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by Budi Utomo .

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Jennie Dianita Sutantio[1], Budi Utomo[2]
[1]General Practitioner, Puskesmas Jagir, Surabaya, Indonesia
[2]Epidemiology Division, Department of Public Health, Faculty of Medicine, Airlangga University

ABSTRAK

*Perkembangan anak adalah proses yang dipengaruhi banyak faktor, termasuk pemberian ASI eksklusif, tingkat pendidikan ibu dan pekerjaan. Tujuan dari penelitian ini adalah untuk mengetahui korelasi antara enam bulan ASI eksklusif, tingkat pendidikan ibu, pekerjaan dan skor KPSP dari bayi 6-24 bulan di Pusat Kesehatan Masyarakat (puskesmas) Jagir, Surabaya. Penelitian ini merupakan penelitian observasional analitik, dilakukan Januari-Februari 2014. Subyek dipilih secara acak, meliputi balita 6 sampai 24 bulan, dan dikecualikan bayi dengan riwayat kelahiran prematur, berat badan lahir rendah, memerlukan dukungan hidup saat lahir, penyakit kuning, memiliki penyakit bawaan, gangguan otak dan penyakit kronis lainnya dan balita dengan orang tua berpendapatan rendah. Data diambil dengan menggunakan kuesioner dan form KPSP, dan dianalisis menggunakan Spearman Correlation test dan regresi logistik. Hasil penelitian menunjukkan terdapat 33 balita mendapat ASI eksklusif dan 27 tidak mendapat ASI eksklusif. Kebanyakan dari mereka memiliki ibu lulusan SMA dan tidak bekerja. Tes korelasi Spearman menunjukkan korelasi antara pemberian ASI eksklusif dan skor KPSP (p = 0,001), antara pekerjaan ibu dan skor KPSP (p = 0,024), tetapi tidak ada hubungan yang signifikan antara tingkat pendidikan ibu dan skor KPSP. Bayi yang tidak disusui memiliki KPSP skor relatif risiko 9,5 kali lebih tinggi daripada bayi yang disusui, sedangkan bayi dari ibu tidak bekerja memiliki KPSP skor relatif risiko 4,16 kali lebih tinggi dibandingkan bayi yang ibunya bekerja. **(FMI 2015;51:66-73)***

Kata kunci: *ASI eksklusif, pendidikan ibu, ibu, pekerjaan,*

ABSTRACT

*Child development is a process influenced by many factors, including exclusive breastfeeding, mothers' education level and occupation. The purpose of this study was to determine the correlation between six months exclusive breastfeeding, maternal education level, occupation and KPSP score of six to twenty four month infants in Jagir primary health care (puskesmas), Surabaya. This research was conducted using analytic observational study, from January to February 2014. Subjects were chosen randomly, included 6 to 24 month toddler, and excluded infants with a history of premature birth, low birth weight, requiring life support at birth, jaundice, having congenital disease, brain disorder and other chronic diseases and toddler with low-income-parents. Data were taken using questionnaires and KPSP form, and analyzed using Spearman Correlation and logistic regression. The result showed that there were 33 exclusively breastfed toddles and another 27 without one. Most of them have mothers who graduated from high school and are jobless. Spearman correlation tests showed the correlation between exclusive breastfeeding and KPSP score (p = 0.001), between mothers' occupation and KPSP score (p = 0.024), but no significant correlation between maternal education level and KPSP score. Non breastfed infants have KPSP score's relative risk 9.5 times higher than breastfed infants, while the infants of jobless mothers have KPSP score's relative risk 4.16 times higher than those working with mothers. **(FMI 2015;51:66-73)***

Keywords: *exclusive breastfeeding, maternal education, maternal, occupation, KPSP score*

Correspondence: Jennie Dianita Sutantio, General Practitioner, Puskesmas Jagir, Surabaya, Indonesia. Email: jejen.1989@gmail.com

