

How to Cite

Darmayanti, P. A. R. ., & Armayanti, L. Y. . (2020). The differences between gross motor, fine motor and language development on toddler based on the age of breast milk weaning. *International Journal of Health & Medical Sciences*, 3(1), 123-129. <https://doi.org/10.31295/ijhms.v3n1.191>

The Differences between Gross Motor, Fine Motor and Language Development on Toddler Based On the Age of Breast Milk Weaning

Putu Ayu Ratna Darmayanti

Institute of Technology and Sciences Bali, Indonesia

Corresponding author email: darmayantiratna@gmail.com

Luh Yenny Armayanti

Institute of Technology and Sciences Bali, Indonesia

Email: armayanti61@gmail.com

Abstract---*Toddlers are a group of children who are in a period of development. Development is the increase in functions of the body that are more complex in gross motor skills, fine motor skills, and language. One of the factors that influence the development of toddlers is parenting patterns and breastfeeding. Stopping breastfeeding in children is known as weaning. This study aims to determine differences in gross motor, fine motor, and language development in toddlers based on the age of weaning breast milk. This study employed a comparative study. The data were collected through a retrospective. There were 100 toddlers at daycare in South Denpasar. The data were analyzed by using the Chi-Square test and the Mann-Whitney test. The finding showed that there were differences between gross motor, fine motor, and language in toddler toward the age of breast milk weaning ($p=0.000$). Toddlers who were weaned at the age of 12-24 months showed normal development of gross motor, fine motor, and language. Parents are expected to optimize breastfeeding until the toddler at the age of ≤ 24 months. Health services are expected to continue in providing information about the appropriate age of weaning breast milk, so there are no developmental delays.*

Keywords--- *breast-feeding, fine motor, gross motor, language, weaning.*

Introduction

Toddlers are a group of children who are in a unique period of growth and development. They have a pattern of growth and physical development, for example, fine motor and gross motor coordination as well as intelligence that is following the level of growth and development that the toddler is going through (Septiari, 2012). Development is the increase of structure and functions of the body that are more complex in gross motor skills, fine motor skills, language, and social personalities. The development process in toddlers will experience the results of the maturity interaction of the central nervous system and the other organs. For example, the development of the neuromuscular system, speech, emotion, and socialization (Anisah, 2016). When the children experience developmental disorders, you can experience delays in the development of the neuromuscular system, speech, emotional, and socialization skills. For example, delays in children's speech due to Global Delay Development (delays in general psychomotor development), sensory neurological disorders in hearing, Down syndrome, and autism (Arya, 2011).

Inadequate nutrition is one of the factors that can cause developmental disorders in children. The most important nutritional problem in Indonesia at this time is the lack of calories and protein in infants. This causes problems in motor development in toddlers. Motor development problems in toddlers include delays in motor development and a lack of sensitivity to the stimuli given (Imam, 2011). The nutrition of toddlers is influenced by the pattern of care. In parenting patterns, there is a practice of feeding toddlers and breastfeeding. Breast milk is recommended to be given to babies until the age of 2 years and it is exclusively recommended for 6 months of the infant. Breast milk is optimal nutrition for the infant that is beneficial for intelligence, growth, and development of children as well as antibodies

that protect the baby's body from allergies and other infectious diseases (Istiany & Rusilanti, 2013; Easterling et al., 2001; Rautava et al., 2002).

WHO recommends exclusive breastfeeding for the first six months of life in developing countries. This statement is related to the many influences that arise from breast milk weaning, and the various processes that can be used to wean (WHO, 2013). Stopping breastfeeding to a baby or weaning is the most critical period in a children's life. Weaning is a process of stopping lactation gradually or all at once (Fitria Ana, 2007). Meanwhile, early weaning is an effort to stop breastfeeding before six months or the transition period between breastfeeding and additional nutrition (Tara, 2007; Bancalari & Claire, 2013; Hess, 2001; Mal et al., 1994). Common reasons of mothers undergoing weaning off breast milk include insufficient milk or concerns about the baby's growth, pain during breastfeeding or mastitis, back to work, a new pregnancy, need a partner or other care providers to be able to feed the baby, or a baby's teeth are starting to grow. This situation may cause early weaning at less than 1 year, despite the mother's desire to continue breastfeeding (Canadian Pediatric Society, 2004).

