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The Application of Developmental Care by Providing Snuggle Up positioning in BBLR-Premature Infants

Muhammad Fajar Ratanca Duri[1], Reni Ilmiasih[2]
[1,2]Faculty of Health Sciences, University of Muhammadiyah Malang, Indonesia

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Abstract

One of the main causes of death in neonates is low birth weight (LBW), which is the condition of babies with birth weight < 2500 grams from gestational age < 37 weeks. Problems that often occur in LBW are thermoregulation disorders, respiratory disorders, nutritional disorders and others. This case study was conducted to describe developmental care interventions on the comfort level of premature LBW infants. This study used a case study design with an evidence-based practice implementation approach that focuses on interventional nursing. The study was conducted in the NICU of RSU UMM on 24-26 October 2023. The participants in this study were Baby Mrs. P aged 0 years, 0 month, 0 days, male, with LBW-Premature. Measurement of comfort level using NIPS and Comfort-B Scale through physical examination and observation every 7 hours for 3 days. Patient observation showed that there was a decrease in pain level and an increase in the baby's comfort level every day. This could be seen from the NIPS score on the first day of treatment from 7 points (severe pain) to 0 points (no pain) on the third day, and the Comfort-B score from 25 points (moderate comfort) to 8 points (high comfort). The application of Snuggle up Position can effectively reduce the level of pain scale and increase the comfort scale in LBW-premature infants in the hospital.

✉Correspondence Address:
University of Muhammadiyah Malang – East Java, Indonesia
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INTRODUCTION

The incidence of babies with Low Birth Weight (LBW) is a health problem that still requires more attention in various countries, especially in developing countries (Suryani, 2020). LBW is a global problem that must be paid attention to by all sectors. LBW is a condition where babies are born with a body weight of <2500 grams (WHO, 2019). LBW treatment is very important to anticipate the risk of problems with subsequent growth and development, such as respiratory problems (apnea, hypoxia, respiratory distress syndrome), nervous weakness, hearing loss, hypothermia, hyper bilirubin, heart problems, low body resistance, lack of nutrition, hampered cognitive development, and leading to the risk of neonatal death (Tarigan et al., 2012). The infant mortality rate (IMR) under 1 year is a very important health indicator. Newborn babies in the first 0 to 28 days of life are called neonates (Nadila et al., 2022). The main causes of neonatal death include LBW babies, premature births, complications related to in partum, infections and birth defects. Other factors that influence infant mortality include gestational age, type of delivery, economic status, poor nutrition (Esmaeilzadeh et al., 2021).

Currently, LBW babies are an important public health problem because they are a risk factor that contributes to infant mortality. The incidence of LBW in the world has reached more than 20 million live births per year (15.5%), with 96.5% of them occurring in developing countries (WHO, 2014). The East Asia and Asia Pacific regions rank third in terms of LBW live births. Overall, 18% of LBW babies were born in the Asian region. Based on data from the 2020 Maternal and Child Health Profile, the percentage of mothers who gave birth to LBW children between 2018 and 2020 experienced fluctuations. In 2018 the LBW percentage showed 13%. Meanwhile, in 2019 the percentage of LBW decreased to 11.32% and in 2020 the percentage of LBW increased to 11.37% (Sari, 2022). In 2020, LBW was recorded as the biggest cause of neonatal deaths reaching 35.2% compared to other causes such as asphyxia, infection, congenital abnormalities and others (Kemenkes, 2022). Apart from that, according to the Badan Pusat Statistik (BPS) in 2016, one of the other causes of infant death is premature birth. Premature births in Indonesia are estimated at 15 million out of 315 million births with a birth rate of 11.1% (Grzesiak et al., 2018). The consequences of the immature anatomy and physiology of premature babies tend to experience various problems. Premature babies must be cared for properly so they can reach optimal growth and development stages (WHO, 2019).