INTRODUCTION

The rate of exclusive breastfeeding, in Indonesia and throughout the world, is currently still very low, although its benefits are unquestionable since many of them have been published. US National Immunization Survey in 2010 recorded 76.5% infants were breastfed immediately after delivery. The number of breastfed infants decreased ito 49% after becoming three month sold and 27% after reaching the first year. Only 37.7% of them were breastfed exclusively until three months old and 16.4% until six months. The number of formula-fed infants, in the other hand, showed a huge amount, where in the United States about 24.2% new born sat day two had been given formula-based milk. The trend of this condition had been increasing into 35.9% on the third month and 43.2% on the sixth month after delivery (CDC 2013). Similar result was also shown in Australia. The Australian National Infant Feeding Survey 2010 revealed that 96% new borns were

given breast milk immediately after birth, but only 61% mothers were able to make it until the first month and 15% until the sixth month. The rate of exclusive breastfeeding in Indonesia doesn't differ too much. According to 2012 Indonesian Demographic Health Survey Data (SDKI), the national coverage of 6-month-exclusively breastfed infants reached 48.6%. The rate in East Java was slightly higher, that was 58.2% (Kementerian Pemberdayaan Perempuan dan Perlindungan Anak and Badan Pusat Statistik 2012).

Child development is also influenced by many factors beside nutrition. It can't be denied that stimulation by parents, especially mothers, has great impact on this process. Mothers' important role certainly needs to be supported by their level of education and the type of work performed. Studies conducted in Western countries reported that mothers' knowledge of child development was greatly important. Clinicians often rely on what they know about their children's health and development in order to establish diagnosis, conduct counseling and make referrals. Government health programs also require basic information from caregivers so that the implementation may work well (Ertem et al 2007). Low exclusive breastfeeding prevalence, low maternal level of education and uncertain effects of mother's occupation on child development, have encourage the writer to study the impacts of those factors on child development. Pre-screening questionnaire development (KPSP) is a screening tool for finding infant early growth abnormalities. The earlier the irregularities are found, the better the therapy is given. KPSP is easy, inexpensive and often used in primary health center. This research's objective is to learn further about the relationship of exclusive breastfeeding for six months, the level of education and occupation of the mother on child's development using KPSP score for toddlers of 6-23 months at Puskesmas Jagir, Surabaya. The main objective of this research is to study the relationship of 6-month-exclusive breast-feeding, mothers' education level and occupation on child development using KPSP. This research benefits are directed to health workers, such as providing information about some advantages of exclusive breastfeeding, the importance of mother's role toward toddler development during golden period, and data of exclusive breastfeeding, mothers' education level and occupation as well as developmental disorders cases in Puskesmas Jagir.

MATERIALS AND METHODS

This research is an observational analytic study using cross-sectional design. This method was done by performing measurement of dependent and independent variables simultaneously in a given time. This research aims to study the correlation of six-month-exclusive breastfeeding, mothers' education level and the occupation toward KPSP score. The population included all children of 6-24 months in PHC Jagir Surabaya, while samples were taken randomly. The exclusion criteria in this study were infants with history of prematurity, low birth weight, difficult labor needing intensive care and other life support, as well as jaundice after birth requiring phototherapy or exchange transfusion. Infants with any congenital disease, ever experienced brain infectious or non-infectious disease and other chronic diseases (chronic diarrhea, tuberculosis) were also excluded. The sample size for the analysis of categorical data pairs (KPSP score) was calculated using this formula (Hosmer & Lemeshow 2000), given $\alpha = 0.05$ and $\beta = 10\%$. 60 toddlers, divided equally based on exclusive breastfeeding status, were obtained.

This study was compiled using primary data. Data were collected using questionnaires to find out the identity of samples, identity, employment and educational status of parents, exclusive breastfeeding status and age-appropriate-KPSP score. 1) Descriptive analysis: frequency distribution in a table/chart, 2) Inferential analysis: analysis of correlation-regression to determine the causative relationship between one variable and another variable. Bivariate analysis was conducted to determine the correlation between two variables studied, with Spearman correlation test, while multivariate analysis was used to find the influence of several independent variables toward dependent variable simultaneously. This study was analyzed using logistic regression analysis with SPSS software.

RESULTS

Research conducted from January to February 2014 at Puskesmas Jagir, Surabaya shows 60 infants' frequency distribution based on their gender and age, fathers' and mothers' age, education and occupation, the number of children, nutritional status, exclusive breastfeeding status and KPSP scores. General frequency distribution is shown in Table 1. Figure 1 shows 60 samples, including 36 boys and 24 girls. Exclusively breastfed group was dominated by boys, i.e 21 children, while the number of exclusively breast girls was only 12 children. Children without exclusive breastfeeding were also dominated by boys group, which were 15 children.