The research was conducted at the Pediatric Neurology Polyclinic Dr. Ciptomangunkusumo Jakarta in 2012, regarding the potential for Global Development Delay. It was found that 151 (2.3%) children out of 6487 visits experienced global development delay. Most cases were not being able to walk and speak 71 (47.1%) cases, 84 (55.6%) men, and most of them were in the age of (13-22) months (Suwarba et al., 2012). Other studies also found that early weaning children (in less than 1 year), can affect language development (Luciana et al., 2005). Weaning can increase the risk of infection, especially diarrheal diseases. This is because babies consume less breast milk which contains anti-infective factors (Prasetyono, 2012). However, other studies have also found that there was a relationship between the length of breastfeeding without solid food and poor dietary habit. Babies are developmentally ready to receive solid foods at 6-month-old. Sucking and chewing are stimulants. When the stimulus is not applied while the development of the nerve is undergoing, the baby's nutritional needs will not be fulfilled. Delaying breastfeeding weaning and introduce solid food beyond the age of six months causes gross motor development, fine motor skills, and delay in speaking of the baby (Dewey, 2001).

Screening or early detection of infant development is to recognize the possibility of developmental disorders from the beginning. It can use standardized ways/tools such as the Pre-Screening Developmental Questionnaire because it is easier to use and the results are more appropriate for assessment of child development (Dhamayanti, 2016). South Denpasar area is one of the urban areas in Denpasar. Some mothers in Denpasar work outdoors. Childcare is handed over to grandmothers and even provided through daycare services. Nowadays, day care is growing especially in urban areas. This is due to the high market demand. Almost everyone in the family has children. However, the mother has no time to accompany their child throughout the full day (Kusumaningtyas, 2016). The insistence on economic needs makes many couples both husband and wife working all day especially in the city area, working hours duration and traffic is so time-consuming that parents do not have the opportunity to take care of their children (Ayuba, 2015).

Therefore, many toddlers are left in day care so that breastfeeding is stopped before 1 year old. Also, parenting patterns about feeding toddlers are less visible. For toddlers who weaned too early so that the needs of nutrients in breast milk cannot be obtained. Also, giving breastfeeding for more than 2 years is given to mothers who do not work. They think that breastfeeding can fulfil the nutritional needs of toddlers even though they are more than 2 years old so that the provision of additional nutritious food is less noticed. Weaning is better after the toddler is 1 year old and at the age of 2 (Marimbi, 2010).

Based on the description, the research question of this study is how the differences of gross motor, fine motor, and language development in toddlers, and the gross motor, fine motor, and language development in toddlers based on the age of breast milk weaning in daycare at south Denpasar. This study will provide basic data on the development of interventions for toddlers to have better development in toddlers' development period so they don't experience developmental delays.

Method

This study employed a comparative study with a retrospective approach where the effects (development of gross motor, fine motor, and language) are identified at this time, then risk factors (age of breast milk weaning) are identified. The sample population in this study were toddlers aged 3-5 years throughout the daycare at South Denpasar. The sampling of this study were 100 toddlers in daycare at South Denpasar. The research was conducted from June to July 2020 assisted by one midwife in assessing the development of gross motor, fine motor, and toddler language using the Developmental Pre-Screening Questionnaire. Midwives as enumerators already have an active

registration letter. The inclusion criteria in this study were toddlers aged 3-5 years who have done breast milk weaning. The mother has a toddler aged 3-5 years and registered in daycare at South Denpasar. The exclusion criteria in this study were parents who were unwilling to be study respondents and toddlers who have congenital abnormalities. The first stage of this study was parents had to fill out informed consent on google forms online. Online questionnaires were used google forms include demographic data of parents and toddlers and the age of breast milk weaning. They need 15 minutes to fill the google form. Before conducted the research, the researcher informed the parents about how to fill the online questionnaire. Meanwhile, assessment of the development of gross motor, fine motor, and toddler language was carried out in daycare assisted by a midwife while prioritizing health protocols in conducting the developmental assessment. Developmental Pre-Screening Questionnaire requires several tools namely balls, pencils, paper, beams, puzzles, and glasses to assess the development of gross motor and fine motor and use fairy tale books to assess language development in toddlers. The study was also supervised by the head of daycare.

