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Proper Nutritional Care And Growth and Development Stimulation For Premature Children

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***ABSTRACT*:** Premature children, or those born before 37 weeks of gestation, are at high risk of experiencing health problems and developmental delays. Proper nutritional care is essential to support their physical growth and cognitive development. Adequate nutrition can help overcome malnutrition that is often experienced by premature children, which can affect long-term health. In addition, growth and development stimulation through social interaction and physical activity also plays an important role in increasing the developmental potential of premature children. This study aims to explore the importance of proper nutritional care and growth and development stimulation in premature children. This study uses a qualitative research method. The data collection technique in this study was through literature studies. The data that has been collected was then analyzed in three stages, namely data reduction, data presentation and drawing conclusions. The results of the study showed that the care of premature infants should begin with the provision of appropriate nutrition. This nutrition comes from breast milk, however, to meet the nutritional needs of premature infants, especially those who are very premature and have very low birth weight, breast milk alone is insufficient, so special formulas such as FSMP premature are needed. In addition, optimal nutritional care needs to be balanced with proper growth and development stimulation. Stimulation in premature babies can be done through various methods, such as physical contact, sound, sight, and movement. The role of parents is very important in supporting children's development, so they need to get accurate information about the appropriate care and types of stimulation.

Keywords- Nutritional Care, Growth and Development Stimulation, Premature Children

INTRODUCTION

Every year, around 15 million premature births are recorded worldwide. According to the World Health Organization (WHO), the incidence of preterm birth has increased over the past 20 years in 62 of

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the 65 countries that have trend data. In Indonesia, more than a third of neonatal deaths are caused by preterm birth. Each year, more than one million children die from complications associated with preterm birth. Indonesia is ranked fifth in the world for the highest number of preterm births (Marsubrin et al., 2024). Preterm birth is the leading cause of death in newborns and is the second leading cause of death in children under five years of age, after pneumonia. In addition, children who survive preterm birth are at higher risk of disability with negative outcomes (Kumar et al., 2017).

Premature birth refers to birth that occurs before 37 weeks of gestation. The cause of this birth is often due to contractions or excessive pressure that causes the cervix to open, allowing the fetus to move into the birth canal. Babies born prematurely are at higher risk of experiencing health problems because their organs are not fully developed. Therefore, premature birth requires immediate treatment to protect the health of the mother and baby (Yuliana et al., 2017).

Providing appropriate nutritional intake can help meet their nutritional needs, which play an important role in the recovery and growth process. Good nutrition not only helps to increase weight and physical health, but also contributes to optimal brain development. Therefore, special attention to the diet and nutrition of premature children is very important to ensure they get a strong foundation for their future, both in physical and cognitive aspects. Breast milk is the main choice to meet the nutritional needs of premature babies. ASI has been proven effective in reducing the risk of Necrotizing Enterocolitis (NEC), sepsis, and late-onset sepsis. In addition, ASI has important benefits for the development of the cardiovascular system, nervous system, bone growth, and other developments (Ganapathy et al., 2012; Lewandowski et al., 2016).

As a second alternative, pasteurized donor breast milk can also be given. However, donor breast milk must undergo a strict screening process to detect HIV, Hepatitis C virus, hepatitis B antigen (HBsAg), and other infectious diseases. Breast milk donors are also required to undergo an examination to ensure they are free from viruses and bacteria within 6 months of donating breast milk. Donor breast milk can be stored at a temperature of -20°C for up to six months, but for premature babies, breast milk that has been stored for more than three months is not recommended. In addition to breast milk, special formula milk can be an alternative for premature babies weighing less than 1,500 grams. This formula is designed to meet the nutritional needs of babies with very low birth weight. One of the main considerations in choosing formula milk for premature babies is its osmolality level, which should be close to breast milk, which is around 300 mOsm/kg, and should not exceed 450 mOsm/kg (Kumar et al., 2017).