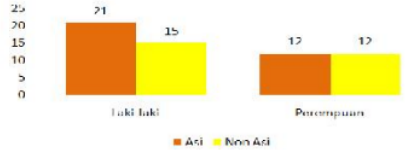
The research conducted from January to February 2014 shows that most respondents, i.e 31 children, were from age group 11-20 months. Sample distribution in all groups was dominated by exclusively breastfed

children, i.e. 10 in age group 1-10 months, 17 in age group 11-20 months and 6 in age group > 20 months. Figure 3. Shows that most of parents were graduated from senior high school, which are 39 fathers and 41 mothers. 11 children had fathers who graduated from college and 9 children had mothers with the same education level. Parents who graduated from elementary school were only 3 people for each group.

Table 1. Data characteristics of respondents

Characteristic	Inappropriate KPSP (%) (n=60)	Appropriate KPSP (%) (n=60)
Gender		
Boys	9 (15)	27 (45)
Girls	5 (8.3)	19 (31.7)
Infant's Age		
1 – 10	6 (10)	13 (21.7)
11 – 20	7 (11.7)	24 (40)
> 20	1 (1.7)	9 (15)
Father's Age		
< 30	4 (6.7)	18 (30)
30 – 40	8 (13.3)	22 (36.7)
> 40	2 (3.3)	6 (10)
Mother's Age		
< 30	6 (10)	28 (46.7)
30 – 40	8 (13.3)	18 (30)
> 40	0 (0)	0 (0)
The Number of Kids		
1	4 (6.7)	19 (31.7)
2	8 (13.3)	19 (31.7)
24	2 (3.3)	8 (13.3)
Father's Education Level		
Elementary School	1 (1.7)	2 (3.3)
Junior High School	1 (1.7)	6 (10)
Senior High School	12 (20)	27 (45)
College	0 (0)	11 (18.3)
Mother's Education Level		
Elementary School	1 (1.7)	2 (3.3)
Senior High School	10 (16.7)	31 (51.7)
College	2 (3.3)	7 (11.7)
Father's Occupation		
Goverment Officer	1 (1.7)	6 (10)
Private Sector Employee	13 (21.7)	40 (66.7)
Unemployed Person	0 (0)	0 (0)
Mother's Occupation		
Goverment Officer	0 (0)	2 (3.3)
Private Sector Employee	2 (3.3)	20 (33.3)
Unemployed Person	12 (20)	24 (40)
Nutritional Status		
Thin	3 (5)	5 (8.3)
Normal	11 (18.3)	41 (68.4)
Breastfeeding Status		
Exclusive	1 (1.7)	32 (53.3)
Not Exclusive	13 (21.7)	14 (23.3)

Figure 4 shows that the majority of fathers' occupation status was dominated by those who worked in private sector, while mothers were mostly unemployed. It is also known that there were no unemployed fathers. Employed mothers were mostly worked in private sector, i.e. 22 people and the rest worked as goverment officer.



Note: Laki-laki = boys, Perempuan = girls, ASI = exclusive breastfeeding

Figure 1. Sample distribution by gender and exclusive breastfeeding state (ASI)

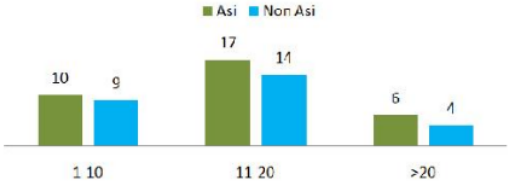
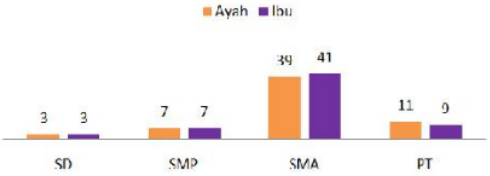
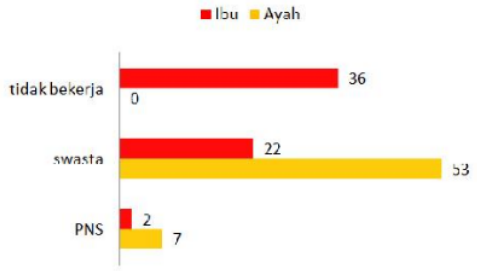


Figure 2. Sample Distribution by age (months) and exclusive breastfeeding state (ASI)



21 e: ayah = father, ibu = mother, SD = elementary school, SMP = junior high school, SMA = senior high school, PT = college

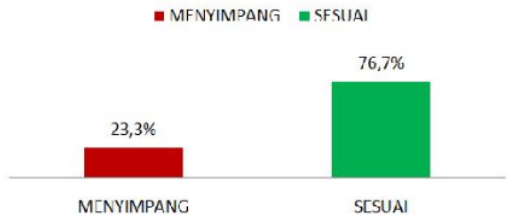
Figure 3. Sample Distributon by parental education level



Note: tidak bekerja = unemployed person, swasta = private sector employee, PNS = goverment officer

Figure 4. Sample distribution by parental occupation

Figure 5 shows that 76.7% samples achieved appropriate KPSP score, while the rest showed deviation.



