

CORRELATION BETWEEN BREASTFEEDING AND CHILD DEVELOPMENT AGED 3-24 MONTHS IN KEPUTIH PUBLIC HEALTH CENTER, SURABAYA, INDONESIA

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ABSTRACT

The prevalence of developmental disorders of children 0-3 years in Indonesia since 2011 remains high, it is about 13 - 62%. In 2018 this disorder was still obtained by 24% in children aged 0-2 years in North Surabaya, Indonesia. Factors that influence child development include breastfeeding. Exclusive breastfeeding in Indonesia is ranked 65th out of 97 countries in the world with an achievement of 37.3%. The Keputih Health Center in Surabaya achieved a high level of exclusive breastfeeding (84.47%). Some research results have not been able to confirm the relationship between impaired child development and breastfeeding, therefore this cross-sectional study aims to determine the relationship between breastfeeding and the development of children aged 3-24 months. A total of 78 mothers who have children aged 3-24 months were randomly selected and met the criteria to be the sample. The mother was asked about breastfeeding and the child's development. Questions for breastfeeding include the duration and mode of administration, while assessing the child's development using the Pre-Screening Child Development Questionnaire. We analyzed the relationship between the two variables by doing the chi square test. As many as 59% mothers give exclusive breastfeeding, and 92.3% mothers give breast milk directly. The development of the children who were not according to age ranged from 15.4% to 28.2%. The duration of breastfeeding has a relationship with the child's fine motor development ($p = 0.024$) and general child development ($p = 0.002$). Meanwhile, the method of breastfeeding has a relationship with the development of speech and language of children ($p = 0.018$). Breastfeeding is related to child development. The breastfeeding program needs to be improved and get community support in order to improve child development.

Keywords: *Breastfeeding, Child Development, Children Aged 3-24 Months.*

ABSTRAK

Prevalensi gangguan perkembangan anak 0-3 tahun di Indonesia sejak tahun 2011 masih tinggi yaitu sebesar 13 – 62%. Pada tahun 2018 gangguan ini masih di dapat sebesar 24% pada anak usia 0-2 tahun di Surabaya Utara, Indonesia. Faktor – faktor yang mempengaruhi perkembangan anak

antara lain adalah pemberian ASI. ASI Eksklusif di Indonesia berada di peringkat 65 dari 97 negara di dunia dengan capaian sebesar 37,3%. Puskesmas Keputih di Surabaya mencapai tingkat ASI Eksklusif cukup tinggi yaitu sebesar 84,47%. Beberapa hasil penelitian belum dapat memastikan hubungan antara gangguan perkembangan anak dengan pemberian ASI eksklusif, karenanya penelitian cross sectional ini bertujuan menentukan hubungan antara pemberian ASI dengan perkembangan anak umur 3 – 24 bulan. Sebanyak 78 ibu yang memiliki anak berusia 3-24 bulan terpilih secara acak dan memenuhi criteria untuk menjadi sampel. Ibu ditanya tentang pemberian ASI pada anak dan juga perkembangan anaknya. Pertanyaan untuk pemberian ASI meliputi durasi dan cara pemberiannya sementara penilaian perkembangan anak menggunakan Kuesioner Perkembangan Pra Skrining Anak. Penentuan hubungan kedua variable dengan melakukan uji *chi square*. Sebanyak 59% ibu memberikan ASI Eksklusif, dan 92,3% ibu memberikan ASI secara langsung. Perkembangan anak yang tidak sesuai umur berkisar 15,4% hingga 28,2%. Durasi pemberian ASI mempunyai hubungan dengan perkembangan motorik halus anak ($p=0.024$) dan perkembangan anak secara umumnya ($p=0.002$). Sementara cara pemberian ASI mempunyai hubungan dengan perkembangan bicara dan bahasa anak ($p=0.018$). Pemberian ASI berhubungan dengan perkembangan anak. Program pemberian ASI perlu ditingkatkan dan mendapatkan dukungan masyarakat guna peningkatan perbaikan perkembangan anak.

Kata Kunci: Pemberian ASI, Perkembangan Anak, Anak Umur 3 – 24 Bulan.

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INTRODUCTION:

Prevalence of children development disorders in Indonesia was 13-18% in 2011. 39.1% of babies experienced a delay of more than two aspects of development in 2013 in Dr. Soetomo General Hospital.¹ There were 62% of children aged 0-3 years whose development was delayed in Pelindo Husada

Citra Hospital in 2016.² Child development which is disturbed will cause permanent damage if it is not intervened up to the age of two.