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Adequate nutrition is essential in overcoming malnutrition that is often experienced by premature children, which can affect their health in the long term. In addition to fulfilling nutrition, growth and development stimulation through social interaction and physical activity also plays an important role in increasing the development potential of these children. Stimulation is a stimulus given since the baby is born, ideally since in the womb, which is carried out every day to stimulate all senses such as hearing, sight, touch, smell, and taste. In addition, stimulation also includes gross and fine movements of the feet, hands, and fingers, communicating, and creating pleasant feelings for babies and children (Agustina & Palembang, 2022).

Routine early stimulation needs to be carried out at every opportunity because lack of stimulation can cause growth and development disorders in children. The age period from 0 to 3 years is the golden age for child development, where children are like white paper that will absorb all the information and experiences they see and hear. This is a very important and crucial period for brain development because children in this phase are very quickly influenced by their surroundings. Every baby needs maximum stimulation to take advantage of this period to optimize their growth and development (Agustina & Palembang, 2022).

Another study by (Rosalinna & Andriyani, 2019) showed that providing the booklet Stimulation Detection and Intervention of Growth and Development (SDIDTK) can significantly improve the growth and development of premature babies. It is hoped that parents can provide stimulation to premature babies properly to improve growth and development. Another study by (Ramadhani et al., 2016) showed that there was an effect of oral stimulation on the ability to suck in premature babies as seen from the increase in the volume of milk consumed, the increase in the frequency of drinking milk and the increase in weight gain. This study contributes to the development of knowledge in the field of nutrition and child development, especially for premature children. The findings of the study can enrich the existing literature, by providing empirical evidence regarding the relationship between nutritional care and stimulation on child growth and development. This study aims to explore the importance of proper nutritional care and stimulation of growth and development in premature children.

RESEARCH METHODS

This study uses a qualitative research method. Qualitative research methods are approaches that focus on in-depth observation of a phenomenon. The purpose of this method is to understand the

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phenomenon as a whole and produce a comprehensive analysis (Waruwu, 2023). The data collection technique in this study was carried out through literature studies which are data collection methods by reviewing various relevant written sources, such as books, journal articles, research reports, and other documents. This process involves searching, reading, and analyzing literature related to the research topic. Researchers obtain in-depth information about theories, concepts, and previous findings related to nutritional care and growth and development stimulation in premature children. This technique also allows researchers to identify existing research gaps, as well as support the arguments and interpretations of the research results to be carried out. The data that has been collected is then analyzed in three stages, namely data reduction, data presentation and drawing conclusions.

DISCUSSION

Preterm birth has been defined by the World Health Organization (WHO) as a birth that occurs before 37 weeks of gestation, or less than 259 days from the first day of the last menstrual period. This definition is the most widely accepted in the health field (Quinn et al., 2016). Babies born prematurely can be divided into several categories based on gestational age. For example, the moderate to late preterm category, which includes births at 32 to 37 weeks, as well as the very preterm category for babies born between 28 to 32 weeks, and extreme preterm for babies born before 28 weeks. Generally, babies born prematurely require intensive care in a Neonatal Intensive Care Unit (NICU), where they receive specialized and ongoing medical attention to support development (Jiménez-Palomares et al., 2021).

Babies born prematurely often experience various disorders that can affect their development in the early years of life. Research shows that preterm infants have a higher risk than full-term infants of developing problems such as cerebral palsy, sensory deficits, learning difficulties, and cognitive and language deficits. In addition, premature infants are also prone to problems related to attention and behavior (Belanger et al., 2021). Therefore, it is important to pay special attention to the growth and development of premature children. Proper care is necessary as their organs are not fully developed, thus requiring more intensive medical attention. Many premature babies are born with low birth weight, or LBW, which is defined as a birth weight between 1,500 and 2,500 grams (Wijayatri et al., 2021). To minimize these risks, proper care must be implemented so that premature babies can grow and develop properly.

