Study protocol on the Application of Family-Integrated Care Guided by Swanson's Caring Theory in the Care of Preterm Infants

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Background and significance

Premature infants are defined as those born before 37 weeks of gestation. Their growth and development require more meticulous attention and specialized care. Due to underdeveloped organs and weakened immune systems, family members often lack a comprehensive understanding of the unique needs of preterm infants within traditional medical care settings, which may lead to gaps or deficiencies in the caregiving process. The involvement and supportive role of the family are often insufficient, making it difficult to meet the complex care requirements of premature infants in the neonatal intensive care unit (NICU). Currently, the family-centered care model is widely implemented in clinical practice and has demonstrated positive outcomes in improving care quality and patient outcomes.

The care of premature infants necessitates collaborative efforts between healthcare professionals and family members. This study introduces a family-participatory care model grounded in Swanson’s theory of caring. By fostering greater family involvement and initiative, caregivers can develop a deeper understanding of the infants’ specific care requirements and design individualized care plans accordingly. This approach holds significant value in supporting the physical development of premature infants and preserving the psychological well-being of their families.

The comprehensive implementation of this project can deliver tailored services to premature infants and their families, more effectively addressing their specific care requirements. By adopting a more professional and individualized care approach,

premature infants can experience a greater sense of security, while the psychological stress on their families can be alleviated. The family-centered care model encourages active involvement of family members in the caregiving process. Through hands-on experience and guided practice, family members can acquire essential skills for caring for premature infants. Close collaboration between family members and healthcare professionals significantly enhances the overall effectiveness of care. Furthermore, this collaborative environment fosters stronger trust and mutual support among family members, enabling premature infants to achieve faster and more stable recovery under scientifically guided care.

Furthermore, the promotion of a family-integrated care model can enhance the professional competence and communication abilities of healthcare personnel, foster close collaboration between families and medical institutions, and encourage innovative thinking among medical staff in the care of premature infants, thereby promoting mutual development and improved outcomes. Therefore, this project not only effectively improves the health outcomes of premature infants and enhances the well-being of their families, but also contributes to the innovation of care models in nursing practices and provides a theoretical foundation for the advancement of premature infant care services.

The current research status and development trends

Akturk U (2018) proposed [1] the establishment of a multidisciplinary care intervention team comprising nurses, physicians, and psychological counselors. Prior to the implementation of the intervention, the psychological counselor should conduct comprehensive training for the entire team. During this phase, the team would collaboratively review and clarify the theoretical foundations of Swanson's theory, essential caregiving skills, and the psychological characteristics of patients. Based on this foundational work, an effective care framework and operational mechanism can be developed, ultimately enhancing the overall quality of patient care.

Health literacy serves as a critical foundation for delivering high-quality healthcare. Improving the health literacy of patients and caregivers can enhance the

efficiency and effectiveness of care delivery. According to the World Health Organization, individual health literacy encompasses the knowledge, motivation, and skills that enable individuals to access, understand, and apply health information and services in order to promote and sustain their health [2]。

Swanson's theory was developed by the distinguished British professor Swanson. The theoretical framework is primarily inspired by three phenomenological studies [3]. First, it explores which types of caregiving behaviors are most beneficial for pregnant women who have experienced unsuccessful childbirth. Second, it investigates the care requirements of new parents and the corresponding caregiving behaviors exhibited by caregivers. Finally, the theory establishes a caregiving model tailored for high-risk pregnant women—such as first-time mothers, single parents, and individuals with low educational attainment or socioeconomic status. Following the implementation of the intervention, these women demonstrated a significant improvement in their ability to care for their newborns.

Professor Swanson proposed that, with regard to care behaviors, caregivers should actively acquire an understanding of the identities of the service recipients, the methods of providing effective care, and the rationale behind their ongoing service provision. Furthermore, caregivers are expected to integrate multidisciplinary knowledge, including aspects of caregiving and humanistic concern [4]

Currently, the Swanson theory has gained widespread popularity and demonstrated favorable outcomes in practical applications. Studies indicate that international scholars have extensively applied this theory across various domains, including maternal care for pregnant and postpartum women, rehabilitation for individuals with limb dysfunction, mental health support for those experiencing post-traumatic stress disorder, and management of patients with hypertension [5]. However, its implementation within China remains in the early stages.

