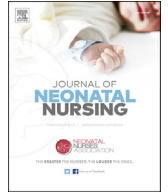




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Original Article

The effect of maternal participation in preterm's care and improved short-term growth and neurodevelopment outcomes

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ABSTRACT

This study aimed to test the effectiveness of the Maternal Participation Program (MPP) on growth and neurobehavioral development of preterm infants. The hypothesis was that preterm infants whose mothers were in the experimental group demonstrated better growth and neurobehavioral development than the control group. Double-blind randomized control trial evaluated 50 mothers whose preterm infants were hospitalized in the neonatal intensive care unit, a university hospital. Mothers were randomly assigned into two groups (experimental group = 25; control group = 25). The experimental group received the usual nursing care and the MPP, and the control group received only the usual nursing care. Preterm infants in the experimental group showed significantly higher weight gains, weight gain velocity, and growth velocity between 14 and 28 days after birth; as well as better neurobehavioral development at days 14 and 28. The effectiveness of the MPP to promote the growth and neurobehavioral development of preterm infants was proven.

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Introduction

The incidence of preterm infant's birth in Thailand is currently high (The National Statistical Office Thailand, 2013). The survival rate of this group has also increased due to advances in medical technology and nursing care. Yet, the survival of preterm infants is accompanied by a high risk of health problems due to their immaturity (Browne, 2004). Thus, they require special care in a neonatal intensive care unit (NICU).

Being hospitalized in an NICU, preterm infants are in a different environment from the maternal womb. NICU environments expose vulnerable preterm infants to potentially harmful stimuli resulting in both short and long-term negative effects on their growth and development (Sullivan et al., 2012), especially neurobehavioral development problems (Braga and Sena, 2012; Schlapbach et al., 2012). For growth, the time from birth to 28 days of life is the important period for preterm infants to catch up (LaHood and Bryant, 2007), and the third to fourth week of their life is the critical period for a growth spurt. Slow growth rate and poor postnatal growth of preterm infants during hospitalization are associated with altered neurodevelopmental outcomes (Ong et al.,

2015; Roze et al., 2012).

Maternal stimulation is one of the beneficial methods to enable preterm infants to achieve normal neurodevelopment (Holditch-Davis and Blackburn, 2014). This activity increases synaptogenesis and can improve preterm infant's neurobehavioral status (Lester et al., 2011; Volpe, 2008). However, hospitalized preterm infants in an NICU miss a chance to establish bonding to their mothers after birth (Aagaard and Hall, 2008; Stefana and Lavelli, 2017). Longitudinal studies demonstrated that neurobehavioral outcomes of preterm infants at later stages were significantly improved after empowering mothers to participate in caring for their infants (Welch et al., 2014; Welch et al., 2015). Thus, including mothers in the care of the preterm infants in an NICU is a crucial and beneficial element to support the most appropriate growth and development of preterm infants. Unfortunately, mothers are commonly restricted from providing appropriate care for preterm infants in an NICU (Hall et al., 2013; Lasiuk et al., 2013).

In Thai culture, mothers normally refrain from getting involved in caring for their infants in NICU. In previous studies among Thai mothers in northern Thailand, who participated in caring for their infants in an NICU, stated their need to perform more infant care activities (Pholanun et al., 2013; Taya et al., 2007). It was also found that Thai parents had their own ways in providing care for their hospitalized child, and they asked less for assistance and knowledge than Western parents who participated in caring for their

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child (Pongjaturawit & Harrigan, 2003). In previous studies, the samples were not randomly assigned into control and experimental groups, the intervention duration was inconsistent (Damrongrak et al., 2012; Singkla, 2007), and none of the studies focused on the health outcomes of preterm infants. Currently, there is no specific comprehensive intervention for maternal participation in the care of preterm infants in Thailand. However, cultural awareness and sensitivity should be employed so as to delineate the cultural underpinnings of maternal participation in Thai culture.

In this study, the researcher developed the MPP based on the Neonatal Integrative Developmental Care (IDC) model (Altimier and Phillips, 2013), with consideration of Thai culture for enhancing growth and neurobehavioral development of NICU preterm infants through maternal participation. The purpose of this study was to test the effectiveness of the MPP on the short term growth and neurobehavioral development of preterm infants. Thus, the objectives of this study were to compare growth and neurobehavioral development of preterm infants between groups whose mothers receiving the usual nursing care plus the MPP and those receiving only the usual nursing care.