The data were analyzed by using the Chi-Square test and Fisher's Exact Test to determine differences in the development of gross motor, fine motor, and language in toddlers against the age of breast milk weaning. This research has obtained an Ethics with Number 04.0047/KEPITEKES-BALI/VII/2020 dated July 23, 2020, from the Ethics Commission of the Faculty in the Institute of Technology and Science Bali (ITEKES Bali).

Findings

Respondent's characteristics

The characteristics of the respondents would be described in this section include the age, gender, number of family members, father's occupation, mother's occupation, father's education, mother's education, breast milk weaning age, and nutritional status of the respondent.

Table 1
Frequency distribution of respondent's characteristics

Variables	Frequency (n)	Percentage (%)
Age		
36-48 months	27	27
49-60 months	50	50
61-72 months	23	23
Gender		
Man	58	58
Woman	42	42
Family Members		
3-4 people	74	74
5-6 people	26	26
Father's Occupation		
Self-employed	12	12
Private	61	61
Civil Servants	27	27
Mother's Occupation		
House Wife	24	24
Self-Employed	5	5
Private	57	57
Civil Servants	14	14
Father's Education		
Elementary School	8	8
Junior High School	21	21
Senior High School	45	45
College	26	26
Mother's Education		

Elementary School	6	6
Junior High School	29	29
Senior High School	48	48
College	17	17
Age of Breast Milk Weaning		
≤ 6 months	41	41
≤ 12 months	36	36
≤ 24 months	23	23
Nutritional Status		
Good	38	38
Moderate	10	10
Malnutrition	6	6
Over	46	46
Gross Motor		
Suspected	15	15
Normal	85	85
Fine Motor		
Suspected	20	20
Normal	80	80
Language		
Suspected	25	25
Normal	75	75
Total	100	100

Based on Table 1. it can be concluded that in terms of age, half of the respondents (50%) were 48-60 months old, the majority of respondents were male (58%). The majority of family members (74%) of respondents were 3-4 people and the rest were >5 people.

In terms of the father's occupation, the majority of respondents were private workers (61%). The majority of mother's occupation (57%) were private workers. In terms of father education, the majority of respondents (45%) were senior high school. The majority of mother's education (48%) were senior high school. Breast milk weaning in toddlers was greatly varied. The majority of respondents (41%) carried out breast milk weaning at the age ≤ 6 months. The majority of respondents (46%) had over nutritional status or in other words obese. There were 10% of respondents who had less nutritional status, even 6% of toddlers who were malnourished. The majority of gross motor development of toddler were in normal category (85%), the majority of fine motor development of toddlers were in category (80%), and the majority of language development of toddler were in normal category (75%).

Table 2
Age, family members, and age of breast milk weaning

Variable	Age ± SD	Min	Max
Age (months)	3.96±0.710	0	24
Total of Family Members	3.99±0.835	3	6
Age of Breast Milk Weaning (months)	0.50±0.732	36	72

Based on Table 2 it can be concluded that the average age of respondents was 3.96±0.710 months with a minimum value of 0 months and a maximum of 24 months. The average number of family members was 3.99±0.835 people and the average age of breast milk weaning was 0.50±0.732 months, with a minimum value of 36 months and a maximum of 72 months.

Differences in the development of gross and fine motor to the age of breast milk weaning

The development of gross and fine motor motors based on the age of breast milk weaning was tested using Mann Whitney tests. As in Table 3. below.

Table 3
The differences in the development of gross and fine motor to the age of breast milk weaning

	<i>Mann-Whitney</i>	Z	Asymp. Sig. (2-tailed)
Gross Motor	453.500	-2.087	0.003
Fine Motor	526.000	-2.774	0.001

Mann-Whitney tests showed the differences between gross motor and fine motor development in toddlers. Based on Table 5, the Mann-Whitney test analysis of gross motor development showed a significant probability value (0.003) which meant that broadly there was a difference in gross motor development based on breast milk weaning age and fine motor development indicated a significant probability value (0.001) which meant that there was a difference in fine motor development based on the age of breast milk weaning.

