

The Effect of Prematurity on Children's Cognitive and Psychomotor Development

Lupi Purnomosari^{1*}, Muhamad Opan Fadilah²

¹Danone SN Indonesia, Jakarta, Indonesia

²Ridwan Institute, Cirebon, Indonesia

*Correspondence: lupi.purnomosari@danone.com

ABSTRACT: Development is something that must occur in living things, including humans. The development that occurs in a child is cognitive and psychomotor development. However, there are several factors that hinder development, one of which is being born prematurely. The purpose of this study was to determine the effect of prematurity on children's cognitive and psychomotor development. The research method used in this research is a literature review with a qualitative approach. The data collection technique is done with documentation. So that the data source used is secondary data. After the data is obtained, data analysis is carried out with Miles & Hubberman interactive analysis through three stages, namely data reduction, data presentation, and conclusion drawing. It was found that prematurity has a significant impact on the development of children's cognitive and psychomotor development as their organs are not fully developed, leading to the risk of complications and impairment of these abilities. So, the importance of cognitive and physical stimulation programs to support the optimal development of children born prematurely.

Keywords- premature, development, child

INTRODUCTION

Prematurity can be defined as delivery that occurs between 20 weeks of gestation to less than 37 weeks of gestation, with a birth weight < 2500 grams. Like normal labor, premature labor can be characterized by the spontaneous onset of uterine contractions and pain with or accompanied by spontaneous rupture of the membranes (Ansi & Hardiyanti, 2022). Premature babies are more susceptible to complications because premature babies' body organs do not yet function like mature babies. Therefore, premature babies have more difficulty living outside the uterus. The shorter the pregnancy period, the less perfect the growth of the organs in the body, resulting in easier complications and higher mortality rates (Rakhmawati & Pangesti, 2017). Indonesia is the fifth country

“The Effect of Prematurity on Children's Cognitive and Psychomotor Development”

with the highest number of preterm births in the world. More than one third of neonatal deaths in Indonesia are due to preterm birth (Marsubrin et al., 2023).

The exact cause of premature babies is not yet known with certainty. The predisposing factors that cause premature births are a history of previous premature births, antepartum hemorrhage, malnutrition, uterine abnormalities, hydramnios, heart disease/other chronic diseases, hypertension, maternal age less than 20 years or more than 35 years, two pregnancies too far apart. close proximity, high parity, infection, trauma to the fetus, namely congenital defects, multiple pregnancies, hydramnios, premature rupture of membranes, low socio-economic conditions, smoking habits, work and others (Lubis, 2020). According to Butali in drastita et al., (2022) a number of risk factors are associated with premature birth, namely a history of premature birth, underweight, obesity, diabetes, hypertension, smoking, infection, maternal age, genetics, multi-fetal pregnancy, long-term pregnancy spacing. too close together, placental disorders, and premature PROM.

The long-term impact of premature babies, both growth, development and cognitive function due to prematurity, still requires further follow-up. The cognitive development of a child with a history of prematurity is related to intrauterine fetal growth, for example birth weight, neonatal period and head circumference (Irwanto, 2014). A child's developmental achievements cannot be separated from several domains, namely cognitive development, gross motor and fine motor development, social emotional development and language development. The development process in children is influenced by several factors, one of which is postnatal environmental factors in the form of the child's condition at birth. The condition of the child at birth was premature birth and low birth weight (LBW) (Halu, 2018).

Physical development is closely related to children's motoric development. If you experience physical problems or obstacles in your development, your motor skills will also be hampered. Individual physical development includes four aspects, namely the nervous system, muscles, endocrine glands, and body or physical structure. The nervous system greatly influences the development of intelligence and emotions. The most important physical aspect is the brain as the center or center of development and developmental functions. The brain has a very determining influence on the development of other individuals (Putri et al., 2018).

Previous research conducted by Halu (2018) stated that child development is directly influenced by prematurity and birth weight. So this is important to do research. The aim of this research is to determine the effect of prematurity on children's cognitive and psychomotor development in more depth.

“The Effect of Prematurity on Children's Cognitive and Psychomotor Development”

RESEARCH METHODS

This research uses a literature review method with a qualitative approach. Literature review research is a search and research of the literature by reading various books, journals and other library publications related to the research topic, to produce an article regarding a particular topic or issue (Marzali, 2017). A literature review is a written summary of articles from journals, books and other documents that describe theories and information both past and present, organizing the literature into the required topics and documents (Widiarsa, 2019).

