

DIFFERENCE BETWEEN GROSS MOTOR SKILLS OF INFANTS RECEIVING BREASTMILK AND RECEIVING BREASTMILK-FORMULA MILK

Johanes F Eduardo¹⁾, Susan²⁾, Irene L Parengkuan³⁾

ABSTRACT

Introduction: Development is the process of changing the functional capacity of the body's organs to a state that is increasingly organized and according to their respective functions. There are gross motor skills, fine motor skills, social skills, emotional abilities, language skills, and knowledge in the development domain. Gross motor movement is the ability to change various body positions using large muscles. Gross motor development begins before a child continues the developmental stage to the next domain. One of the factors in infant development is breastfeeding. Breastfeeding can be done as a solution to prevent delays in motor development in children.

Purpose: To determine the difference between the gross motor skills of infants receiving breastmilk and receiving breastmilk-formula milk in Gotong Royong Hospital.

Method: This study used an observational analytic study with a research design retro cross-sectional. The sampling technique was carried out by random sampling. The data collection procedure was carried out by collecting secondary data based on medical records from the main study, "The Impact of Early Initiation of Breastfeeding on the Health Profile of Mother and Infant in Gotong Royong Hospital". In this study, using the statistical test Chi-square then data analysis was performed using software SPSS on the computer.

Results: Based on the analysis test, there was no difference in gross motor development of infants aged three months who were breastfed and those who were breastfed and received formula milk with a value of $p = 1,000$ ($p < 0,05$). Babies who experienced gross motor development were suspected (42%), while those who experienced normal gross motor development were (58%).

Conclusion: There is no difference in gross motor development of infants aged three months receiving breastmilk and breastmilk-formula milk in Gotong Royong Hospital.

Keywords: Gross motor skill development, Infants, Breastmilk, Breastmilk-Formula milk

¹⁾ Student of Faculty of Medicine, Widya Mandala Surabaya Catholic University.
Email : eduardojohanes@gmail.com

²⁾ Department of Pediatrics, Faculty of Medicine, Widya Mandala Surabaya Catholic University

³⁾ Department of Pathology Anatomy, Faculty of Medicine, Widya Mandala Surabaya Catholic University

INTRODUCTION

Developments (*development*) is the process of change in functional capacity or the ability of the body's organs to work toward a state that is more and more organized (controllable) and according to respective their functions. Physical motor development is very important because it influences other developments such as cognitive, social and emotional development.¹

Gross motor movement is the ability to change various body positions using large muscles. Examples of gross motor skills are walking and running.² In the development domain, there are gross motor skills, fine motor skills, social skills, emotional abilities, language skills, and knowledge. Gross motor development is the beginning and basis of this developmental domain before a child continues the developmental stage to the next domain. Delays in gross motor development will have an impact on other developmental abilities.³

Based on the Basic Health Research (RISKESDAS) 2018, the total development index for Indonesian children in 2018 is 88.3%, while for Thailand it is 91.1%, Vietnam it 88.7%, and Kazakhstan is 85.5%. This data shows that the development of children is quite low when compared to other developing countries.⁴ Research conducted by Prastika (2020) in Surakarta from a total sample of 33 children (100%), it is known that children with normal gross motor development are 14 (42.4%) and children who experience delays in gross motor development are 19 (57.5 %).⁵ From these data, it can be concluded that the rate of impaired gross motor development of children in several regions in Indonesia is still quite high.

The process of developing a baby is influenced by many factors, one of which is nutrition. Nutritional elements in babies can be fulfilled by breastfeeding. Breast milk has significant benefits for children's development through nutrition, especially through essential fatty acids.