Differences in language development to breast milk weaning age

Table 4
Differences in language development to the age of breast milk weaning

Language Development	The Age of Breast Milk Weaning						<i>p</i>	<i>Fisher's Exact (2-sided)</i>
	≤ 6 months		≤ 12 months		≤ 24 months			
	N	%	N	%	N	%		
Suspected	23	92	2	8	0	0	0,000	0.000
Normal	18	24	34	45,33	23	30,67		

Based on table 4 it can be concluded that there was a difference between language development to the age of breast milk weaning with a value of $p=0,000$. Toddlers with suspected category were almost entirely experienced who were in the age of breast milk weaning ≤ 6 months (92%), toddlers with normal category were half experienced by toddlers who were the age of breast milk weaning ≤ 12 months (45.33%).

Discussion

Breast milk has a major impact on toddlers' health, growth, and development. Babies should get breastfeeding for six months, then introduced to additional nutritious foods while still breastfeeding until 2 years old. This study describes the differences in gross motor, fine motor, and language development based on the age of breast milk weaning in toddlers as measured by the Developmental Pre-screening Questionnaire. WHO has recommended weaning breast milk after the baby turns to 2 years old. The study focused on assessing the gross motors, fine motors, and language development indicating that the majority of a toddler is in the normal developmental category.

The Mann Whitney test analysis showed that gross motor development had a significant probability value (0.003) which means there are differences in gross motor development based on the aging breast milk weaning and fine motor development indicates a significant probability value (0.001) which means that there is a difference in fine motor development based on the age of breast milk weaning. Fisher's Exact test showed that there is a difference between language development in toddlers based on the age of breast milk weaning with a value of $p=0.000$. Toddlers with the suspected category are almost entirely experienced by toddlers who are the age of breast milk weaning ≤ 6 months (92%), toddlers with the normal category are experienced by toddlers who are breast milk weaning age ≤ 12 months (45.33%).

Other studies in Padang Indonesia in 2019 also showed similar things. Where babies who get exclusive breastfeeding are obtained 83.3% experienced normal development and 16.7% have impaired development (spec). Providing breastfeeding becomes a biological environment factor and foster care needs that contain the best nutrition for babies until the age of 6 months (breast milk only without food and other beverages except for vitamins, minerals, or medicines in the form of drops or syrups) (Intani, 2019).

Breast milk has good nutrition for the development of babies such as taurine is a form of egg white substance that is only found in breast milk. It is useful for neurotransmitters that play an important role in the development process of the brain and retina, lactose which is the main carbohydrate in breast milk that serves as a source of energy for the

needs of growing babies and fats in breast milk contain essential fatty acid components namely linoleic acid and linoleic alda acid to be processed baby body becomes AA and DHA (Arini, 2012). Breast milk has higher fat levels than formula. High-fat levels are needed to support brain development in infants. Arachidonic Acid (AA) and Docosahexaenoic Acid (DHA) are long-chain polyunsaturated fatty acids that not only work for energy sources but also essential for the development of the brain cells that can affect the mental functioning, vision, and psychomotor development of infants (Maryunani, 2012).

Breast milk is very useful as the most complete food nutrition which is a foster need for babies, breastfeeding also provides immunity, increases affection, can support motor development, support personality development, emotional intelligence, spiritual maturity, and good social relationships. During breastfeeding, there is physical and psychic contact between the mother and the baby, the toddler's need for compassion, attention, and appreciation give a sense of security to the baby and there is a stimulation process that stimulates the formation of cooperation between brain tissues. Thus, could stimulate the basic ability of the development of the baby early on, it occurs through sound, eye gaze, heart rate, touch, radiance, and sense of breast milk (Khamzah, 2012).

Research also conducted in North Sumatra in 2017, stated that babies who don't wean of breast milk early experience faster in growing. Infants who get exclusive breast milk would have good nutritional status so that the baby can perform gross motor skills as well as a fine motor (Aisha, 2017). This is following the WHO theory (2013), that exclusive breastfeeding helps the development of babies as well as the intellectual development process of the child.