One of the factors that influence child development is breastfeeding.³ World Health Organization (WHO) recommends that breastmilk is given exclusively for the first

six months and continued until the age of two with complementary foods to achieve optimum growth and development.⁴ Riset Kesehatan Dasar in 2018 showed exclusive breastfeeding was 37.3% in Indonesia. This was still lower than the national target of 80%.⁵ Dinas Kesehatan Jawa Timur reported that babies who had exclusive breastfeeding reached 75.7% in 2017.⁶ Breastfed 2-year infants in East Java were 81.42%, particularly in Surabaya on the average up to 10.44 months.⁷

The percentage of exclusively breastfed children in Surabaya was 71.53%, while one of the Health Centers that high percentage was Keputih Health Center (84.47%).⁸ Research about breastfeeding and child development had been conducted at Banyu Urip Health Center with exclusive breastfeeding 26.92%, Tenggilis Health Center 26.7%, and Kedungdoro Health Center 40.6%.⁹⁻¹¹ However, there has been no research about child development at Keputih Health Center.

Delgado and Matijasevich stated that there was no correlation between breastfeeding for 2 years with children's development.¹² Mantu et al revealed no significant difference in the development of children who were exclusively breastfed with formula-fed children.¹³ Nevertheless, other

studies suggested that children who were exclusively breastfed had better cognitive, motor, language, and psychosocial development, while those who were not breastfed would suffer at least one developmental domain disorder.¹⁴⁻¹⁶ Based on the above phenomenon, researchers aimed to investigate the correlation between breastfeeding and children's development.

SUBJECT AND METHODS:

This study was conducted at Keputih Health Center from September 2019 to February 2020 with observational analytical design through a cross-sectional approach. Randomly selected 78 samples fulfilled the inclusive and exclusive criteria. The sample was mothers who had children aged 3 – 24 months. Inclusive criteria meant mothers who were willing to be respondents and children whose parents were still complete. Exclusive criteria meant children who were born prematurely, had low birth weight and congenital abnormalities. Mothers signed written informed consent if they were willing to be respondents. They were interviewed about breastfeeding concerning the duration, method (directly breastfeeding or expressed breast milk feeding), and feeding other than breast milk. Children development were interviewed based on the list in Pre-screening Developmental Questionnaires (PDQ) which

included four aspects of development, namely gross motor, fine motor, speech and language as well as social and independence. The children's development was assessed by the researchers under the auspices of Dr. Soetomo General Hospital pediatric residents.

The variables used were breastfeeding and *3 – 24 months old children development*. Breastfeeding included breastfeeding duration and breastfeeding method. Indicators of breastfeeding duration were exclusive breastfeeding and non-exclusive breastfeeding. The child whose first 6 months got breast milk only without complementary foods or beverages were classified as exclusive breastfeeding. Breastfeeding accompanied by additional foods or beverages before 6 months old, including children who were less than 6 months old, whether they got additional food or breast milk only was classified as non-exclusive breastfeeding. Indicators of breastfeeding methods were direct breastfeeding and expressed breast milk feeding.

Child development was interpreted based on the total score of 'Yes' answers from 10 questions listed in PDQ according to the child's age. Score 6 or below was a possible deviation, 7 – 8 was dubious, and 9 – 10 was appropriate. Every question from each aspect

of a child's development if answered 'Yes', then it was categorized as age-appropriate. Meanwhile, one or more questions from each aspect of a child's development if answered 'No', then it was categorized as age-inappropriate. Correlation between breastfeeding and 3 – 24 months old children development was analyzed with the Chi-Square test. This study has obtained the approval of ethical clearance from the ethics committee of Airlangga University No. 225/EC/KEPK/FKUA/2019.

RESULTS:

The sample of mothers in this study had a range of age 18 to 46 years old with an average of 29.5 and a standard deviation of 5.609. The majority characteristics of mothers were aged 25 – 34 years (56,4%), highly educated (75,6%), and housewives (71,8%). *The children's age was at 3 – 24 months old, with an average of 12.8 and a standard deviation of 5,931.* The majority characteristics of children were aged 12 – 18 months (29,5%) and boys (52,6%).

Mothers who exclusively breastfeed were 53,8% whereas mothers who directly breastfeed were 92,3. Based on PDQ, the assessment of overall children's development indicated 71,8% age-appropriate. Assessed from each aspect, gross motor which appropriates to age was

75,6%, fine motor 75,6%, speech and language 78,2%, social and independence 84,6%. Duration breastfeeding was found to be related to overall children's development

($p=0.014$) and fine motor aspect ($p=0.025$) (**Table 1**). While breastfeeding method was found to be related to children's speech and language aspects ($p=0,018$) (**Table 2**).