The World Health Organization (WHO) explains that exclusive breastfeeding means babies only receive breast milk and recommends that children should be exclusively breastfed until the age of 6 months.²

Based on the 2017 RISKESDAS data in Surabaya, the number of babies aged 0-6 months was 19,359 babies, while those who received exclusive breastfeeding were 12,603 babies (65.1%). This data shows the low level of exclusive breastfeeding in Surabaya when compared to other cities in East Java, such as Blitar (88.1%), Nganjuk (83.4%), Bojonegoro (88.2%), and Ponorogo (83.1%).⁶

In his discussion, research conducted by Kurniawan (2019) explained that the proportion of children who received exclusive breastfeeding had better development with a significance value of $p < 0.05$, indicating a relationship between exclusive breastfeeding and development.⁷

The low attainment rate of exclusive breastfeeding needs attention because it plays a role in the successful development of children. The benefits of breastfeeding are numerous, but the tendency of mothers not to carry out breastfeeding is getting bigger. Based on this background, we want to study breastfed babies and babies who are breastfed with breast milk substitutes (PASI) on differences in gross motor development, as the importance of breastfeeding children.

Gotong Royong Hospital (RSGR) was chosen as the place for the research to be carried out because most visitors to this hospital are pregnant women, children and toddlers. This study wanted to determine the differences in gross motor development of infants aged three months who were breastfed and those who were breastfed at the Gotong Royong Hospital.

METHOD

The type of research used is an observational analytic study with research

design *retro cross-sectional*. The population used in this study were babies born at Gotong Royong Hospital in Surabaya from July 2019-January 2020. The sample used in this study was babies aged three months born at Gotong Royong Hospital Surabaya who met the inclusion criteria and did not fulfil the exclusion criteria from July 2019-January 2020. The sampling technique was carried out by *random sampling* with the sample size calculated using a comparative numerical formula *matching / crossed over* two groups.

The inclusion criteria in the study were fit babies (APGAR) born at the Gotong Royong Hospital during the period July 2019-January 2020 who were members of the parent research and parents were willing to take part in research for babies and

mothers and signed the *informed consent* for the parent research. The exclusion criteria in this study were data from incomplete parent studies, babies with congenital abnormalities, and babies who had bad conditions (respiratory problems, sepsis, seizures), so they had to use a breathing apparatus(*ventilator*).

RESULTS

Based on the research that has been done following the data obtained about the character of respondents.

Table 1. Characteristics of Respondents

Variable	Frequency (n)	Percentage (%)
Age (years)		
20-25	6	12
26-30	32	64
31-35	7	14
36-40	5	10
Mother's Education		
Elementary School Graduate	1	2

Junior High School Graduate	2	4
High School Graduate Associate's Degree Graduate Bachelor Graduate Master Graduate	11	22
	5	10
	28	56
	3	6

Number Of Siblings

Only Child	30	60
1 Brother	15	30
2 Brothers	4	8
3 Brothers	1	2

The Gender's Of The Baby

Male	23	46
Female	27	54

Nutrition Pattern

Breastmilk	25	50
Breastmilk-Formula milk	25	50

Gross Motor Development

Normal	29	58
Suspect	21	42

Based on the research data, the most maternal age ranges are mothers with age 26-30 years old as many as 32 respondents with a percentage of 64%, the table data on maternal education shows that with the highest percentage were mothers graduated bachelor as many as 28 respondents (56%). Characteristics of the sample based on the number of brothers with the most frequent are the baby with 0 brothers(only child) were 30 (60%), sample characteristics most prevalent type of the gender of the babies were female babies 27 (54%).

In the distribution pattern of nutrition to babies who received breastmilk, as many as 25 babies (50%) and babies who received breastmilk-formula milk had the same number of 25

babies (50%). Characteristics of the sample based on gross motor development in infants with normal development as much as 29 (58%) and infants with suspect development based on observation sheets as much as 21 (42%).

Based on the test's analysis results, the *Chi-square* value of $p = 1,000$ ($p < 0.05$) is obtained.

According to the data obtained, it can be concluded that in this study, there was no significant difference in the gross motor development of infants aged three months who have received breastmilk and those who were received breastmilk-formula milk at Gotong Royong Hospital.