Babies with premature LBW have an impact on care in the NICU room which is an unexpected event for parents and can cause anxiety (Marwah et al., 2018). Parental stress begins with separation from their newborn baby, the inability to look after and care for the baby, the inability to protect the baby from pain, the use of technology and tools in intensive care, and the critical condition of the baby (Aeni et al., 2019). Based on the research results of (Oktiawati et al., 2020), 50% of mothers who had LBW babies who were treated in the perinatology room experienced moderate levels of anxiety, 31.2% experienced severe anxiety and 18.8% experienced mild anxiety. One of the factors that increases the risk of chronic disease in adults is LBW. Several conditions that influence LBW include maternal comorbidities such as cardiovascular disease, diabetes and hypertension (Nengsih et al., 2016).

Babies with LBW can increase the risk of infection, complications in babies, stunting, decreased intelligence levels and thermoregulation disorders as well as problems that affect the respiratory and central nervous systems (Wulandari et al., 2018). LBW babies who experience respiratory problems who can still survive usually experience delays in growth and development (Nurfitriani & Kurniawan, 2019). Factors that influence the incidence of LBW include premature birth, Hb and maternal age during pregnancy, nutritional status of pregnant women, maternal weight, anemia, mother's education level, baby's gender, and complications in pregnant women (Agorinya et al., 2018).

The care that can be given to premature LBW babies is integrative neonatal developmental care including setting up a healing environment, collaborating with the family, positioning and handling, minimizing stress and pain, maintaining sleep, protecting the skin, and optimizing nutrition (Altimier & Phillips, 2013). Prevention of LBW incidents can be done through health services to facilitate the growth and development of babies and reduce infant mortality (Wanda et al., 2014). One of the treatments for premature LBW babies that can be given when the baby is in hospital is to maintain a normal body temperature to prevent hypothermia, strictly prevent infection, monitor nutrition and breast milk and reduce physical and psychological stress (Nuzula & Dasuki, 2020). However, this intervention is still not optimal because there has not been a significant reduction in LBW and the number of babies in and out of hospital tends to fluctuate every

year (Irianti et al., 2021).

Previous research conducted by (Novitasari et al., 2020) stated that prevention and control that can be done to overcome LBW is a healing environment, developmental care, supervision and monitoring, health education, preventing hypothermia in babies, and measuring the mother's nutritional status. pregnant. Developmental care is a method for adjusting the environment to reduce stress, support behavioral organization, increase physiological stability, maintain sleep, and promote neural growth and maturation of the baby (Lucas, 2015). Apart from that, another study conducted by (Efendi et al., 2019) stated that positioning by providing a nest to patients with respiratory problems can optimize lung function in premature babies. This is supported by research conducted by (Utario et al., 2017) that positioning can increase oxygenation and maintain sleep patterns in premature babies with continuous positive airway pressure (CPAP). Similar research by (Sathish et al., 2017) shows that using the snuggle up position with positioning aids can increase growth facilities, reduce pain, increase comfort and reduce the duration of stay in the NICU. Therefore, the aim of this research is to determine the application of developmental care by providing a snuggle up positioning using a nesting aid to premature babies in the Neonatal Intensive Care Unit (NICU).

METHODS

This research design uses a case study with the application of an evidence-based practice approach that focuses on nursing interventions. Case studies are research that emphasizes a deeper understanding of certain phenomena about individuals. This case study was conducted to describe developmental care interventions by providing a snuggling position to reduce the level of pain scale and increase the comfort scale in LBW-Premature infant patients. The research was conducted in the NICU of UMM Hospital Malang City on October 24-26, 2023. The population in this study amounted to one baby Mrs. P aged 0 years 0 months 0 days, male, born with LBW-premature with Transient Tachypnea of the Newborn (TTNB) who was treated in the NICU room. Data collection was carried out starting from history taking, physical examination, observation and medical record data. The instrument used was the Neonatal Infant Pain Scale (NIPS) to measure the infant pain scale and the comfort level was measured using the Comfort-B scale and by observation of the patient's vital signs (TTV). Data collection was carried out by assessing the observation sheet by the duty nurse every 7 hours for 3 days starting from the first day the patient entered the NICU until the patient was discharged. The inclusion criteria in this study were babies born prematurely and LBW. After fulfilling the predetermined criteria, the researcher asked permission from the head of the room and parents or family so that the baby was given the use of nesting for as long as possible.