Qualitative research has the characteristics of natural research, without using experimental engineering and using humans as subjects and objects of research. Its holistic and flexible nature and the induction mechanism make truth in qualitative research a relative truth (Prayogi, 2021). Qualitative research is a research technique that uses narratives or words to explain and explain the meaning of certain phenomena, symptoms and social situations. In qualitative research, the researcher is the key instrument for understanding and interpreting each phenomenon, symptom and particular social situation. Therefore, researchers need to master theory to analyze the gaps that occur between theoretical concepts and actual facts (Waruwu, 2023).

In this research, the data source used is secondary data obtained through documentation sourced from journals, books or other documents that support the research, after the data is obtained it is then analyzed. The data analysis used was Miles and Huberman. This interactive model data analysis has 3 components, namely (1) data reduction, (2) data presentation, and (3) drawing conclusions/verification (Zulfirman, 2022).

RESULTS AND DISCUSSION

Every individual experiences development. Development occurs from early childhood to adulthood. Progress cannot be measured, but it can be felt. Development is progressive, systematic and continuous. The things that develop in each individual are the same, it's just that there are differences in the speed of development, and there are developments that precede previous developments, even though in reality the development of one aspect and another occurs simultaneously (Khaironi, 2018). Development is a systematic, progressive and continuous change in an individual from birth to the end of his life. Each individual undergoes these changes, especially from birth until maturity or maturity. Systematic means that development in a normal sense has a clear sequence. Progressive means that development is a metamorphosis towards ideal conditions.

“The Effect of Prematurity on Children's Cognitive and Psychomotor Development”

Sustainable means that there is consistency in the rate of development up to the optimum level that can be achieved (Sabani, 2019).

Periodization of human development aims to group and make it easier to understand the nature of development itself. Human development is generally described in periods or stages, where the periods or stages in question are already widely known by the wider community. These periods or stages include the prenatal period, infancy, early childhood, middle childhood and adolescence (Hanafi, 2018).

One of the developments that children will experience is cognitive development. This cognitive development approach is based on assumptions or beliefs that cognitive abilities are fundamental and guide children's behavior (Khoiruzzadi & Prasetya, 2021). Cognitive development is the stages of change that occur in the span of human life to understand, process information, solve problems and know something. Cognitive can be said to be a psychological part which includes mental behavior, including the ability to consider, solve problems, understand, process information, stability and deliberateness, so that cognitive can be interpreted as an individual's psychology which is related to the knowledge they have (Nuryati & Darsinah, 2021).

The development of children's cognitive abilities, referring to Piaget's theory, is influenced by 6 factors (Marinda, 2020). These six factors are:

a. Heredity factors

Factors that influence cognitive development through heredity or heredity are influenced by the genes and chromosome structure that are inherited from both parents to the child.

b. Environmental factors

Environmental factors as one part that can influence children's cognitive development are related to the tabularasa theory which was popularized by John Locke. This theory says that every child born into the world is as pure as white paper.

c. Maturity factors

In Piaget's cognitive theory, maturity factors are closely related to a child's physical development. Physical development is related to the development of organs that are used as tools for thinking, such as the maturity of the nervous system in the brain.

d. Formation factors

Formation is all circumstances outside a person that influence the development of intelligence. There are two formations, namely intentional formation (formal school) and unintentional formation (influence of the natural environment).

e. Interest and talent factors

Interest directs actions towards goals and is an encouragement to do more actively and better. A person's talent will influence his level of intelligence. Someone who has a certain talent will find it easier and faster to learn it.

“The Effect of Prematurity on Children's Cognitive and Psychomotor Development”

f. Freedom factor

Human freedom to think divergently, which means that humans can choose certain methods in solving problems and are free to choose problems according to their needs.

Apart from cognitive development, what is no less important is the child's psychomotor development. According to Bloom's theory, psychomotor development is a domain that includes movement behavior and physical coordination, motor skills and a person's physical abilities. The skills that will develop if practiced frequently can be measured based on distance, speed, pace, technique and method of implementation. In conclusion, psychomotor development is the development of human personality which is related to physical movement and muscle function as a result of encouragement from thoughts, feelings and will from within a person (Salsabila et al., 2023).

Cognitive and psychomotor skills can be developed through cooperative learning which involves young children learning in groups (Loesche, 2019). The factors that influence growth and development include genetic, nutritional and disease factors as well as environmental factors consisting of pre-natal factors and post-natal factors such as a history of prematurity and LBW. Both often cause complications which will increase the risk of delays in growth and development such as motor, cognitive and language development (Styasih, 2021).

Premature birth is a major risk factor for child growth and development. This affects children's cognitive and intellectual development and is associated with impaired IQ, executive function, and well-being, with these problems continuing into adulthood (Zmyj et al., 2017). For this reason, it is necessary to stimulate early.