Table 2. Analysis of Differences in Gross Motoric Development of Babies Receiving Breastmilk and Receiving Breastmilk-Formula milk

Breastfeed	Gross Motor Development				Total n (%)	P Value
	Normal		Suspect			
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)		
for 3 months						
Yes	15	51,7%	10	47,6%	25 (100%)	1,000
No	14	48,3%	11	52,3%	25(100%)	
Total	29	58%	21	42%	50(100%)	

Based on the test's analysis results, the *Chi-square* value of $p = 1,000$ ($p < 0.05$) is obtained. According to the data obtained, it can be concluded that in this study, there was no significant difference in the gross motor development of infants aged three months who have received breastmilk and those who were received breastmilk-formula milk at Gotong Royong Hospital.

DISCUSSION

The differences in gross motor development of infants aged three months who have received breastmilk and those who were received breastmilk-formula milk it is influenced by many factors, especially the factors studied are maternal age, maternal education, number of

siblings, gender of the baby, and the pattern of the nutrition.

Based on the research data, the highest maternal age range is 26-30 years old, as many as 32 (64%). A similarity in research by Hastuti (2015) in Klaten shows that the highest frequency is mothers of productive age.⁸

Soetjningsih (2014) explains that child development is influenced by psychosocial factors including love and affection, the quality of child-parent interactions, emotional relationships, and parenting patterns influenced by the maternal age and the older the maternal age, the factors that support this development are less.⁹

The data table for maternal education shows that the highest percentage of mothers who passed bachelor is 28 (56%). Research conducted by Hardika (2018) with a p -value = 0.028 ($p < 0.05$) shows that there is a relationship between maternal knowledge and children's gross motor development.¹⁰ In his research showed that the higher the maternal education, the greater the practice to gross motor stimulation in children so that gross motor development of children is getting better.¹⁰

In the data related to the number of siblings, the most number of children who do not have siblings is 30 (60%), Sitoresmi (2015) in his research explained that children with suspect gross motor development that most working mothers are the only child, so that the lack of stimulation given to the child, the number of siblings acting as playmates can affect stimulating children's gross motor development.¹¹

In the table of the male gender, 23 babies (46%), while female babies have a frequency of 27 babies with a larger percentage (54%), Soetjningsih (2014) explains that in traditional societies, female babies tend to be viewed as having a lower status than male babies, which results in the provision of nutrition which can result in impaired gross motor development of the child.⁹

Karina (2015), in her research, concluded that there is a significant relationship between exclusive breastfeeding and children's motor development, the benefits of breastfeeding for children are the best source of nutrition because there are nutrients that are not found in other nutritional sources, to optimize endurance, optimize children's intelligence, improve relationships and support children's motor development.¹²

In the research that has been done, the results of gross motor development are divided into 2, normal and suspect. Babies with normal gross motor development were 29 babies (58%), while babies with suspect gross motor development were 21 babies (42%). Based on the results of research on children with normal and suspect gross motor development, it is not much different because gross motor development of children is not only influenced by nutritional factors but also physical needs (ASUH), moral needs/affection (ASIH) and mental stimulation needs (ASAH).⁹

Based on the research that has been done, there is no difference in gross motor development of infants aged three months who have received breastmilk and those who were received breastmilk-formula milk with a value of $p = 1,000$ ($p \leq 0.05$), indicating that there is no difference in gross motor development of infants aged three months who have received breastmilk and those who were received breastmilk-formula milk. Research conducted by Sari (2017) showed insignificant results with a test result value of Fisher ($p = 0.0130$) so that $p > \alpha$ showed no difference in gross motor development in infants who were exclusively breastfed and non-exclusively breastfed.¹³

Sari explained that there was no difference in her research due to other uncontrolled factors such as stimulation factors, where stimulation factors played a major role in the learning and development process, other factors such as

socioeconomic and the position of children in the family.¹³

Research conducted by Damayanti in 2015 also showed the same results, namely that there was no significant difference in the development of infants aged 0-6 months who were exclusively breastfed and babies who were breastfed non-exclusively with results ($p = 0.144$) where ($p < 0.05$), according to Damayanti, there was no difference due to researchers only paying attention to nutritional factors in the post-natal period and not examining other factors.¹⁴

Apart from nutritional factors that support children's gross motoric development, psychosocial stimulation factors are stimulated by the mother. The stimulation factor is related to maternal education because parents can receive insight and information from outside to provide good care with a good level of education.