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Premature infant care must begin with providing proper nutrition, as nutrition is vital for the growth and development of premature infants. Preterm infants who experience various health problems are prone to malnutrition, which can result in suboptimal growth or even postnatal growth failure (PGF) (Rohsiswatmo et al., 2023). Several studies have shown that almost all preterm infants, especially those with very low birth weight, experience growth retardation when they are discharged from the hospital (Rohsiswatmo & Amandito, 2019). This can lead to long-term problems, including the potential for stunting, which is a result of chronic malnutrition. The main risk factors contributing to stunting are inadequate nutritional intake and mothers who are short in height, as well as other factors such as birth history, family socioeconomic conditions, history of infectious diseases, immunization status, and gestational weight and age at birth. Previous research has also shown that preterm birth is one of the determinants of stunting in Indonesia (Beal et al., 2018). Thus, attention to preterm infant nutrition is very important to prevent stunting and support optimal development of preterm infants.

However, premature infants face many challenges in achieving optimal growth and development. One of the main challenges is the mode of nutrition, which must be administered orally as the infant is unable to obtain natural nutrients from the womb. In addition, premature infants have limited nutrient storage at birth and are at high risk of serious nutritional deficits. Due to their immature gastrointestinal system, premature infants also take longer to start enteral nutrition (Rohsiswatmo & Amandito, 2019).

The condition of premature infants is often also exacerbated by physiological and metabolic stress, such as infection, inflammation, or respiratory distress, which increases the nutritional requirements of premature infants (Salvatori et al., 2020). Therefore, providing adequate nutrition for preterm infants with low birth weight (LBW) is very important (Sulistijono et al., 2016). All these factors emphasize the importance of special attention in planning and providing nutrition for preterm infants. With proper nutrition, it is expected that preterm infants can achieve development equivalent to that of full-term infants and have a good quality of life in the future.

Breast milk is the best food for all infants, including premature infants. Breast milk or human donor milk is the recommended source of enteral nutrition for premature or low birth weight (LBW) infants in the first few months of life (Salvatori et al., 2020). Breast milk has evolved to contain optimal macro and micronutrients, making it easily digested and absorbed by human infants. In addition, breast milk is rich in immunonutrients, including secretory IgA immunoglobulin, lactoferrin, cytokines, enzymes,

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growth factors and leukocytes, which play an important role in strengthening the infant's immune system (Walsh & McGuire, 2019).

Breastfeeding is crucial to support the health and growth of preterm infants, as its nutrients not only meet basic needs, but also help protect against infections and improve the body's ability to deal with various health problems. Pediatricians in Indonesia consider the balance of gut microbiota important for immunity, growth and development of preterm infants, and breast milk is the most ideal source of nutrients for preterm infants to optimize gut microbiota balance (Sitorus et al., 2021). However, to meet the nutritional needs of preterm infants, especially those who are very preterm and have very low birth weight (VLBW), breast milk alone may not be sufficient. Breast milk cannot fully meet all the nutritional needs of preterm infants (Wijayatri et al., 2021). This has led to the need to supplement breastmilk with other sources of nutrients, such as special formulas for preterm infants (Formula for Special Medical Purpose or FSMP) to optimally meet nutritional needs. This approach helps ensure that preterm infants get all the nutrients necessary to grow and develop properly.

FSMP is a special milk formula recommended by the Ministry of Health for very premature babies. According to the Decree of the Minister of Health of the Republic of Indonesia Number Hk.01.07/Menkes/2197/2023 concerning the National Formulary, very premature infants are defined as infants born before 32 weeks of gestation. Handling for this case requires special attention, including the provision of special formula milk.

In the Ministerial Regulation, it is stated that the provision of FSMP is part of the case management procedure. FSMP for very premature and very low birth weight infants must meet certain criteria, namely containing at least 24 kcal of energy per 30 ml, and can be supplemented with human milk fortifier. In addition, the provision of Coronary Heart Disease (CHD) can be done through central or local government programs, in accordance with applicable laws and regulations.