Note: menyimpang = inappropriate, sesuai = appropriate

Figure 5. Sample distribution by KPSP score

Spearman correlation test is aimed to test the relationship between one observation and another observation. Spearman correlation test results for each variable are as follows.

Table 2. Results of Spearman correlation test to KPSP score

Variables	*Rank Spearman* Correlation	P value
Breastfeeding status (X_1)	-0.403	0.001
Mothers' occupation (X_2)	0.292	0.024
Mothers' education level (X_3)	0.011	0.933

Table 2 indicates correlation between KPSP score and breastfeeding status, and also between KPSP score and mothers' education level, since the significance or p value was more than 5%. Mothers education level doesn't have any correlation with KPSP because of p value insignificance. The next process is to do binary logistic regression for variables with correlation to KPSP, i.e. breastfeeding status and mothers' occupation.

Logistic regression analysis in this study is done using backward method. This method is a procedure to select variables by collecting all significant dependent variables and putting out insignificant variables in one step.

A statistical model goodness of fit test describes how well it fits a set of observations. Goodness of fit measurement typically summarize the discrepancy between observed value and the value expected under the model in question. This test is performed using hypothesis as follows: a. H0: Model is appropriate (no difference between observation result with the predictive result) b. H1: Model isn't appropriate (there is a difference between observation resultand predictive result).

Table 3. Goodness of fit test result

Step	*chi-square* value	df	P value
1	0.471	5	0.993
2	0.033	3	0.984

Table 3 describes that the result of Hosmer and Lemeshow Test using Chi-Square test is 0.033. Significance level or p value is more than 5%, which is 0.984, so that the decision taken in this test is accepting H0. This means no difference between observation result and predictive result, or the model is appropriate. This determinant coefficient (R2) is a modification of the Cox Snell R square that produces a value between 0 and 1. Nagelkerke R2 belongs to the most widely used base for interpretation.

Table 4. Nagelkerke R2 values

Step	Nagelkerke R *Square*
1	0.514
2	0.488

Table 5. The accuracy of prediction

Observed			*Predicted* KPSP		%
			Appro-priate	Inappro-priate	
Step 2	KPSP	Appropriate	40	6	87.0
		Inappropriate	3	11	78.6
	Total				85.0

Table 4 indicates that Nagelkerke R2 value produced in this study is 0.488. It means 48.8% of KPSP score can be explained by breastfeeding status and mothers' occupation, while the other 51.4 % can be explained by variables outside the scope of study. The next work after getting a logistic regression model is to analyze the predictive accuracy of the model. The result can be seen in Table 5. Appropriate predicted KPSP scores are about 43, while the observed results are 46, which means the accuracy of prediction reaches 87%. Model prediction results are about 17, while the observed results are 14, which means the accuracy of prediction reaches 78.6%. The average of accuracy is 85%. Partial test can be seen in the Wald test section inside table of variables in the equation. Wald test result of breastfeeding status can be seen inside table of variables in the equation as follows:

Table 6. The result of Wald Test

		B	P value	OR
Step 2[a]	Breastfeeding status(1)	3.537	0.002	34.372
	Mothers' occupation		0.022	
	Mothers' occupation (1)	-21.817	0.999	0.000
	Mothers' occupation (2)	-2.504	0.006	0.014
	Constant	-2.923	0.004	

Wald test result shows that breastfeeding status significantly influenced KPSP score because the p value is less than 5%, i.e 0.0002. Odds ratio value given in this study is 34.372, which means infant risk to achieve inappropriate KPSP score is 34.372 times higher in infants without exclusive breastfeeding. Mothers' occupation has partial significance in influencing KPSP score because the p value is 0.006. Odds ratio value given is 0.014, which means infant risk to achieve inappropriate KPSP score is 0.014 smaller in infants whose mothers are unemployed.

Predictive variables which have significant influence to responded variable are variables of breastfeeding status and mothers' occupation. This can be seen from the p value of breastfeeding status (0.002) and p value of mothers' occupation (0.006), which are below ? = 0.05. It is decided to reject H0, or in other word, variables influence are significant. Probability function of the model of this study is Simulation models based on the general probability function above.