Following research conducted by Kholifah (2014) in Kemayoran Surabaya shows that stimulation by the mother affects the gross motor development of children.¹⁵

The differences in the results that are not significant in this study are caused by many other factors that can influence children's gross motor development that is not controlled, including genetic factors, environmental factors (health care and immunization), physical environmental factors (geographical conditions, home conditions and sanitation), psychosocial factors (stimulation and quality of parental interaction), family factors (education, income, number of siblings and parenting patterns).

CONCLUSION

Based on the research that the researcher has done, the result is that there is no significant difference in the gross motor development of infants aged three months who have received breastmilk and those who were received breastmilk-formula milk at Gotong Royong Hospital.

REFERENCES

1. Aye T, Kuramoto-Ahuja T, Sato T, Sadakiyo K, Watanabe M, Maruyama H. Gross motor skill development of kindergarten children in Japan. *J Phys Ther Sci.* 2018;30(5):p.711–5.
2. Sit, Masganti. Psikologi Perkembangan Anak Usia Dini Jilid 1. Perdana Publishing, Medan. 2015.p.1-5.
3. Kliegman RM, Stanton BF, St Geme III JW, Schor NF, Behrman RE. Nelson textbook of pediatrics. Edisi ke-20. Toronto: Elsevier; 2016.p.48-56.
4. Riskesdas K. Hasil Utama Riset Kesehata Dasar (RISKESDAS). *J Phys A Math Theor [Internet].* 2018 [disitasi 2020 April 17];44(8):p.1–200.
5. Prastika HD, Sumarmi S. Hubungan Sulit Makan Pangan Hewani , Tingkat Asupan Energi , Asam Folat , Dan Seng Dengan Perkembangan Motorik Halus Dan Motorik Kasar Anak Prasekolah Di Tk Kristen Setabelan Surakarta Association between Eating Difficulty on Animal Based Foods , Energy ,. 2020;p.8–12.
6. Kementrian Kesehatan. Profil Kesehatan. 2016;p.100.
7. Kurniawan K, Mangunatmadja I. Faktor Risiko Eksternal terhadap Keterlambatan Motorik Kasar pada Anak Usia 6-24 Bulan: Studi Kasus-Kontrol. *Sari Pediatr.* 2019;21(1):p.24.
8. Hastuti BW, Machfudz S, Budi Febriani T. Hubungan Pengalaman Menyusui Dan Tingkat Pendidikan Ibu Dengan Pemberian Asi Eksklusif Di Kelurahan Barukan, Kecamatan Manisrenggo, Kabupaten Klaten. *J Kedokt dan Kesehat Indones.* 2015;6(4):p.179–87.
9. Soetjiningsih. Tumbuh Kembang Anak. 2014;p.25-168.
10. Hardika MD. Praktek Stimulasi Motorik Kasar Ditinjau dari Pengetahuan Ibu Mengenai Tahap Perkembangan Bayi 0-12 Bulan. *J Aisyah J Ilmu Kesehat.* 2018;3(1):p.29–38.
11. Sitoresmi, S., & Kusnanto, K. (2015). Perkembangan Motorik Anak Toddler pada Ibu Bekerja dan Ibu Tidak Bekerja. *Jurnal Pediomaternal*, 3(01).
12. Karina. ASI sebagai Pilihan untuk Perbaiki Perkembangan Motorik Bayi. *Majority.* 2015;4(7):p.85–90.
13. Kasar M, Bulan B. Perbedaan Perkembangan Yang Diberi Asi Eksklusif Dan Non Asi Eksklusif Di Kelurahan. 2017;(2):p.26–30.
14. Damayanti DF. Tumbuh kembang bayi 0-6 bulan menurut status ASI di Puskesmas Telaga Biru Pontianak. *J Vokasi Kesehat.* 2015;1(3):p.75–9.
15. Kholifah, Siti Nur, et al. "Perkembangan motorik kasar bayi melalui stimulasi ibu di kelurahan kemayoran Surabaya." *Jurnal Sumber Daya Manusia Kesehatan* 1.1 (2014).