Based on these results, it can be said that optimal nutritional care for preterm infants includes the provision of breast milk and FSMP premature formula. These results are consistent with previous studies showing that proper and continuous provision of nutrition either through fortified breast milk or preterm formula is essential during the hospitalization period. After discharge from the hospital, exclusively breastfed infants need to receive additional supplementation. Meanwhile, formula-fed infants should continue the use of nutrient-enriched formula for about nine months according to the corrected age. The study also went on to add that protein supplementation of preterm infant formula can increase the

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protein-to-energy ratio to 3 g per 100 kcal, which contributes to increased muscle mass and reduced fat deposits (Su, 2014).

Furthermore, in the management of premature babies, good nutritional care must be balanced with proper growth and development stimulation. Early stimulation is very important to help premature babies catch up with babies born full term. Stimulation of premature baby care can be done in ways, such as:

1. Physical Contact Stimulation

   One effective method of stimulation is physical contact. Skin-to-skin contact with parents provides a sense of security and comfort, which is very important for the emotional development of babies (André et al., 2020). Research shows that premature infants often have a higher sensitivity to gentle tactile stimuli. Affective touch can strengthen the bond between mother and baby, which has a positive impact on their emotional regulation (Mariani Wigley et al., 2021).

2. Voice Stimulation

   Stimulation through sound also plays a crucial role in infant development. Speaking in the mother tongue about positive feelings or singing a lullaby can have a calming effect. Preterm infants exposed to maternal voice showed better oxygen saturation and higher autonomic stability, as well as better neuromotor skills at three months of corrected age (Zheng et al., 2022; Picciolini et al., 2014). The results showed that emotional interaction in the NICU is very important, and the more parents talk to their babies, the higher language and cognitive scores achieved at 7 and 18 months of age (Caskey et al., 2014).

3. Vision Stimulation

   Facing the baby and maintaining eye contact as much as possible helps build emotional connection and supports visual development. Visual interaction strengthens the sense of attachment between parents and infants, which is important for infants' psychological growth (Zheng et al., 2022).

4. Movement stimulation

   The provision of movement also contributes to the stimulation of infant development. Performing a gentle massage on the baby's face and hands can stimulate motor development. Research shows that massage can decrease infants' heart and respiratory rates, and increase body temperature during the intervention. In addition, massage was also associated with better mental

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and psychomotor development and more positive interactions between mothers and infants at six months of corrected age (Zheng et al., 2022).

A combination of stimulation through physical contact, sound, sight and movement is essential in supporting the growth and development of premature infants. Appropriate stimulation helps preterm infants adapt to new environments and achieve optimal development. Research shows that interventions involving tactile and kinesthetic stimulation can provide significant benefits, including increased weight, length and head circumference after two weeks of care (Zhang & Wang, 2019). This emphasizes the importance of parental attention and action in the process of care and stimulation of premature infants.

The role of parents is vital in supporting children's growth and development. Therefore, parents need to get accurate information about appropriate care and stimulation. Good communication with doctors and nurses can provide insight into the best ways to care for premature babies, including effective stimulation techniques. Furthermore, parents should also actively participate in care. This may include breastfeeding, performing massages, or simply spending time interacting with the baby. This involvement can encourage emotional bonding and give the baby the support it needs to grow and develop.

In addition, people can also create a comfortable environment. A calm and safe environment will help babies feel more comfortable and relaxed, supporting their growth and development. Ensuring appropriate temperature, lighting and noise can contribute to the baby's comfort. Finally, patience is key in this process. Each baby has a different pace of growth and development, and it is important not to compare one baby's progress to another. With understanding and a patient attitude, parents can provide the support needed to help premature babies grow and develop well.

