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Neonatal Developmental Care Model For Health Workers And Its Effectiveness On Premature Infant Development In Hospitals

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ABSTRACT

Background: The development of premature babies often faces special challenges that require intensive attention from health workers. The neonatal developmental care model is designed to support health workers in providing appropriate interventions to accelerate the optimal development of premature babies in hospitals. **Objective:** to determine the knowledge and attitudes of health workers about the neonatal developmental care model for health workers towards the development of premature babies in the NICU Room in hospitals before and after training. **Method:** The research method used a quasi-experimental approach with a pre-test and post-test with a population of all nurses and midwives on duty in the NICU Room of Undata Hospital and Anutapura Hospital, Palu, totaling 50 people. This study was conducted from January to September 2024 in the NICU Room of Undata Hospital and Anutapura Hospital, Palu, Central Sulawesi. Knowledge and attitude data were measured using a questionnaire (pre-test and post-test). **Results:** The results of the analysis using the Wilcoxon test obtained an increase in the score on the knowledge variable before and after training with an average (Mean Rank) of 19.50, on the attitude variable there was an increase in the score before and after training with an average increase (Mean Rank) of 20 with a significance value of p-value on both attitude and knowledge variables of 0.000 <0.05. Conclusion: there is an effect of premature infant development care training on the level of knowledge and attitudes of nurses before and after training. **Suggestion:** the neonatal development care model is effective in improving the development of premature infants in hospitals. Implementation of this model by health workers can be an important strategy in efforts to reduce morbidity and mortality of premature infants and improve their quality of life in the long term.

Keywords: developmental care model_ health worker_knowlede_attitude

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INTRODUCTION

Premature birth remains a global health problem, with around 15 million cases annually. Indonesia ranks fifth worldwide with approximately 675,700 premature births each year (Browne et al., 2020). Neonatal mortality in NICUs is still high due to limited readiness of services and human resources.

Developmental care is an evidence-based approach designed to reduce stress, support neurodevelopment, and engage families in neonatal care. Several models have been developed internationally, including Developmental Supportive Care (DSC), NIDCAP, IBAIP, Universal Developmental Care (UDC), and the Neonatal Integrated Developmental Care Model (NIDCM) (Altimier, 2011; Coughlin et al., 2019; Sathish et al., 2019). These models have demonstrated benefits such as improved neurodevelopment, reduced parental stress, and shorter hospital stays (Syamsu, 2021).

In Indonesia, implementation of developmental care in hospitals remains suboptimal due to the absence of structured certification programs such as the *Wee Care Neuroprotective NICU Program* (Austin, Downing, & Hastings-Tolsma, 2019). Many NICU health workers also lack adequate training and certification in neonatal life support and developmental care (Mutmainah et al., n.d.).

Given the absence of localized programs, research on developmental care models in Indonesia is limited. This study therefore aimed to develop and evaluate a neonatal developmental care model to improve knowledge and attitudes of NICU health workers, providing novelty in its contextual application.

METHOD

This study employed a quasi-experimental pre–post test design without a control group. The research was carried out in the Neonatal Intensive Care Units (NICUs) of RSUD Undata and RSU Anutapura, Palu, Central Sulawesi, Indonesia, from January to September 2024. The population consisted of all nurses and midwives working in the NICUs of both hospitals, and a total of 50 participants were recruited using a total sampling technique. Inclusion criteria included health workers who had worked in the NICU for at least six months and agreed to participate in the study.

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The intervention was the Neonatal Developmental Care Model training, which covered key components such as sleep protection, positioning and nesting, minimal handling, pain management, noise reduction, facilitated tucking, and parental involvement. The training was conducted by neonatal nurse specialists through lectures, demonstrations, and guided practice sessions.

Data were collected using structured and validated questionnaires. Knowledge was assessed with 25 items, while attitudes were measured with 20 items related to neonatal developmental care. A pre-test was administered prior to the training, followed by a post-test immediately after the intervention to measure changes in participants' knowledge and attitudes.

The data were first tested for normality using the Kolmogorov–Smirnov test, which indicated that the data were not normally distributed. Therefore, the Wilcoxon signed-rank test was used to analyze differences between pre-test and post-test scores, with a significance level set at $p < 0.05$.

RESULTS

Based on age, most respondents were in the 26–35 years group, totaling 19 respondents (50%). This was followed by 16 respondents (42.1%) aged 36–45 years, 2 respondents (5.3%) aged 46–55 years, and 1 respondent (2.6%) over 55 years old.

Regarding length of work, the majority of respondents had more than 10 years of work experience (16 respondents, 42.1%). Another 13 respondents (34.2%) had worked for 5–10 years, while 6 respondents (15.8%) had less than 1 year of experience, and 3 respondents (7.9%) had 1–4 years of experience.