A baby boy was born on October 24, 2023 by cesarean section (SC) from a mother with a history of previous pregnancies and births, including Grafida500, Paritas3003, Abortus100 (GPAb), in addition to the Ballart score used to assess gestational age with points 25 which means that the gestational age is around 34 weeks. The first minute APGAR (Appearance, Pulse, Grimace, Activity, Breathing) assessment score of 7 and the fifth minute of 9 is a simple scoring system performed on newborns to evaluate the baby's health condition. The baby was born crying and the airway was cleared by suction. The baby was born with a body weight of 2,408 grams, body length of 44 cm, chest circumference of 31.5 cm, and head circumference of 32 cm. Vital signs (VTS) measurements were taken including respiratory frequency (RR) 67x/min, oxygen saturation 95%, temperature 36.1oC. The baby appeared restless, cyanotic, crying, shivering and using breathing muscles characterized by increased retraction of the chest wall (barrel chest) and often woke up during sleep. A C-PAP PEEP 7 FiO2 21% flow 10 ventilator was installed, and the patient was observed during treatment.

RESULTS

The results of the assessment found that the nursing problems that arose physiologically were **ineffective breathing patterns** related to breathing effort resistance as evidenced by the Respiratory rate of 67x/minute, the use of T-Piece breathing apparatus and C-PAP ventilator and an increase in chest wall retraction. Another nursing problem that arises in accordance with the patient's condition is **hypothermia** with the patient's body temperature below the normal value (36.5oC-37.5o C) which is 36.1^{o} C, Low temperatures result in increased tissue metabolism and metabolic acidosis easily occurs. The next nursing problem is **acute pain** as evidenced by the NIPS score. The

next nursing problem is a **nutritional deficit** as evidenced by the baby's weak suction reflex and the installation of an Oral Gastric Tube (OGT) to meet the baby's nutritional needs. It is necessary to establish an action to reduce, eliminate and prevent nursing problems for patients in accordance with the Indonesian Nursing Diagnosis Standards. Indonesian Nursing Diagnosis Standards, which are as follows:

Table 1 Nursing Intervention and Outcome

Nursing Outcome	Nursing Intervention
After nursing actions fir 3x24 hours are expected to improved breathing pattern with the following criteria: a. Decreased use of breathing muscles (5) b. Breathing frequency improved (5) c. Chest excursion improved (5) (L. 01004)	Airway Management (1.01011) Observation: 1. monitor breath patterns 2. monitor additional breath sounds 3. sputum monitor Therapeutic: 4. maintain airway patience 5. position semi fowler 6. perform mucus suction for less than 15 seconds 7. give oxygen
After nursing actions fir 3x24 hours are expected to Decreased pain levels with the following criteria: a. Decreased anxiety (5) b. Difficulty sleeping decreased (5) c. Pulse frequency improved (5) d. Breathing pattern improved (5) (L.08066)	Pain management (1.08238) Observation: 1. Identify non-verbal pain responses 2. Monitor side effects of analgesic use Therapeutic: 3. control environment that aggravates pain 4. facilitate sleep rest Colaboration: 5. collaborative analgesic administration
After nursing actions fir 3x24 hours are expected to Improved thermogulation with the following criteria: a. Red skin decreased (5) b. Body temperature improved (5) c. Skin temperature improved (5) d. Pallor decreased (5) e. Tachypnoea decreased (5) (L.14134)	Temperature regulation (1.14578) Observation: 1. monitor the baby's temperature until it stabilises 2. monitor breathing and pulse frequency 3. monitor skin colour and temperature Therapeutic: 4. install continuous temperature monitoring device (monitor) 5. swaddle the baby after birth 6. place the baby in the incubator 7. use a mattress (Nest Snuggleup Positions) Colaboration: 8. collaborative administration of antipyretics
After nursing actions fir 3x24 hours are expected to baby's nutritional status improved with the following criteria: a) Ody weight increased (5) b) Body length increased (5) c) Difficulty eating decreased (5) (L. 03031)	Nutrition Management (1.03119) Observation: 1. Monitor food intake 2. Weight monitor 3. Identify the need for nasogastric tube use 4. Monitor body length 5. Identify feeding difficulties Therapeutic: 6. perform oral hygiene before meals Colaboration: 7. encourage exclusive breastfeeding