CONCLUSION

Premature baby care should start with providing proper nutrition, as nutrition is vital for the growth and development of premature babies. Breast milk is the best food for all babies, including premature babies. However, to meet the nutritional needs of premature babies, especially very premature and very low birth weight babies, breast milk alone is inadequate. Breast milk cannot fully provide all the nutrients required by premature babies, so special formulas such as FSMP premature are needed. Furthermore, in the management of premature infants, good nutritional care must be balanced with proper growth and development stimulation. Premature infant care can be improved through various forms of stimulation,

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such as physical touch, sound, sight, and movement. The role of parents is crucial in supporting the baby's development, so they need the right information about appropriate care and stimulation for their baby. The importance of good communication between parents and medical personnel, such as doctors and nurses, cannot be overlooked, as this will help provide a better understanding of effective care for premature babies, including the application of appropriate stimulation methods. With the appropriate approach, it is expected that the development of premature babies can be maintained and optimized.

REFERENCES

Agustina, N., & Palembang, M. H. (2022). Tugas Perkembangan Anak dan Stimulasinya. https://yankes.kemkes.go.id/view_artikel/751/tugas-perkembangan-anak-dan-stimulasinya#:~:text=Stimulasi%20yang%20dapat%20dilakukan%20pada,perabaan%2C%20pembauan%2C%20pengecapan). Diakses pada 25 September 2024.

André, V., Durier, V., Beuchée, A., Roué, J. M., Lemasson, A., Hausberger, M., ... & Henry, S. (2020). Higher tactile sensitivity in preterm infants at term-equivalent age: A pilot study. *PLoS One*, *15*(3), e0229270.

Beal, T., Tumilowicz, A., Sutrisna, A., Izwardy, D., & Neufeld, L. M. (2018). A review of child stunting determinants in Indonesia. *Maternal & child nutrition*, *14*(4), e12617.

Belanger, R., Leroux, D., & Lefebvre, P. (2021). Supporting caregivers of children born prematurely in the development of language: A scoping review. *Paediatrics & child health*, *26*(1), e17-e24.

Caskey, M., Stephens, B., Tucker, R., & Vohr, B. (2014). Adult talk in the NICU with preterm infants and developmental outcomes. *Pediatrics*, *133*(3), e578-e584.

Ganapathy, V., Hay, J. W., & Kim, J. H. (2012). Costs of necrotizing enterocolitis and cost-effectiveness of exclusively human milk-based products in feeding extremely premature infants. *Breastfeeding medicine*, *7*(1), 29-37.

Jiménez-Palomares, M., Fernández-Rejano, M., Garrido-Ardila, E. M., Montanero-Fernández, J., Oliva-Ruiz, P., & Rodríguez-Mansilla, J. (2021). The impact of a preterm baby arrival in a family: a descriptive cross-sectional pilot study. *Journal of clinical medicine*, *10*(19), 4494.

Kumar, R. K., Singhal, A., Vaidya, U., Banerjee, S., Anwar, F., & Rao, S. (2017). Optimizing nutrition in preterm low birth weight infants—consensus summary. *Frontiers in nutrition*, *4*, 20.

Lewandowski, A. J., Lamata, P., Francis, J. M., Piechnik, S. K., Ferreira, V. M., Boardman, H., ... & Lucas, A. (2016). Breast milk consumption in preterm neonates and cardiac shape in adulthood. *Pediatrics*, *138*(1).

Mariani Wigley, I. L. C., Mascheroni, E., Fontana, C., Giorda, R., Morandi, F., Bonichini, S., ... & Montirosso, R. (2021). The role of maternal touch in the association between SLC6A4 methylation and stress response in very preterm infants. *Developmental Psychobiology*, *63*, e22218.

Marsubrin, P. M. T., Ibrahim, N. A. A., Dilmy, M. A. F., Ariani, Y., Wiweko, B., Irwinda, R., ... & Basrowi, R. W. (2024). Determinants of prematurity in urban Indonesia: a meta-analysis. *Journal of Perinatal Medicine*, *52*(3), 270-282.

Picciolini, O., Porro, M., Meazza, A., Giannì, M. L., Rivoli, C., Lucco, G., ... & Mosca, F. (2014). Early exposure to maternal voice: effects on preterm infants development. *Early human development*, *90*(6), 287-292.