Most NICU operate in a closed format without accommodating parental presence or active involvement [6]. Nevertheless, in such settings, nursing staff typically assume primary caregiving responsibilities, while parents remain largely excluded from the care process. Consequently, caregivers often experience heightened anxiety and

insufficient preparedness following the discharge of preterm infants, which may result in significant caregiving challenges.

FI Care [7] emphasizes that parents should assume the primary responsibility for caring for premature infants in the NICU and asserts that they should serve as the principal caregivers and decision-makers. Research indicates that a family-centered care approach can significantly alleviate parental stress and anxiety. The United States has developed a data collection platform to support research on family-participatory care models [8], offering a valuable resource for parents who are unable to visit hospitals to understand the care requirements of premature infants. This indicates that international research on family-participatory care models began earlier and was conducted on a larger scale, thereby providing both theoretical foundations and practical guidance for enhancing parental caregiving capabilities.

Research Topics and Technological Approaches

3.1 Main topic

The care of premature infants represents a multifaceted challenge that involves not only physical and mental health aspects but also broader socio-economic considerations. Swanson's Caring Theory is a well-established nursing framework that emphasizes the provision of comprehensive and systematic care, centered on principles such as understanding, companionship, support, empowerment, and the preservation of hope. This study seeks to investigate the application and impact of Swanson's Caring Theory within the context of family-participatory care for premature infants.

The care process is guided by the five core principles of Swanson's Theory of Caring. 1. Knowing: Provide the family with a comprehensive explanation of the preterm infant's development, potential complications, and essential care considerations to ensure they have a thorough understanding of neonatal care requirements. 2. Being with: Offer consistent emotional presence and companionship to the family within the NICU setting, aiming to alleviate feelings of anxiety and helplessness while fostering a relationship of trust. 3. Doing for: Support and guide family members in actively participating in the infant's daily care routines, including

feeding, diaper changing, and basic physical assessments. 4. Enabling: Acknowledge and validate the emotional challenges experienced by the family, provide appropriate psychological support, and assist them in accessing relevant social and professional resources. 5. Maintaining belief: Foster a sense of hope and resilience by maintaining open, positive communication and encouraging the family to remain optimistic about the infant's progress and their own capacity to cope with challenges.

The impact of family-involved care on premature infants was assessed through various indicators, including infant health outcomes such as growth and development metrics (e.g., weight, height, and head circumference), the psychological well-being of family members, objective evaluations of caregiving quality (such as accuracy and timeliness of care delivery), and family satisfaction surveys.

3.2 Technological Approaches

1. Family participation

Family participation constitutes a central principle in family-centered care. It is essential to appropriately evaluate the extent of family members' involvement in daily caregiving practices, in order to ensure their rightful role and accountability in the care process and to facilitate their comprehensive understanding of the unique needs of preterm infants. This evaluation can be systematically conducted through family-administered questionnaires, observational metrics, and assessments performed by healthcare professionals.

2. Communication skills

A comprehensive understanding and continued adherence to Swanson's Caring Theory highlight the critical role of effective communication in the caregiving process. Enhancing the communication abilities of both healthcare professionals and family members, as well as engaging in thorough communication regarding the infant’s needs and care procedures, contributes to the establishment of genuine trust and minimizes communication barriers throughout the care delivery.

3. Emotional Empowerment

This serves as a critical technical indicator for assessing the suitability of family members for participation in patient care, particularly in cases involving emotional

disturbances or mental health conditions within the family. It necessitates that healthcare professionals possess specialized emotional support capabilities and the ability to provide appropriate guidance. Through open and empathetic communication, medical staff should progressively adapt to the evolving needs of the patient's family.

4. The correctness of care operations

The care of premature infants requires a high level of professional expertise. Errors in care procedures can easily cause serious harm to the infants. Therefore, it is very necessary to assess and record the correctness of care procedures, as well as the improvement of skills of family members during the process of learning and familiarizing themselves with the care procedures.

5. The timeliness of care

As premature infants are a high-risk group, their health conditions may change dramatically. It is very important to assess the timeliness of care, which can help detect and solve problems in the early stage. The missed visit count method can be used to statistically record the timeliness of care.