Table 2 Nursing Evaluation

Nursing Diagnosis	Evaluation		
	1st Day (pre)	2nd Day (post)	3rd Day (post)
Dx. ineffective breathing patterns related to breathing effort resistance as evidenced by the Respiratory rate of 67x/minute, the use of T-Piece breathing apparatus and C-PAP ventilator and an increase in chest wall retraction (D.0005)	S: - O: 1. Chest excursion still increasing 2. C-PAP oxygenation support still in place 3. Respiration 67 x/min A: problem has not been resolved P: Continue intervention	S: - O: 1. Chest excursion slightly reduced 2. C-PAP oxygenation support is decreased 3. Respiration 52 x/min A: problem partially resolved P: continue intervention	S: - O: 1. Chest excursion improved 2. C-PAP oxygenation support removed 3. Respiration 50 x/min A: problem fully resolved P: Discontinue intervention
Dx. Acute Pain as evidenced by the NIPS score (D.0077)	S: - O: 1. NIPS score 3-7 severe pain 2. pulse x/min 3. comfort-b score 17-27 moderate comfort A: problem not resolved P: Continue intervention:	S: - O: 1. NIPS score1-2 is moderate pain 2. pulse x/min 3. comfort-b score 13-16 hight comfort A: problem partially resolved P: Continue intervention	S: - O: 1. NIPS score 0 no pain 2. pulse x/min 3. comfort-b score 9-12 hight comfort A: problem fully resolved P: Discontinue intervention
Dx. Hypothermia with the patient's body temperature below the normal value (36.5oC-37.5o C) which is 36.1° C (D.0131)	S: - O: 1. body temperature still fluctuates 36.1oC 2. Respiration 52 x/min 3. red skin all over the body 4. cold skin temperature A: problem not resolved P: Continue intervention	S: - O: 1. body temperature started to improve 36.5oC 2. Respiration 52 x/min 3. skin temperature improved A: problem partially resolved P: Continue intervention	S: - O: 1. body temperature improved to 36.9oC 2. Respiration 50 x/min 3. skin temperature improved A: problem fully resolved P: Discontinue intervention
Dx. Nutritional deficit as evidenced by the baby's weak suction reflex and the installation of an Oralgastric Tube (OGT) (D.0019)	S: - O: 1. Body weight 2,408 grams 2. body length 44 cm 3. excessive saliva production 4. weak chewing muscles A: problem not resolved P: Continue intervention	S: - O: 1. Body weight 2,320 grams 2. body length 44 cm 3. reduced saliva production 4. chewing muscles improved can suckle A: problem partially resolved P: Continue intervention	S: - O: 1. Body weight 2,270 grams 2. body length 44 cm 3. saliva production was absent 4. Patient could suckle fully A: problem fully resolved P: Discontinue intervention

Table 3 NIPS Score.

Pre/Post	Day1 (Pre)			Day 2 (Post)			Day 3 (Post)		
Time	M	A	E	M	A	E	M	A	E
Facial Expression	1	0	0	0	0	0	0	0	0
Crying	2	1	1	1	0	0	0	0	0
Breathing Pattern	1	1	1	1	0	0	0	0	0
Arm Hand	1	1	1	0	1	1	0	0	0
Arm Leg	1	1	0	0	0	0	0	0	0
State	1	0	0	0	0	0	0	0	0
SUM	7	4	3	2	1	1	0	0	0

NIPS score interpretation: 0-1: no pain; 2: mild pain; 3-4: moderate pain; 5-7 severe pain

Information: M: Morning; A: Afternoon; E: Evening; Facial Expression: 0: relaxed, 1: grimacing; Crying: 0: no whimpering, 1: whimpering, 2: strong crying; Breathing Pattern: 0: relaxed breathing, 1: irregular breathing; Arms: 0: relaxed, 1: strong flexion/extension, Leg Arm: 0: relaxed, 1: strong flexion/extension; State: 0: deep sleep, 1: fussy/restless.