This study also showed that the majority of respondents had private working mothers (57%). Breastfeeding mothers who work with organizations, industries, or institutions tend to have less time to provide exclusive breastfeeding, taking care of their children due to a hectic schedule at work. This has a major influence on the mother breastfeeding behavior so that the mother weans the child less than the exclusive breastfeeding period which is less than six months (Ashigabu et al., 2014). Proper nutrition from the beginning of pregnancy to a two-year-old has a huge impact on a child's health, well-being, and future success. This can be achieved through proper maternal nutrition during pregnancy, exclusive breastfeeding, and proper breast milk weaning period (Foote & Marriott, 2013). Research in Western Ethiopia in 2017 showed that only a quarter (23.9%) of mothers who have practiced proper breast milk weaning. The low practice of proper breast milk weaning is related to the low maternal knowledge of the right weaning period. Public health education is highly recommended to increase proper breast milk weaning time (Bewket Zeleke et al., 2017). The findings of this study provide further evidence of the impact of early weaning of breast milk on the development of gross motors, fine motors, and language development. Therefore, serious consideration in weaning breast milk in toddlers and appropriate educational strategies to ward off various myths related to breast milk weaning, providing early additional nutritional food, and consider the socio-cultural aspects. Also, it is pursued to develop an early detection program and early stimulation of toddler development during the COVID-19 pandemic. The limitation of this research is that this research is a comparative study with a retrospective approach so there would be certain biases. Information about weaning only obtained from the mother because there is no other way to obtain such information and therefore may cause memory bias. The findings of this study could not be generalized to the broader population because it is only done in daycare at South Denpasar Bali. The reliability of toddler developmental data is assessed with the Developmental Pre-Screening Questionnaire examination by midwives to ensure data quality. The date of birth is confirmed from the children's book or family card.

Conclusion

Toddlers who experienced breast milk weaning at the age of 12-24 months showed the development of gross motor, fine motor, and normal language. Parents are expected to optimize breastfeeding until the age of ≤ 24 months and the health service is expected to continue providing information to the mother about the appropriate age of breast milk weaning and other weaning practices so that the toddler's development period is not interrupted which can lead to developmental delays.

Acknowledgments

Researchers express their thanks to daycare workers at South Denpasar and the respondents who participated in this study.