The next step is to calculate the relative risk (RR) of breastfeeding status with KPSP score and mothers' occupation with KPSP score. The manual calculation Tables 8 and 9.

Table 7. Logistic regression model simulation

Breastfeeding	Non-breastfeeding	Mothers' Occupation (Goverment Officer)	Mothers' Occupation (private sector employee)	Mothers' Occupation (unemployed mother)	Probability
1	0	1	0	0	0.64
1	0	0	1	0	0.6E9
1	0	0	0	1	0.871
0	1	1	0	0	0.51
0	1	0	1	0	0.18E9
0	1	0	0	1	0.0043

The value of relative risk (RR) above illustrates that toddlers without exclusive breastfeeding have the risk to achieve inappropriate KPSP score 9.5 times higher than toddlers with exclusive breastfeeding, while toddlers of working mothers have the risk of achieving inappropriate KPSP score 0.24 times higher than toddlers whose mothers did not work.

Table 8. Cross tabulation of breastfeeding (ASI) and KPSP

		KPSP		Total
		Inappropriate	Appropriate	
Breastfeeding status	*Non Breastfeeding*	13	21	34
	Breastfeeding	1	25	26
Total		14	46	60

Table 9. Cross tabulation of work mother data and KPSP

		KPSP		Total
		Inappropriate	Appropriate	
Working mother	Working	2	22	24
	Not working	12	24	36
Total		16	46	60

DISCUSSION

Breastfeeding creates positive effects such as maternal instinct and mother-son bonding. It also helps stimulating and improving child's cognitive abilities. Breastfeeding also diminishes maternal stress level, which bolsters up her potency in child nurture (Fitzsimons & Vera-Hernández 2013). This research proves that there is a correlation between exclusive breastfeeding for 6 months and toddler's KPSP scoring (p = 0.001). Toddlers who weren't breastfed have risks for KPSP scoring deviation 9.5 times as much as those who were.

Research with similar result was also conducted by Mahardita et al by conducting experiment to find correlation between exclusive breastfeeding and cognitive function. The mean score for cognitive function of toddlers with six-month exclusive breast-feeding and nine-month exclusive breastfeeding is greater than the mean score for those who didn't receive exclusive breastfeeding; 1.41 times and 1.49 times consecutively (Mahardítha et al 2008). Another experiment conducted by Novita et al also proved the influence of exclusive breastfeeding toward toddler's IQ. It was concluded that toddlers given exclusive breastfeeding had IQ ± 13.9 points higher than those without exclusive breastfeeding (Novita et al 2008). Result from large scale research by Kramer et al (2008) increasingly reinforced exclusive breastfeeding impact on toddler's cognitive ability. This WHO-funded research proved that on breastfed group, Wechsler Abbreviated Scales of Intelligence score was higher; 7.5 points higher for verbal IQ, 2.9 points higher for performance IQ and 5.9 points for complete IQ test.

Breastfed group also scored higher on reading and writing school tests (Kramer et al 2008).

In 2001, researchers in Scandinavia had conducted experiment on the correlation between exclusive breast-feeding duration and child development. In total, 345 children with different duration of exclusive breast-feeding participated on this experiments. Their neuromotor development at one and five year old were measured using Bayley's Scales of Infant Development, Wechsler Preschool and Primary Scales of Intelligence), and Peabody Developmental Scales. This resulted on greater risks of neuromotor development disturbance for toddlers given less-than-three-month exclusive breastfeeding (Angelsen et al 2001).

WHO globally recommended in 2001 so that mothers breastfeed their babies for approximately 6 months. This motion wasn't absolute because some researches showed that the duration should be subjective while complementary food and micronutrient supplement could be given if breastfeeding wasn't enough. This would also influence child development. WHO reported that iron and zinc level in breast milk could cover child's need till first half year, however this also depended on their prenatal stock. Its reserve would thin out when fetus grew up and if it's exhausted, breastfeeding wouldn't be sufficient. Little amount of vitamin D in breast milk could also increase risk for vitamin D deficiency, especially on babies with less time of sun exposure and suboptimal maternal vitamin D level. The inability to definitely figure out those micronutrient deficiency risks on exclusive breastfed infants made researchers to deduce that further experiments have to be conducted. A new systematical review by Reilly informed about the consumption of energy source that can be metabolized and feeding pattern of exclusive breastfed infants in developed countries. He concluded that metabolized energy source in breast milk is lower than the transferred one. This research also concluded that many mothers who gave exclusive breastfeeding didn't give enough of it for six-month-old infants (Reilly & Wells 2005).