Based on table 3, the NIPS score shows that the level of pain felt by the patient can be seen from the first day (pre) in the morning with a total score of 7 which is severe pain, score 4 which is moderate pain during the day, and score 3 which is mild pain at night. Whereas on the second day (post) a total score of 1-2 is moderate pain in the morning, score 2 is mild pain during the day and score 1 is no pain at night, and on the third day (post) a total score of 0 in the morning, afternoon and evening which means no pain. So, it can be concluded that there is a decrease in pain levels as indicated by the first day (pre) the pain felt by patients is moderate to severe pain and on the second and third days (post) mild pain to no pain.

Table 4 B-Comfort Score

Pre/Post	Day1 (Pre)			Day 2 (Post)			Day 3 (Post)		
Time	M	A	E	M	A	E	M	A	E
Alert	4	3	2	2	2	2	2	2	2
Calmness	3	2	2	2	2	1	1	1	1
Respiration	3	2	2	2	2	2	1	1	1
Crying	3	2	2	2	2	1	1	1	1
Physical Movement	3	3	3	3	3	3	3	3	2
Muscles	3	2	2	1	1	1	1	1	1
Facial Tension	5	4	4	4	4	3	3	1	1
SUM	25	18	17	16	16	13	12	10	9

Interpretation of comfort-b scores: 8-16: high comfort; 17-26: moderate comfort; 27-45 low comfort.

Information: Alertness: 1: deep sleep, 2: deep sleep, 3: sleepy, 4: moderate response, 5: excessive response; Calmness: 1: calm, 2: slightly anxious, 3: anxious, 4: very anxious, 5: panic; Breathing: 1: no spontaneous breathing, 2: spontaneous breathing, 3: spontaneous with ventilator, 4: anxious with ventilator, 5: active breathing with ventilator or regular coughing; Crying: 1: no crying, 2: moaning, 3: whining, 4: crying, 5: yelling/screaming; Physical Movement: 1: no movement, 2: occasional <3 times, 3: frequent >3 times, 4: strong movement of extremities, 5: strong movement of body and head; Muscles: 1: relaxed and no muscle tone, 2: decreased muscle tone, 3: normal muscle tone, 4: increased muscle tone, 5: stiff muscle tone; Tension: 1: relaxed facial muscles, 2: normal facial muscles, 3: slightly tense facial muscles, 4: fully tense facial muscles, 5: wrinkled facial muscles.

Based on table 4, the results show that the total b-comfort score on the first day (pre) with a score of 25 in the morning which means moderate comfort, a score of 18 during the day which means moderate comfort, a score of 17 at night which means moderate comfort. Whereas on the second day (post) with a score of 16 in the morning which means deep sedation, a score of 16 in the afternoon which means high comfort, a score of 13 at night which means high comfort. On the third day (post) with a score of 12 which means high comfort, score 10 in the afternoon means high comfort, score 9 means high comfort. It can be concluded that there is an increase in comfort in infants as evidenced by a decrease in the total comfort-b score between before and after being given the snuggling position.

Table 5 vital sign score

Pre-Post	Pre-Test			Post-Test					
Date	24 October 2023			25 October 2023			26 October 2023		
Time	M	A	E	M	A	E	M	A	E
Temperature (°C)	36.1	36.8	36.5	37.0	37.3	36.8	36.5	36.6	36.6
Pulse (x/minute)	146	143	132	126	120	123	119	127	118
Oxygen Saturation (%)	95	95	95	96	98	98	96	96	97
Respirations (x/minute)	57	56	54	48	40	39	40	40	40
Upper Arm Circumference (cm)	10			10			10		
Chest Circumference (cm)	31.5			29			28		
Head Circumference (cm)	31			31			31		
Body Length (cm)	44			44			44		
Body Weight (grams)	2.408			2.320			2.270		

Based on table 5, it was found that there were differences before and after the intervention on the score of increasing temperature stability before and after the baby was put into the incubator, the increase in pulse rate (tachycardia) decreased to normal levels, oxygen saturation continued to improve, rapid breathing (tachypnea) decreased to normal numbers, decreased use of respiratory muscles marked by the retraction of the chest wall with the help of CPAP mechanical ventilators that improved on the vital signs data above through observation. And it is normal for newborns to experience weight loss. In addition, there was no significant difference before and after the intervention on the scores of upper arm circumference, head circumference, and body length. This proves that there is an increase in comfort in infants before and after the snuggle position intervention.