References

- Aisyah, S. (2017). Pengaruh ASI Eksklusif Terhadap Tumbuh Kembang Usia 0-12 Bulan. *Fakultas Kedokteran Universitas Sumatera Utara*, 10.
- Anisah. (2016). Pengaruh ASI eksklusif terhadap Tumbuh Kembang Bayi usia 0-6 bulan.
- Arini, H. (2012). Mengapa seorang ibu harus menyusui. *Yogyakarta: Flash Books*.
- Arya. (2011). Pengaruh terapi aktivitas motorik terhadap perkembangan motorik pada anak usia 0-12 bulan. , pp. 5–10.
- Ashigabu, J. T., Yunus, S. A., Abubakar, T. M. (2014). Attitudes Towards Breastfeeding and Weaning Among Nursing Women. *International Journal Of Scientific Research*, 3(10), 483-485.
- AYUBA, N. (2015). Hubungan Peran Ibu dalam Stimulasi Dini dengan Perkembangan Anak Usia Toddler di Desa Hutabohu Kecamatan Limboto Barat Kabupaten Gorontalo. *Skripsi*, 1(841411071).
- Bancalari, E., & Claire, N. (2013). Strategies to accelerate weaning from respiratory support. *Early human development*, 89, S4-S6. [https://doi.org/10.1016/S0378-3782\(13\)70002-1](https://doi.org/10.1016/S0378-3782(13)70002-1)
- Bewket Zeleke, L., Welday Gebremichael, M., Mehretie Adinew, Y., & Abebe Gelaw, K. (2017). Appropriate weaning practice and associated factors among infants and young children in Northwest Ethiopia. *Journal of Nutrition and Metabolism*, 2017.
- Canadian Paediatric Society. (2004). Weaning from The Breast. *Paediatrics & Child Health Journal*, 9(4), 249–253.
- Dewey, K. G. (2001). Nutrition, growth, and complementary feeding of the breastfed infant. *Pediatric Clinics of North America*, 48(1), 87-104. [https://doi.org/10.1016/S0031-3955\(05\)70287-X](https://doi.org/10.1016/S0031-3955(05)70287-X)
- Dhamayanti, M. (2016). Kuesioner praskrining perkembangan (KPSP) anak. *Sari Pediatri*, 8(1), 9-15.
- Easterling, T., Davis, C., & Bond, E. F. (2001). Breast-feeding by a cyclosporine-treated mother. *Obstetrics & Gynecology*, 97(5), 816-818. [https://doi.org/10.1016/S0029-7844\(01\)01122-X](https://doi.org/10.1016/S0029-7844(01)01122-X)
- Fitria, A. (2007). Panduan lengkap kesehatan wanita. *Yogyakarta: Gala Ilmu Semesta*.
- Foote, K. D., & Marriott L. D. (2013). Weaning of Infants. *Archives Of Disease In Childhood Journal*, 88(6):488–492.
- Hess, D. (2001). Ventilator modes used in weaning. *Chest*, 120(6), 474S-476S. https://doi.org/10.1378/chest.120.6_suppl.474S
- Imam, M. (2011). Pengaruh ASI eksklusif dan ASI non eksklusif terhadap status gizi dan tumbuh kembang bayi usia 0-12 bulan. *Fakultas Ilmu Keperawatan universitas Klatat*, 16, s27-s42.
- Intani, T. M., Syafrita, Y., & Chundrayetti, E. (2019). Hubungan Pemberian ASI Eksklusif dan Stimulasi Psikososial dengan Perkembangan Bayi Berumur 6-12 Bulan. *Jurnal Kesehatan Andalas*, 8(1S), 7-13.
- Istiany, A., & Rusilanti. (2013). Gizi Terapan. Bandung: Remaja Rosdakarya.
- Khamzah, S. N. (2012). Segudang keajaiban ASI yang harus Anda Ketahui. *Yogyakarta: Flashbooks*, 160-2.
- Kusumaningtyas, K. (2016). Faktor Pendapatan Dan Pendidikan Keluarga Terhadap Perkembangan Motorik Halus Anak Usia 3-4 Tahun. *Jurnal Penelitian Kesehatan "SUARA FORIKES"(Journal of Health Research" Forikes Voice")*, 7(1).
- Luciana, V.V., Wilma, T., Melissa A.O., Melchior, T.H., Grechifabiana, C.P. & Valera. (2005). Breast-Feeding And Deleterious Oral Habits In Mouth And Nose Breathers. *Brazilian Journal Of Otorhinolaryngology*: 71(6):747-751
- Mal, M. E., McCall, C. A., Cummins, K. A., & Newland, M. C. (1994). Influence of preweaning handling methods on post-weaning learning ability and manageability of foals. *Applied Animal Behaviour Science*, 40(3-4), 187-195. [https://doi.org/10.1016/0168-1591\(94\)90060-4](https://doi.org/10.1016/0168-1591(94)90060-4)
- Marimbi, H. (2010). Tumbuh kembang, status gizi dan imunisasi dasar pada balita. *Yogyakarta: Nuha Medika*, 26-7.
- Maryunani, A. (2012). Inisiasi menyusui dini, ASI eksklusif dan manajemen laktasi. *Jakarta: Trans Info Media*.
- Prasetyono, D. (2012). Buku Pintar ASI Eksklusif Pengenalan, Praktik, dan Kemanfaatan-kemanfaatannya. Yogyakarta: Diva Press
- Rautava, S., Kalliomäki, M., & Isolauri, E. (2002). Probiotics during pregnancy and breast-feeding might confer immunomodulatory protection against atopic disease in the infant. *Journal of allergy and clinical immunology*, 109(1), 119-121. <https://doi.org/10.1067/mai.2002.120273>
- Septiari, B. B. (2012). Mencetak balita cerdas dan pola asuh orang tua. *Yogyakarta: Nuha Medika*, 163-174.
- Suwarba, I. G. N., Widodo, D. P., & Handryastuti, R. S. (2016). Profil klinis dan etiologi pasien keterlambatan perkembangan global di Rumah Sakit Cipto Mangunkusumo Jakarta. *Sari Pediatri*, 10(4), 255-61.
- Tara. (2007). Hubungan Antara Lama Penyapihan Dengan Tingkat Frekuensi Sakit Anak Usia 6-24 Bulan Desa Kembang Kecamatan Ampel Kabupaten Boyolali. *Skripsi*. Surakarta: Universitas Muhammadiyah Surakarta.
- World Health Organization. (2013). Essential Nutrition Actions: Improving Maternal, Newborn, Infant and Young Child Health and Nutrition. Geneva, Switzerland: World Health Organization.