Stimulation is useful for stimulating all the senses (sensory), movement (motor), communication and feelings (emotions). Stimulation is an important component for child development. Stimulation aims to help and provide opportunities for children to reach their potential. Providing stimuli such as inviting children to carry out play activities that involve their physical-motor movements. Such play activities are also called functional play activities, for example running, jumping, crawling, climbing and so on. If these activities are carried out routinely or repeatedly, they can result in physical strength, muscle flexibility and motor skills in children which can directly influence physical-motor development (Mandala, 2021).

The earlier the stimulation is given, the better the child's development will be. The more stimulation provided, the wider the child's knowledge will be so that the child's development will be more optimal. It is also stated that the brain tissue of children who receive a lot of stimulation will develop up to 80% at the age of less than 4 years. On the other hand, if a child is never stimulated, the brain tissue will shrink so that brain function will decrease. This is what causes children's development to be hampered (Hati & Lestari, 2016).

The brain is a very fundamental part of the human thinking process, both in understanding something and in gaining new knowledge. Therefore, in its development it must be given good

“The Effect of Prematurity on Children's Cognitive and Psychomotor Development”

stimulation, so that it develops optimally in carrying out its functions (Khadijah, 2016). In premature children, developmental care early in birth can result in improved outcomes in the following 2 years in psychomotor aspects. Developmental care is nursing care for babies to improve the growth and development of babies being treated in hospital (Haumont, 2014; Westrup, 2014). This developmental care has various positive impacts, including reducing the incidence of disease, reducing pain, reducing length of stay, reducing care costs, accelerating weight gain in premature babies, and speeding up the baby's return home (Hendrawati et al., 2021).

Prematurity, which is the birth of a baby before reaching 37 weeks of gestation, can have a significant influence on a child's cognitive and psychomotor development. Babies born prematurely are often at risk of complications because their organs are not yet fully developed, especially the brain. The impacts can vary, from learning difficulties to attention disorders, and even delays in achieving motor skills such as walking and crawling. Premature children may also have a higher risk of neurological disorders, such as cerebral palsy. Environmental factors, intensive medical care, and family support can also influence the development of premature children. Therefore, it is important for premature children to receive appropriate care and intervention according to their needs, including cognitive and physical stimulation programs designed to help them reach their optimal developmental potential. Research and ongoing monitoring are also needed to understand more about how prematurity affects child development and how intervention strategies can be improved to minimize its negative impacts.

CONCLUSION

Based on the research results, it was found that prematurity can have a significant influence on children's cognitive and psychomotor development. Children who are born prematurely are at risk of experiencing complications because their organs are not yet fully developed, which has an impact on their cognitive and psychomotor abilities. So the importance of cognitive and physical stimulation programs is to help children born prematurely to experience optimal development.

REFERENCES

- Ansi, S. A., Hardiyanti, W. O. (2022). Faktor-Faktor yang Mempengaruhi Kejadian Bayi Lahir Prematur di BLUD RSUD Kota Baubau Tahun 2017. *Formosa Journal of Science and Technology (FJST)*. 1(6), 767-776.
- Drastita, P. S., Hardianto, G., Fitriana, F., & Utomo, M. T. (2022). Faktor Risiko Terjadinya Persalinan Prematur. *Oksitosin: Jurnal Ilmiah Kebidanan*. 9(1), 40-50.

"The Effect of Prematurity on Children's Cognitive and Psychomotor Development"