DISCUSSION

The birth of a premature baby is usually accompanied by low birth weight. Low-birth-weight infants born at term or prematurely have a small body appearance and weigh below normal (<2500). Premature babies have a small body appearance with below normal weight (<2500 grams) and incomplete organ system maturity, body abnormalities, undeveloped lungs, and weak respiratory muscles can be the main cause of death in infants (Wahyuni & Puspitasari, 2021). Premature infants are babies born with a gestational age of less than 37 weeks, to be precise between 20 weeks to less than 37 weeks (Rachmantiawan & Rodiani, 2022). Babies who experience problems such as not full term, low birth weight and experiencing other problems must be treated specifically in the ward in the neonatal intensive care unit (NICU). Preterm infants transition from intrauterine environment to the extra-uterine environment is triggered by various stimuli, factors such as pain, stress, and separation from parents as well as environmental stimuli (ventilators), parents as well as environmental stimuli (ventilators, monitors, incubators, ringtones of the telephone, and the sound of taps, shelves, and cupboard doors) can cause also negatively impact the baby's health, causing changes in heart rate and oxygen saturation levels, expanding blood pressure fluctuations, increasing restlessness in the short term, and delaying the development of the central nervous system and brain in the long term (Jalali et al., 2022). In addition, other factors such as light, noise from monitors, and light from phototherapy, heel prick procedures, feeding, nappy changing and routine care cause sleep deprivation in preterm neonates (Nurhidayati & Setianingsih, 2017).

Immature sensory modalities in preterm infants, such as hearing and vision, are over-stimulated, including machine and bell sounds and distorted sounds amplified by the incubator walls. Early auditory experiences affect brain development; along with the noise environment in the ward, noise may be associated with tachycardia or bradycardia, apnea, decreased oxygenation, increased muscle tension, blood pressure and intracranial pressure, and sleep disturbances. The average premature infant sleeps for 50-70 minutes in one sleep cycle. Sleep promotes the development of the cerebrum and brain segment connections. Inadequate rest causes illness and also causes psychological problems. Newborns need to rest many times a day and this is related to their feeding habits. Adequate rest is very important for newborns as it helps the maturation of sight and smell, hearing, taste and touch. It also helps the maturation of brain segments. In newborns, inadequate rest, can lead to temporary cessation of breathing and discomfort (Vadakkan & Prabakaran,

2022). Quiet sleep conditions in infants are very necessary, which in this condition will make it easier for babies to optimise their growth and development process. Because with the decrease in arterial blood pressure, pulse frequency, feriferous vascular tone and muscles that experience a state of complete rest will make the baby use the energy available for growth and development (Arvina & Sutarno, 2024). Previous research conducted by (Hakiki et al., 2020) stated that around 33-50% of babies born worldwide are born with Transient Tachypnea of the Newborn (TTNB) and 1% have respiratory distress that is not related to infection.

During their stay in the NICU, premature babies are exposed to various stimuli. There are various treatment measures that can be used to reduce the stimuli and improve the neurodevelopment of newborns, one of which is placing the baby in an incubator. The physiological indicator of a newborn is body temperature. The newborn's body temperature decreases by 0.1◦C immediately after birth, causing hypothermia in some neonates. In the following days, the newborn's body temperature should be maintained between 36.5◦C and 37.5◦C, with an average of 37◦C. However, the problem of postnatal hypothermia may remain because the thermoregulatory ability of premature newborns is not fully developed especially in preterm infants (Cetin & Ekici, 2023). Environmental noise worsens the baby's energy expenditure, causes physiological instability, and may affect hearing quality. Indeed, staying more than four days in the NICU is a risk factor for hearing loss (Seassau et al., 2023). A study on music therapy by (Arnon, 2023) showed a decrease in noise and an increase in signal-to-noise ratio, suggesting that music therapy is a developmental treatment modality used in the NICU to reduce infant and parental anxiety and to increase parent-infant bonding.

