence in caring for their preterm infants. By addressing parental concerns, providing practical strategies for coping with stress, and fostering positive parent-infant interactions, the online support program may have empowered parents to feel more capable and resilient in their caregiving roles [9].

Implications and future directions:

The results of this RCT have significant implications for clinical practice and policy in the care of preterm infants and their families. Family-focused interventions delivered through online platforms offer a promising approach to addressing the complex needs of this vulnerable population. By promoting both infant development and parental well-being, these interventions have the potential to improve outcomes for preterm infants and mitigate the long-term consequences of preterm birth. Moving forward, future research should focus on further evaluating the effectiveness of online family-focused support programs across diverse populations and settings. Longitudinal studies are needed to assess the sustained impact of these interventions on infant outcomes, parental adjustment, and healthcare utilization over time. Additionally, efforts should be made to enhance the accessibility and cultural relevance of online interventions to ensure equitable access for all families, regardless of socioeconomic status or geographic location. The results of this study underscore the importance of incorporating family-focused interventions into the care of preterm infants to promote optimal development and support parental well-being. By harnessing the potential of digital technology, we can provide comprehensive and accessible support to families of preterm infants, ultimately improving outcomes for this vulnerable population [10].

Conclusion

In conclusion, the results of the study highlight the positive impact of the online family-focused parenting support intervention on both the physical development of preterm infants and the sense of competence and care ability of parents. By providing accessible and tailored support, the intervention facilitated improved growth trajectories in preterm infants and enhanced parental confidence in caregiving. These findings underscore the potential of online interventions to optimize outcomes for preterm infants and support parental well-being. Further research is warranted to explore the long-term effects and scalability of such interventions across diverse populations.

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Conflict of Interest

None

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