- Halu, S. A. (2018). Pengaruh Riwayat Lahir Terhadap Perkembangan Anak Prasekolah Di Surakarta. *Jurnal Wawasan Kesehatan*. 3(2), 51-56.
- Hanafi, I. (2018). Perkembangan Manusia Dalam Tinjauan Psikologi Dan Alquran. IQ (Ilmu Al-qur'an): *Jurnal Pendidikan Islam*. 1(1), 84-99.
- Hati, F., & Lestari, P. (2016). Pengaruh Pemberian Stimulasi pada Perkembangan Anak Usia 12-36 Bulan di Kecamatan Sedayu, Bantul. *Jurnal Ners dan Kebidanan Indonesia*. 4(1), 44-48.
- Hendrawati, S., Adistie, F., & Maryam, N. (2021). Effectiveness Of Developmental Care On Physiological Functions' Low Birth Weight Babies: A Literature Review. *Indonesian Contemporary Nursing Journal*. 4(2), 52-63.
- Imani, F., & Hardaningsih, G. (2017). Pengaruh Pemberian Formula Hidrolisa Ekstensif Dan Isolat Protein Kedelai Terhadap Perkembangan Anak Dengan Alergi Susu Sapi Di Kota Semarang. *Jurnal Kedokteran Diponegoro*. 6(2), 530-540.
- Irawan, F., Lima, C., Hanip, R., Rafi'y, M., & Welerubun, P. (2022). Perkembangan Kognitif Dan Psikomotorik Anak Usia Dini Terhadap Model Pembelajaran Kooperatif Terintegrasi Sticky Note. *Jurnal Pendiidkan Indonesia: Teori, Penelitian dan Inovasi*. 2(6), 185-192.
- Irwanto. (2014). Cognitive And Behavioral Outcomes Of School-Aged Children Who Were Born Preterm: A Meta-Analysis. *Pendidikan Profesi Berkelanjutan II IDAI cab Jatim*. 178-198.
- Khadijah. (2016). Pengembangan Kognitif Anak Usia Dini. Medan: Perdana Publishing.
- Khaironi, M. (2018). Perkembangan Anak Usia Dini. *Jurnal Golden Age Hamzanwadi University*. 3(1), 1-12.
- Loesche, P. M. (2019). Estimating the true extent of gender differences in scholastic achievement: A neural network approach. *Intelligence*, 77(August), 101398. <https://doi.org/10.1016/j.intell.2019.10>
- Lubis, D. H. (2018). Pengaruh Pendidikan Kesehatan Bayi Prematur Terhadap Pengetahuan Orang Tua Bayi Di Desa Tandam Hilir II. *Jurnal Kebidanan Flora*. 11(1), 1-9.
- Marinda, L. (2020). Teori Perkembangan Kognitif Jean Piaget Dan Problematikanya Pada Anak Usia Sekolah Dasar. *An-Nisa' : Jurnal Kajian Perempuan & Keislaman*. 13(1), 116-162.
- Marsubrin, P. M. T., Ibrahim, N. A. A., Dilmy, M. A. F., Ariani, Y., Wiweko, B., Irwinda, R., ... & Basrowi, R. W. (2023). Determinants of prematurity in urban Indonesia: a meta-analysis. *Journal of Perinatal Medicine*, (0).
- Mardhotillah, A., & Marsubrin, P. M. T. (2024). Prosedur Menunda Minum saat Transfusi Sel Darah

"The Effect of Prematurity on Children's Cognitive and Psychomotor Development"

- Merah dan Kejadian Enterokolitis Nekrotikans pada Bayi Prematur. *Sari Pediatri*, 25(5), 341–348.
- Nuryati., & Darsinah. (2021). Implementasi Teori Perkembangan Kognitif Jean Piaget dalam Pembelajaran Matematika di Sekolah Dasar. *Jurnal Papeda*. 3(2), 153-162.
- Prayogi, A. (2021). Pendekatan Kualitatif dalam Ilmu Sejarah: Sebuah Telaah Konseptual. *Historia*. 5(2), 240-252.
- Putri, A., Mawarni, H., Yara, N., & Sumarlam. (2018). Kemampuan Berbahasa Anak Lahir Prematur Usia 2 Tahun. *Arkhis*. 9(2), 139-146.
- Rakhmawati, N., & Pangesti, C. (2017). Hubungan Bayi Lahir Prematur Dengan Infeksi Neonatorum Di Rsd Dr. Moewardi Surakarta. *Jurnal Kesehatan Kusuma Husada*. 177-181.
- Sabani, F. (2019). Perkembangan Anak-anak Selama Masa Sekolah Dasar (6 – 7 Tahun). *Didaktika: Jurnal Kependidikan*. 8(2), 89-100.
- Salsabila, Y., Harahap, A., Fitria, N., & Harahap, N. (2023). Pengaruh Perkembangan Kemampuan Pada Aspek Kognitif, Afektif Dan Psikomotorik Terhadap Hasil Belajar. *Algebra : Jurnal Pendidikan, Sosial Dan Sains*. 3(1), 9-15.
- Styasih, B. D. (2021). Hubungan Riwayat Bayi Lahir Prematur Dan Bblr Dengan Tingkat Perkembangan Balita Literature Review. Universitas Aisyiyah Yogyakarta.
- 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.
- Widiarsa. (2019). Kajian Pustaka (Literature Review) Sebagai Layanan Intim Pustakawan Berdasarkan Kepakaran Dan Minat Pemustaka. *Media Informasi*. 28(1), 111-124.
- Zmyj, N., Witt, S., Weitkamper, A., Neumann, H., & Lucke, T. (2017). Social Cognition in Children Born Preterm: A Perspective on Future Research Directions. *Front Psychol*. 8, 455.
- Zulfirman, R. (2022). Implementasi Metode Outdoor Learning Dalam Peningkatan Hasil Belajar Siswa Pada Mata Pelajaran Pendidikan Agama Islam Di Man 1 Medan. *Jurnal Penelitian, Pendidikan, dan Pengajaran*. 3(2), 147-153.