Table 1. Distribution of Breastfeeding Duration and Children's Development

| Children's Development | Breastfeeding Duration | | p-value |
|--------------------------------|-----------------------------|-------------------------|---------|
| | Non-exclusive Breastfeeding | Exclusive Breastfeeding | |
| | n (%) | n (%) | |
| Overall Development | | | |
| Dubious | 15 (41.7) | 7 (16.7) | 0.014 |
| Appropriate | 21 (58.3) | 35 (83.3) | |
| Gross Motor | | | |
| Age-inappropriate | 9 (25) | 10 (23.8) | 0.903 |
| Age-appropriate | 27 (75) | 32 (76.2) | |
| Fine Motor | | | |
| Age-inappropriate | 13 (36,1) | 6 (14.3) | 0.025 |
| Age-appropriate | 23 (63,9) | 36 (85.7) | |
| Speech and Language | | | |
| Age-inappropriate | 7 (19,4) | 10 (23.8) | 0.642 |
| Age-appropriate | 29 (80.6) | 32 (76.2) | |
| Social and Independence | | | |
| Age-inappropriate | 7 (19,4) | 5 (11,9) | 0.358 |
| Age-appropriate | 29 (80.6) | 37 (88,1) | |

DISCUSSION

Our results showed significant correlations between breastfeeding duration and overall children's development ($p = 0.014$). This is similar to a study by Prasetyawati et al figuring out that exclusive breastfeeding was associated with overall children's development in their 1000 First Day of Life.¹⁷ Ara et al reported children 6-12 months old who were not exclusively breastfed would have a risk of development 3.8 times worse compared to children who were

exclusively breastfed.¹⁸ In contrast, Khudri et al stated that there was no correlation between exclusive breastfeeding and 12 – 24 months of children's development.¹⁹ Breast milk requires to be given exclusively for 6 months because breast milk has complete nutrients. Furthermore, breast milk protects the child against diseases such as diarrhea, respiratory infections, eczema, and allergies, so child development can be more optimal.²⁰

Tabel 2. Distribution Frequency of Breastfeeding Method and Children's Development

| Children's Development | Breastfeeding Method | | p-value |
|--------------------------------|----------------------|-------------------------------|---------|
| | Direct Breastfeeding | Expressed Breast Milk Feeding | |
| | n (%) | n (%) | |
| Overall Development | | | |
| Dubious | 21 (29,2) | 1 (16,7) | 0.670 |
| Appropriate | 51 (70,8) | 5 (83,3) | |
| Gross Motor | | | |
| Age-inappropriate | 17 (23,6) | 2 (33,3) | 0.630 |
| Age-appropriate | 55 (76,4) | 4 (66,7) | |
| Fine Motor | | | |
| Age-inappropriate | 18 (25) | 1 (16,7) | 1,000 |
| Age-appropriate | 54 (75) | 5 (83,3) | |
| Speech and Language | | | |
| Age-inappropriate | 13 (18,1) | 4 (66,7) | 0.018 |
| Age-appropriate | 59 (81,9) | 2 (33,3) | |
| Social and Independence | | | |
| Age-inappropriate | 12 (16,7) | 0 (0) | 0.582 |
| Age-appropriate | 60 (83,3) | 6 (100) | |

In this study, breastfeeding duration also correlated with the children's fine motor ($p=0.025$). This result is in line with Anggraeni that exclusive breastfeeding correlated with the fine motor of 7-24 months old children.²¹ This contrasts with a study by Choi et al. that there was no correlation between breastfeeding duration and child fine motor.²² Fine motor is a movement of small muscles with accurate coordination such as touching, holding, and composing blocks.²³ This ability requires the maturity of motoric, visual, and non-verbal intellect functions to focus the movements.³ Breast milk contains essential fatty acids as Long Chain Polyunsaturated Fatty Acids (LCPUFA)

especially Arachidonic Acid (AA) and Docosahexaenoic Acid (DHA) which are useful for brain development, vision tissue, neural tissue, and motor coordination of children.^{24,25} Breast milk also contains taurine, an essential amino acid that is required for eyes and brain development.³

Breastfeeding duration did not correlate with the children's gross motor ($p=0.903$), speech and language ($p=0.642$), and social and independence ($p=0.358$). This is due to the sample of mothers (87.2%) many had children above 6 months old. Children at that age already get complementary foods in addition to breast milk.⁴ The majority of mothers also had higher education (75.6%).