Research Plan, Technical Approach, Organizational Structure

4.1 Research Plan

1. Inclusion and exclusion criteria

The inclusion criteria were as follows: gestational age ranging from 28 to 36 weeks, stable vital signs for at least 24 hours, and parental accompaniment of preterm infants during hospitalization. The exclusion criteria included: preterm infants with severe congenital or genetic disorders, dysfunction of vital organs, or requiring mechanical life support; preterm infants requiring surgical intervention; and preterm infants with a birth weight below 500 grams.

2. Intervention and Control

FICare nursing method guided by Swanson's caring theory encompasses the following five dimensions:

Understanding: A neonatologist provided a comprehensive explanation regarding the developmental progress of premature infants, potential complications, and essential aspects of nursing care to ensure the family gained a thorough understanding

of the care requirements for premature infants.

Accompaniment: Two nursing guides provided essential support to parents of newborns in the NICU, helping to alleviate the anxiety and sense of helplessness among family members and fostering a relationship of trust between the medical staff and the families.

Help: A neonatal nurse played a guiding role in facilitating parental involvement in the daily care of premature infants, which encompassed feeding guidance, introduction of complementary foods, skin care, and related aspects.

Empowerment: A psychological counselor was assigned to provide psychological counseling and guidance to new parents, offering appropriate emotional support and assisting them in accessing necessary social and professional resources.

Maintaining Confidence: A neonatologist and a nurse monitored neonatal development through outpatient visits and telephone follow-ups to encourage families to sustain their confidence in improving infant health outcomes and to support them in maintaining a positive outlook when facing challenges in caregiving.

The control group will continue to receive the traditional model of hospital care, encompassing standard medical services such as physical health monitoring and nutritional support.

3. Outcome

The primary outcomes included the corrected head circumference, weight, and height of the newborns at 1 month, 3 months, and 6 months of age. Additionally, parental anxiety and depression status was assessed using the Trait Anxiety Inventory (T-AI), which measures long-term and stable anxiety tendencies, and the State Anxiety Inventory (S-AI), which evaluates current or recent anxiety states. Parental self-efficacy and satisfaction with their parenting role were assessed using the Child-Parental Self-Competence Scale (C-PSOC).

Secondary outcomes included the length of hospital stay, discharge weight, and the number of unplanned hospitalizations.

Confounding factors included fetal gender, gestational age, birth weight, duration of oxygen therapy, duration of total enteral feeding, and the duration required to

transition from full enteral feeding to full oral feeding, defined as the time from the initiation of oral feeding (when preterm infants begin to suck voluntarily and consume the first milk volume exceeding 5 mL) to the complete establishment of full oral feeding.

4. Sample Size Calculation

With the assistance of Select Statistical Services (https://select-statistics.co.uk/calculators/sample-size-calculator-two-means/), the sample size was determined. This calculation utilizes the following formula to compute the sample size n:

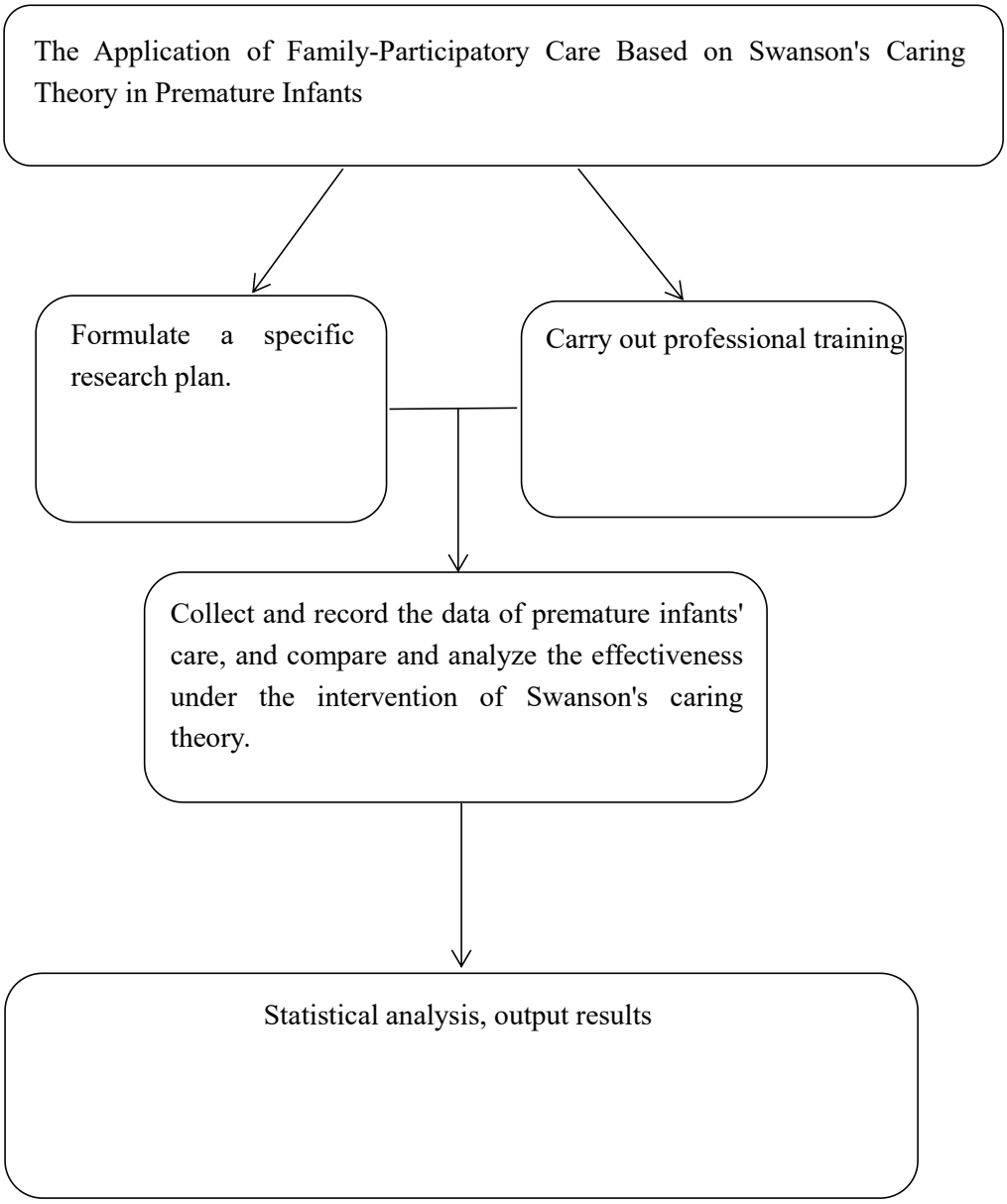
$$n=\frac{2\times(Z_{\alpha/2}+Z_{\beta})^2\times\sigma^2}{d^2}$$

Among them, "$Z_{\alpha/2}$" denotes the critical value of the standard normal distribution at α/2 (for a 95% confidence level, α = 0.05, and the corresponding critical value is 1.96); "Z_{β}" denotes the critical value of the standard normal distribution at β (for a statistical power of 80%, β = 0.2, and the corresponding critical value is 0.84); "σ^2" represents the population variance, which is set at 2.5; and "d" refers to the minimum detectable difference, which is set at 1.5 for the primary outcome analysis. Based on these parameters, the required minimum sample size per group is calculated to be 18 participants.

5. Statistical Analysis

Measurement data that conformed to a normal distribution were expressed as mean ± standard deviation (SD). Independent sample t-tests and paired sample t-tests were employed to assess intergroup statistical differences. For measurement data that did not conform to a normal distribution, results were summarized as median (interquartile range), and the Mann-Whitney U test was applied to evaluate statistical differences between groups. Categorical data were presented as frequency and percentage [n (%)] and analyzed using the chi-square test. Repeated measurement data were examined using repeated measures analysis of variance (ANOVA). All statistical analyses were conducted using SPSS version 25.0.

4.2 Technical Approach



4.3 Organizational mode

The project leader assumes responsibility for the planning, coordination, and supervision of the entire research process, including decision-making, resource allocation, and risk management. The research focuses on preterm infants, and the project leader is tasked with applying for research sites and securing necessary equipment support. Additionally, the leader collaborates with relevant departments and institutions to promote the implementation of family-participatory care based on Swanson's Caring Theory in the context of preterm infant care. Other project members are assigned specific responsibilities, such as data collection, care

intervention, and outcome analysis. Furthermore, the project's progress and outcomes are regularly evaluated and monitored. Based on these evaluations, the research plan and intervention strategies are adjusted in a timely manner to ensure the study's effectiveness and feasibility.

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