Quinn, J. A., Munoz, F. M., Gonik, B., Frau, L., Cutland, C., Mallett-Moore, T., ... & Brighton Collaboration Preterm Birth Working Group. (2016). Preterm birth: Case definition & guidelines for data collection, analysis, and presentation of immunisation safety data. *Vaccine*, *34*(49), 6047-6056.

Ramadhani, A. N., Widodo, A., & Fis, S. (2016). *Pengaruh Stimulasi Oral Terhadap Kemampuan Menghisap Pada Bayi Prematur di RSUD Dr. Moewardi Surakarta* (Doctoral dissertation, Universitas Muhammadiyah Surakarta).

Rohsiswatmo, R., & Amandito, R. (2019). Optimalisasi Pertumbuhan Bayi Prematur dan Pasca Prematur di Indonesia; Mengacu pada Pedoman Nutrisi Bayi Prematur di Rumah Sakit Cipto Mangunkusumo. *Sari Pediatri*, *21*(4), 9.

Rohsiswatmo R, Kaban RK, Sjahrulla MAR, Hikmahrachim HG, Marsubrin PMT, Roeslani RD, Iskandar ATP, Sukarja D, Kautsar A and Urwah I (2023) Defining postnatal growth failure among preterm infants in Indonesia. *Front. Nutr*

Rosalinna, R., & Andriyani, A. (2019). Pengaruh Booklet Stimulasi Intervensi Pertumbuhan Dan Perkembangan Pada Bayi Prematur Terhadap Peningkatan Pertumbuhan Dan Perkembangan Bayi. *Jurnal Kebidanan dan Kesehatan Tradisional*, *4*(2), 74-84.

Salvatori, G., Martini, L., & Study Group on Neonatal Nutrition and Gastroenterology—Italian Society of Neonatology. (2020). Complementary feeding in the preterm infants: summary of available macronutrient intakes and requirements. *Nutrients*, *12*(12), 3696.

DOI: 10.46799/jisn.v1i5.26

Sitorus, N. L., Dilantika, C., & Basrowi, R. W. (2021). Perspective of Indonesian Pediatricians On The Role of Prebiotic Supplemented Formula Towards Immunity, Growth and Development In Preterm Infants: A Preliminary Data. *Amerta Nutr*, 34-42.

Su, B. H. (2014). Optimizing nutrition in preterm infants. *Pediatrics & Neonatology*, *55*(1), 5-13.

Walsh, V., & McGuire, W. (2019). Immunonutrition for preterm infants. *Neonatology*, *115*(4), 398-405.

Waruwu, M. (2023). Pendekatan penelitian pendidikan: metode penelitian kualitatif, metode penelitian kuantitatif dan metode penelitian kombinasi (Mixed Method). *Jurnal Pendidikan Tambusai*, *7*(1), 2896-2910.

Wijayatri, A. A., Sulistyani, S., & Agustina, T. (2021, May). Tatalaksana pemberian nutrisi pada bayi prematur untuk mencapai tumbuh kembang yang optimal. In Prosiding University Research Colloquium (pp. 186-193).

Yuliana, R., Rahmawati, I., Ns, S. K., An, M. K. S. K., & Marini, G. (2017). Studi Kasus Penerapan Terapi Musik Lullaby Pada Bayi Prematur Untuk Meningkatkan Berat Badan Di Rumah Sakit Siti Khodijah Sepanjang (Doctoral dissertation, Universitas Muhammadiyah Surabaya).

Zhang, X., & Wang, J. (2019). Massage intervention for preterm infants by their mothers: A randomized controlled trial. *Journal for specialists in pediatric nursing*, *24*(2), e12238.

Zheng, W., Chotipanvithayakul, R., Ingviya, T., Xia, X., Xie, L., & Gao, J. (2022). Sensory stimulation program improves developments of preterm infants in Southwest China: A randomized controlled trial. *Frontiers in Psychology*, *13*, 867529.