Theoretical framework for development of the maternal participation program

The MPP was developed by the researcher based on the conceptual framework of the Neonatal Integrative Developmental Care (IDC) model (Altimier and Phillips, 2013). The IDC model provides guidelines to promote neuroprotective intervention for preterm infants. The central core neuroprotective intervention is partnering with the family to perform the six care practices for preterm infants: 1) creating a healing environment by minimizing the impact of the artificial extrauterine environment in an NICU, 2) providing fetal positioning and supporting the preterm infant to have autonomic stability during handling, 3) minimizing stress and pain to improve physiological stability-enhanced regulation in preterm infants, 4) promoting and safeguarding sleep to prolong periods of uninterrupted sleep, 5) protecting skin, and 6) optimizing nutrition by promoting breast feeding.

The MPP has three key components of the intervention process including psychosocial support, parent education, and therapeutic developmental interventions aiming to improve the growth and neurobehavioral development of preterm infants (Benzies et al., 2013). Psychosocial support refers to assisting, facilitating, and encouraging mothers to participate in caring for their infants by nurse. Parent education refers to teaching the content of the six care practices for preterm infants indicated above. Lastly, therapeutic developmental interventions aim to improve growth and neurobehavioral development of preterm infants, and refer to the participation activities by mothers pertaining to performance of the six care practices.

Methods

Development and content of the of the Maternal Participation Program (MPP)

The intervention in the MPP was developed by integration of the three key components including psychosocial support, parent education, and therapeutic developmental interventions targeting infants in this study. The MPP had activities of 4 weeks duration. Application of the intervention was divided into two sets of infants: preterm infants of 28–30 wk gestations and preterm infants of 31–32 wk gestations. The activities were performed by the researcher who is an NICU nurse. The activities consisted of four, 1-hr teaching sessions, and four, 1-hr practice sessions, along with

assisting, facilitating, and encouraging mothers to participate in the six care practices for preterm infants indicated above which were provided within those sessions. Table 1 illustrates the MPP activities.

The program consisted of two main components led by researcher: (a) education pertaining to the preterm infant's neuroprotective care, and (b) an improved care-giving strategies including facilitation, assistance, and encouragement. Teaching and practice sessions were conducted by means of media, including the education plan, multi-touch interactive multimedia, and a handbook with relevant information on practicing learned skills. Steps of implementing the MPP were offered for 4 wk. The feasibility and acceptability of the MPP was assessed via conducting a pilot study that was tested with mothers of three preterm infants using the same criteria of the participants in this study. The results of the pilot test indicated the feasibility and acceptability of the MPP.

Design

The RCT, two-group pretest-post-test design, with the double-blind technique, was used to test the effectiveness of the MPP on preterm infant growth and neurobehavioral development.

Participants

Mother-preterm infant dyads were recruited with the following inclusion criteria for the mother: 1) being 18 years of age or older, 2) being able to read and speak Thai, 3) giving birth of the preterm infant with the gestational age of between 28 wk and 32 wk based on the New Ballard score, and 4) having a first time hospitalized preterm infant in the NICU with anticipation of survival, no congenital anomaly, birth weight of less than 2500 g, singleton birth, and born at the study site. After the recruitment, 50 mothers were randomly assigned into experimental and control groups using permuted-block randomization, 25 in each group. The study groups were blinded to the research assessor and statistical analyst.

Measures

Demographic variables

Mothers were asked to complete the personal data profile including age, educational level, occupation, marital status, family income, type of delivery, and duration of admission. For infants', the researcher collected data from their medical records on the first admission to the NICU. Data included gender, gestational age, birth weight, infants' size for gestational age, order of preterm infants, APGAR score in the first minute and the fifth minute, diagnosis, CRIB score, nutrition type, enteral feeding intake, energy intake, day of full feeding retained umbilical catheter, duration of hospitalized admission, and duration of NICU stay.

Maternal participation activities

The researcher evaluated mothers' participation level in infant care using the Maternal Participation in Caring for Preterm Infant's Checklist (MPCPI) on 14 and 21 d after the infant's birth. The MPCPI is a dichotomous checklist of six care practice activities and 16 items developed by the researcher. The content validity of the MPCPI checklist was 0.94, and the Cronbach's alpha coefficient was 0.84 at the 14th day after infant birth. The total score was used to measure the level of maternal participation activities of participants with feedback. In cases where the mothers' overall participation level was less than 95%, the researcher and participants conducted discussions to eliminate any causes or barriers preventing participation in care practices with their preterm infant.

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