The higher the education, the mother has better knowledge in supporting child development. Mothers with higher education can be role models and mentors in children's daily lives.²⁶

The breastfeeding method correlated with children's speech and language development ($p=0.018$). This is supported by Neiva et al. that the breastfeeding method was related to the speech ability of children.²⁷ Barbosa et al. stated that there was a correlation between the use of bottles and language difficulties in 3-5 years old children.²⁸ This is contrasted to Pang et al. that there was no correlation between the breastfeeding method with the children's speech and language.²⁹ The development of speech and language requires a perception of language in the brain and motor interaction between mouth muscles. Children who breastfeeding directly will use the strength of their mouth muscles to suck the mother's breast than by using a bottle.³⁰ Bottle pacifiers had a negative pressure mechanism for milk production that caused children to lack control over the flow rate of milk.³¹ The ability to suck involves sound-forming muscles of children that play an important role in their speech and language development.³²

The result showed that the breastfeeding method did not correlate with overall children's development ($p=0.670$), gross motor ($p=0.630$), fine motor ($p=1,000$), and social and independence ($p=0.582$). This was due to 71.8% of mothers were housewives. Mothers who do not work have more time with their children, thus they pay good attention to the children's development.³³

CONCLUSION:

This study concludes that breastfeeding duration was related to overall children's development, especially in the fine motor aspect. The breastfeeding method was related to children's speech and language aspects. Besides, further research is needed on the correlation between breastfeeding and children's development by increasing the sample.

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REFERENCES:

1. Arumsari DR, Faizi M, Nuswantoro D, Utami S. Faktor risiko yang berhubungan dengan keterlambatan perkembangan global pada balita. *Berkala Ilmiah Mahasiswa Kebidanan*

- Indonesia. 2015;3(2):7–14.
2. Natalia V. Profil pasien anak balita dengan keterlambatan perkembangan di pelayanan Klinik Spesialis Rehabilitas Medik Rumah Sakit PHC Surabaya [undergraduate thesis]. Surabaya: Widya Mandala Catholic University; 2016.
 3. Soetjningsih, Ranuh IG. G. Tumbuh Kembang Anak. 2nd ed. Jakarta: EGC; 2013.
 4. World Health Organization. Infant and Young Child Feeding: Model Chapter for Textbooks for Medical Students and Allied Health Professionals. Switzerland: WHO; 2009.
 5. Kementerian Kesehatan RI. Hasil Utama Riskesdas Tahun 2018. Indonesia: Kemenkes RI; 2018.
 6. Dinas Kesehatan Provinsi Jawa Timur. Profil Kesehatan Provinsi Jawa Timur Tahun 2017. Surabaya: Dinkes Provinsi Jawa Timur; 2018.
 7. Badan Pusat Statistik. Rata-rata Lama Pemberian ASI Kepada Anak Usia 0-23 Bulan (Baduta) di Jawa Timur Menurut Kabupaten/Kota dan Jenis Kelamin, 2017 [Internet]. BPS. 2017 [cited 2019 Apr 23]. Available from: <https://jatim.bps.go.id/statictable/2018/01/31/804/rata-rata-lama-pemberian-asi-kepada-anak-usia-0-23-bulan-baduta-di-jawa-timur-menurut-kabupaten-kota-dan-jenis-kelamin-2017.html>
 8. Dinas Kesehatan Kota Surabaya. Profil Kesehatan Kota Surabaya Tahun 2017. Surabaya: Dinkes Kota Surabaya; 2018.
 9. Nurjanah S. ASI eksklusif meningkatkan perkembangan bayi usia 6 – 12 bulan di wilayah kerja Puskesmas Banyu Urip Surabaya. Jurnal Ilmiah Kesehatan. 2015;8(2):221–8.
 10. Nurjannah A. Hubungan pemberian ASI eksklusif dengan tumbuh kembang pada bayi usia 0 – 6 bulan di Puskesmas Kedungdoro [undegraduate thesis]. Surabaya:Airlangga University; 2017.
 11. Nuzula TM. Hubungan pemberian ASI eksklusif terhadap tumbuh kembang bayi usia 6 bulan di Puskesmas Tenggilis [undegraduate thesis]. Surabaya:Airlangga University; 2017.
 12. Delgado C, Matijasevich A. Breastfeeding up to two years of age or beyond and its influence on child growth and development: a systematic review. Cad Saude Publica.