Newborn comfort is very important and can be provided through methods such as kangaroo care, skin-to-skin contact, massage or gentle touch, sleeping position, lullabies, music, holding, and nesting. Although many methods are available to increase neonate sleep duration, nesting may reduce the frequency of arousals by restricting motor movements and also induce normothermia (El-Star et al., 2022). Nesting aims to limit excessive infant movement, provide a comfortable place for the infant, and stabilizese the physiological functions of the infant (Hayati et al., 2023). Therapeutic positioning with the baby's midline, flexed and restrained, is used to facilitate sleep and prevent uneven motor development (Visscher et al., 2015). Positioning with nesting can be done by placing a roll of cloth or can be modified at the bottom of the cloth to maintain the flexion position while in the prone or tilted position. The curled up or flexion position is therapeutic as it increases warmth and improves blood supply to the brain and promotes calmness in premature infants. The nesting position, which is similar to the position in the womb, has a positive effect on the stability of physiological functions and maintenance of the infant's posture (Sumathy, 2021). Nesting aims to minimize neonate movement as a form of energy conversion and increase comfort to reduce pain in neonates (Margaretta, 2023). Handling and care commonly performed in the NICU such as bathing, changing nappies, bathing are considered as pain stressors and have a negative impact on the baby's brain development. Minimizing stress in premature infants has many neurological benefits such as reducing the occurrence of abnormal care. Research conducted by (Abusaad et al., 2017) found that 53.6% of premature infants in the NICU who were placed in the right position had minimal pain. Meanwhile, in the control group of infants, it was found that 32.1% of infants who experienced severe pain had lower pain scores.

In this study, infant comfort level was measured using NIPS and comfort-b scores. The results showed that there was a significant difference before and after being given developmental care combined with the provision of snuggling position for 3 days during treatment. It was found that there was an increase in infant comfort, namely looking more comfortable and calmer while sleeping, and neonates were more awake in their sleep patterns, namely falling asleep faster and waking up later. Sleep is a very important need for babies in the NICU because they sleep 80% of the time. Strategies that can be done include maintaining the baby's sleep pattern, maintaining the REM (Rapid Eye Movement) cycle, maintaining environmental and lighting conditions and using eye protection from direct light exposure. Many studies have been conducted regarding sleeping positions for the comfort of newborns. Giving position to babies can support the quality of neonate sleep, support the development of the sensory system, support a decrease in stress in neonates, and can be used for non-pharmacological therapeutic measures to reduce pain in neonates. In a study conducted by (Kahraman et al., 2018) who treated 33 premature neonates, gestational age 31-35 weeks, measuring pain using the Neonatal Infant Pain Scale NIPS and Comfort-b, the prone position was found to be significantly higher ($p<0.000$) than the supine position in

newborns.

CONCLUSION

Developmental care which includes minimizing lighting, minimizing sound, minimal handling, snuggling, and positioning can affect the physiological function of infants with premature LBW. The results of this case study show that the provision of developmental care integrated with the application of the snuggle up position for infants in the NICU is effective in reducing pain, increasing comfort, optimizing the physiological function of infants, increasing quiet sleep time as indicated by a decrease in pain scores and an increase in comfort scores in infants and improved physiological function. As a nurse, you should increase your knowledge and skills to be able to determine and provide variations of appropriate interventions to improve comfort in premature LBW babies who are treated in special units.

SUGGESTION

Future research is expected to develop developmental care using other approaches that can increase effectiveness in providing nursing care to patients.

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CONFLICTS OF INTEREST

All authors declare that there is no conflict of interest during research and publication.

AUTHOR CONTRIBUTIONS

The first author is responsible for the research process from creation to publication. The second author assisted in literature study, data collection, and data analysis.

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