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Table 1. Distribution of Knowledge Levels Before and After Developmental Care Training for Premature Infants (n = 38)

Knowledge Level	**Pre-test f (%)**	**Post-test f (%)**
Good	0 (0.0)	22 (57.9)
Moderate	10 (47.4)	16 (42.1)

Before the training, more than half of the respondents (20 respondents, 52.6%) had a poor level of knowledge, while 10 respondents (47.4%) had a moderate level of knowledge, and none had a good level of knowledge.

After the training, there was a marked improvement in knowledge levels, with 22 respondents (57.9%) achieving a good level of knowledge and 16 respondents (42.1%) having a moderate level of knowledge. Notably, no respondents remained in the poor knowledge category.

Table 2. Distribution of Attitudes Before and After Developmental Care Training for Premature Infants (n = 38)

Knowledge Level	**Pre-test f (%)**	**Post-test f (%)**
Good	0 (0.0)	22 (57.9)
Moderate	10 (47.4)	16 (42.1)

Based on Table 2, before the training most respondents were in the unfavorable category (36 respondents, 94.7%). After the training, the majority shifted to the favorable category, with 34 respondents (89.5%).

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Table 3. Effect of Neonatal Developmental Care Training on Knowledge and Attitudes (Wilcoxon Signed-Rank Test, n = 38)

Variable	Mean Rank	Sum of Ranks	p-value	Interpretation
Knowledge	19.50	741.0	0.000	Significant
Attitude	20.00	740.0	0.000	Significant

Based on Table 3, the Wilcoxon signed-rank test showed an increase in knowledge scores before and after the training with a mean rank of 19.50. Similarly, attitude scores also increased with a mean rank of 20.00. The significance value for both variables was $p = 0.000$ (< 0.05), indicating that neonatal developmental care training had a significant effect on improving both knowledge and attitudes of nurses.

DISCUSSION

The results of this study showed that neonatal developmental care training significantly improved both knowledge and attitudes of nurses, with mean rank values of 19.50 for knowledge and 20.00 for attitudes ($p < 0.05$). This finding confirms that structured training interventions are effective in enhancing the competence of NICU health workers.

This study is consistent with the findings of Agustina & Rustina (2017), who reported significant differences in nurses' knowledge and skills between intervention and control groups after developmental care training. Similarly, Altimier, Kenner, and Damus (2015) demonstrated the effectiveness of the *Wee Care Neuroprotective NICU Program*, which showed that training improved nurses' confidence in applying developmental care. In another study, Milette et al. (2005) highlighted that nurses positively welcomed developmental care training, with more than two-thirds actively participating and showing significant improvements in seven out of twelve measured variables, particularly those related to attitudes.

According to cognitive theory (Schunk, 2022), new knowledge must be integrated with existing knowledge to form deeper understanding. This aligns with the present study, where nurses initially had limited understanding of developmental care concepts but showed significant improvement after structured training sessions. Developmental care is designed to

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reduce stress in premature infants, stabilize physiological functions, support sleep–wake cycles, and promote neurodevelopment (Altimier & Phillips, 2016; Sizun & Westrup, 2004). Despite its proven benefits, developmental care is still not widely implemented in many low- and middle-income countries, including Indonesia (Fitri et al., 2024).

Previous studies have identified barriers to the implementation of developmental care, such as lack of training, negative attitudes, limited clinical exposure, and resistance to change (Mosqueda-Peña et al., 2016; Kim & Kim, 2018). Organizational and systemic factors, including workload, staffing, and lack of institutional support, further hinder its adoption (Austin et al., 2019; Zhang et al., 2016). On the other hand, supportive organizational culture, professional efficacy, and positive perceptions of developmental care have been shown to facilitate its implementation (Park & Kim, 2019; Aydoğdu, 2023).

The training model developed in this study addressed these gaps by providing a structured curriculum with eight key components: sleep protection, pain management, family collaboration, healing environment, positioning and handling, nutritional optimization, skin protection, and teamwork. This model, adapted from NIDCM and DSC frameworks, emphasizes family-centered care and interprofessional collaboration, which are crucial in neonatal intensive care (Altimier & Phillips, 2016; Sathish et al., 2019).

Overall, the findings highlight the importance of systematic and context-specific developmental care training to strengthen nurses' competence, promote family involvement, and improve the quality of care for premature infants in NICUs.

CONCLUSION(S)

` This study demonstrated a significant improvement in the knowledge and attitudes of health workers after receiving training on the neonatal developmental care model for premature infants in the NICU. The findings highlight the importance of structured developmental care training in strengthening nurses' competence and readiness to provide neuroprotective, family-centered care.

Conflict of Interest

The author(s) declare that they have no conflict of interest.

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