- 2013;29(2):243–65.
13. Mantu MR, Setiawan A, Handayani N. Hubungan antara pemberian ASI eksklusif dengan perkembangan anak berdasarkan Kusioner Pra-Skrining perkembangan di Rumah Sakit Tarakan Jakarta. *Jurnal Muara Sains, Teknologi Kedokteran dan Ilmu Kesehatan*. 2019;2(2):512–7.
 14. Oddy WH, Robinson M, Kendall GE, Li J, Zubrick SR, Stanley FJ. Breastfeeding and early child development: A prospective cohort study. *Acta Paediatr*. 2011;100(7):992–9.
 15. Tasnim S. Effect of breast feeding on child development: At birth and beyond. *South East Asia Journal of Public Health*. 2015;4(1):4–8.
 16. Tan S, Mangunatmadja I, Wiguna T. Risk factors for delayed speech in children aged 1-2 years. *Paediatr Indones*. 2019;59(2):55–62.
 17. Prasetyawati N, Tamtomo DG, Hanim D, Salimo H. The correlation between child spacing (heading), exclusive breastfeeding and parenting with child development at first 1000 days of life. *Indian J Public Health Res Dev*. 2019;10(12):1890–4.
 18. Ara M, Sudaryati E, Lubis Z. Perbedaan perkembangan bayi usia 6-12 bulan berdasarkan pemberian ASI. *Jurnal Muara Sains, Teknologi Kedokteran dan Ilmu Kesehatan*. 2018;2(1):216–24.
 19. Khudri G, Fadlyana E, Sylviana N, Padjadjaran U, Padjadjaran U. Association between exclusive breastfeeding and child development. *Althea Medical Journal*. 2016;3(1):79–84.
 20. Kramer M, Kakuma R. Optimal duration of exclusive breastfeeding (Review). *Cochrane Database Syst Rev*. *Cochrane Database Syst Rev*. 2012;(8).
 21. Anggraeni T. Hubungan pemberian ASI eksklusif dengan perkembangan motorik halus anak usia 7-24 bulan di Desa Jembungan. *Indonesian Journal on Medical Science*. 2016;3(2):80–5.
 22. Choi HJ, Kang SK, Chung MR. The relationship between exclusive breastfeeding and infant development: A 6- and 12-month follow-up study. *Early Hum Dev*. 2018;127:42–7.
 23. Magill R, Anderson D. *Motor Learning and Control*. 10th ed. New York: McGraw-Hill Publishing; 2013.
 24. Martin CR, Ling PR, Blackburn GL. Review of infant feeding: Key features

- of breast milk and infant formula. *Nutrients*. 2016;8(279):1–11.
25. Krol KM, Grossman T. Psychological effects of breastfeeding on children and mothers. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*. 2018;61(8):977–85.
 26. Fernald LCH, Kariger P, Hidrobo M, Gertler PJ. Socioeconomic gradients in child development in very young children: Evidence from India, Indonesia, Peru, and Senegal. *Proc Natl Acad Sci U S A*. 2012;109(2):17273–80.
 27. Neiva FCB, Cattoni DM, Ramos JL de A, Issler H. Desmame precoce: implicações para o desenvolvimento motor-oral [Early weaning: implications to oral motor development]. *J Pediatr (Rio J)*. 2003;79(1):7–12.
 28. Barbosa C, Vasquez S, Parada MA, Gonzalez JCV, Jackson C, Yanez ND, et al. The relationship of bottle feeding and other sucking behaviors with speech disorder in Patagonian preschoolers. *BMC Pediatr*. 2009;9(66):1–8.
 29. Pang WW, Tan PT, Cai S, Fok D, Chua MC, Lim SB, et al. Nutrients or nursing? Understanding how breast milk feeding affects child cognition. *Eur J Nutr*. 2020;59(2):609–19.
 30. Groher ME, Crary MA. *Dysphagia: Clinical Management in Adults and Children*. 2nd ed. America: Elsevier; 2015.
 31. Dowling DA, Tycon L. *Bottle/Nipple systems: Helping parents make informed choices*. *Nurs Womens Health*. 2010;14(1):61–6.
 32. Widuri. *Cara Mengelola ASI Eksklusif Bagi Ibu Bekerja Bagi Ibu Bekerja*. Yogyakarta: Gosyen Publishing; 2013.
 33. Ering SO, Akpan FU, Emma-Echiegu N. Mothers employment demands and child development: An empirical analysis of working mothers in Calabar Municipality. *Am Int J Contemp Res*. 2014;4(4):184–91.