Maternal education level is one of external factors which has great importance to child development. Mothers with high education level have better knowledge so that they can provide optimal stimulation and nutrition for child development. In a 2003 study, Currie and Moretti mentioned that more school period for mother would mean less low birth weight (Currie & Moretti 2003) Another study in Dublin stated that maternal education level affected child physical health, cognitive ability, and emotional and social adaptation ability (Lawrence 2013). In a 2007 study, Carneiro et al (2007) mentioned that more school period for mother would increase seven or eight-year-old children mathematic scores by 5.6%, reduce seven or eight-year-old children and 12 or 14-year-old children class repetition by 2.8%, and reduce behavior disorder. This research also concluded that maternal cognitive ability was a great factor for child cognitive ability (Carneiro et al 2007). Long-term effects of parental education level toward adolescent parenting had been studied, which gave positive uncertain result. Parents with higher education level tend to have children with better academic success (Dubow et al 2009).

The result from this study is different from theory specified above, whereas maternal education level didn't have significant correlation with child education. This is caused by other factors, such as maternal knowledge about child development. A mother with high education level doesn't always know how to comprehend child development, unless she has studied as health worker. She also has less time nurturing child because of work. A study in Turkey in 2007 employing 1200 respondents investigated about the correlation between maternal education level and her knowledge about child development. General study showed that mothers didn't have enough information about their child's development. 52 % of them did not know children's vision development, 79 % of them did not know when their children started to speak, 59 % of them did not know when their children start to smile as a sign of social interaction. 68 % of them did not know the brain development in general. This study also revealed that only 25 % of women with high education level and lived in urban know about children's vision development (Ertem et al 2007).

Other effects of maternal education background to the children development were also shown through exclusive breastfeed, but the result still varies. A study in Brazil reported that educated mothers delayed extra food and only gave exclusive breastfeed. A research conducted in RSCM Jakarta also found that mothers with low to medium education level gave formula milk earlier than uneducated and well educated mothers. A study in Bangladesh and Jogjakarta showed opposite result where maternal education did not influence exclusive breastfeeding pattern. A study in Kariadi Hospital, Semarang revealed that mothers with high education gave extra food (Novita et al 2008).

The effect of career mothers to the children development is still debatable. Those who agree about the situation say that children whose mothers work will practice independency in doing activities at home without mother's presence, they were able to develop close relationship to the others, they respected and waiting for interaction with their mothers and they are

able to learn how adult people including their mother have responsibility to the family. Those who disagree state that if the mothers work, they do not have enough chance to intervene in the children's activities because the children are not dependent rely on what they get from caregiver, grandmother or people at home when their mother were working so that the mother's influence will also decrease (Hadiwidjojo 2012). Previous research has studied the effects of career mothers to the children development. A study did not find sufficient evidence that mothers who work while her child is still under 5 years will cause learning disorder at school, especially part-timer (Cooksey et al 2009). It is against a study result conducted in 2005 that mother who work fulltime before their child reach 18 months of age will cause negative effect to the child's development after 7 years of age. It also applied for single mother who has 21 month old child and working mother who gets family's donation to raise her child. Part-time job of mother with children under 18 months has no correlation with children development disorder (Verropoulou & Joshi 2009).

This study reveals the correlation between maternal occupation with KPSP score (p = 0.024). Toddlers whose mother works will have KPSP deviation risk 0.24 higher than toddler whose mother does not work. In other words, if the mother works, the toddler will experience as much as 4.16 times better development. It's probably because of better stimulation in the mother despite of lack of interaction. Mothers who work also increase family income and create a better social and economic condition. This in turn cause better children development. Children dependency and socialization to other people is also better in children who are not fully cared.

Limitation of this study is caused by several factors such as the effect of stimulation, caregiving method, genetic factors, and maternal cognitive functions which are uncontrollable. The KPSP accuracy to evaluate the development function is yet to confirm because of some questions in KPSP which responses depend on the parent's and teacher's subjectivity. The main difficulty in this study occurred during interview and questionnaires filling because not all mothers presented and replaced by the grandmothers, neighbors or caregivers. It created difficulty in getting accurate data relating to children's development.

CONCLUSION

Exclusive breastfeeding in children aged 6-24 months for six months correlates to mother's employment status with KPSP scores, but not with maternal education.

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