

EARLY INITIATION OF BREASTFEEDING RELATED TO EXCLUSIVE BREASTFEEDING AND BREASTFEEDING DURATION IN RURAL AND URBAN AREAS IN SUBANG, WEST JAVA, INDONESIA

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ABSTRACT:

Background: Reports suggest that early initiation of breastfeeding can reduce infant mortality rates by around 22%. Infants who are given early initiation of breastfeeding will obtain colostrum that contains immunoglobulin to improve infants' immunity. Early initiation of breastfeeding within twenty four hours of birth can determine exclusive breastfeeding (EBF) and breastfeeding duration. However, in Indonesia, the rate of breastfeeding initiation was only 34.5%, and exclusive breastfeeding was about 54.3% in 2014. West Java is one of the provinces with the lowest exclusive breastfeeding rate, as low as 35%. The objective of this study was to analyze the relationship between early initiation of breastfeeding with exclusive breastfeeding and with breastfeeding duration in rural and urban areas in Subang, West Java-Indonesia.

Methods: A cross-sectional study was conducted from January to June 2013 to analyze the relationship between early initiation of breastfeeding with EBF and breastfeeding duration. A total of 243 mothers who had babies aged between 12-24 months were interviewed using the questionnaire. The inclusion criteria are mothers aged ≤ 40 years who have spontaneous birth, singleton birth, baby's birth weight ≥ 2500 grams, not disabled, and been willing to participate in this study. 107 mothers who live in Pagaden sub-district (a rural area), and 136 mothers in Subang sub-district (an urban area) have completed the social and demographic data questionnaire. The participants were recruited using cluster random sampling technique.

Results: The overall early initiation of breastfeeding was seen in 33.7% of mothers (from the total of 243 mothers), and the rate of exclusive breastfeeding was about 38.6%. A total of 42.0% of the babies have been breastfed for more than 12 months. The mothers in the urban area are more likely to initiate early breastfeeding (about 39.7% in $\geq 1-2$ hours and 52.9% < 1 hour) and perform exclusive breastfeeding (45.6%) than mothers in the rural area. The multiple logistic regression analysis showed that early initiation of breastfeeding has statistically significant positive relationship with exclusive breastfeeding and breastfeeding duration. The most significant relationship is on exclusive breastfeeding (OR: 2.14, 95% CI 1.19 to 4.18).

Conclusions: Early initiation of breastfeeding is related to exclusive breastfeeding and breastfeeding duration, with the most significant relationship on exclusive breastfeeding. Educational strategies need to improve and to increase the knowledge of breastfeeding mothers who live in urban and rural areas, which in turn can gradually increase the rate of early initiation of breastfeeding and exclusive breastfeeding in Subang District, West Java-Indonesia.

Keywords: Early initiation of breastfeeding, Exclusive breastfeeding, Indonesia

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INTRODUCTION

Indonesia is short of the Millennium Development Goals (MDGs) target to decrease

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Infant Mortality Rate (IMR) to 23 per 1000 live births as of 2015 [1]. IMR is the highest during the 28 first days of life, the neonatal period; and reports from the Indonesian Basic Health Research of 2013 showed that about 36% of neonatal deaths were caused by infections, which is influenced by low immunity among the neonates [2]. Neonatal immunity would increase if the infants get the first milk of mother, the colostrum, in the first day after birth. Colostrum is only produced during 1-3 days post-partum and contains immunoglobulins, and data suggests that this can reduce IMR by as much as 22% [3]. Colostrum is rich in protein and minerals and lower in carbohydrates, fat, and some vitamins but the concentration of total protein, total ash (minerals) and whey in colostrum and early milk gradually changes over the first two or three weeks to reflect the infant's need, as lactation becomes established. Colostrum also contains immunoglobulins which the infants receive from breastmilk, and is relatively constant throughout lactation [4]. Some studies show that colostrum can prevent infectious diseases, particularly diarrhea and acute respiratory infection (ARI). The risk of mortality due to diarrhea and other infections can increase in infants who are either partially breastfed or not breastfed at all [5-8]. Apart from this colostrum also helps to improve mental and cognitive development in children [3, 9].

Since 2003, the World Health Organization (WHO) has recommended early initiation of breastfeeding which should start early and within the first hour after birth [10]. Early initiation of breastfeeding should continue until the infants can suckle the breast successfully. This should be followed by exclusive breastfeeding for six months [10]. It is generally believed that skin-to-skin contact during early initiation of breastfeeding can show an effect and enhance early infant self-regulation. Inborn breastfeeding reflexes were depressed at birth, possibly because of a depressed sensory system. When the infant is given the option to peacefully go through the nine behavioural phases birth cry, relaxation, awakening, crawling, resting, familiarization, suckling and sleeping when skin-to-skin cwith its mother this results in early optimal self-regulation. Skin-to-skin contact also has been found to be the natural way to keep the infant warm after birth. Inborn breastfeeding [11]. Early initiation of breastfeeding can determine the success of exclusive breastfeeding and breastfeeding duration [6, 12, 13]. Babies who are given exclusive breastfeeding and followed by exclusive

breastfeeding for six months can reach optimal growth, development and health [14, 15]. The benefits of early initiation of breastfeeding has been proven by several previous studies [16-18]. Some other studies also indicate that exclusive breastfeeding for six or more months are protective against overweight and obesity in children and adolescents later in life [19, 20].

However, increasing the practice of early optimal breastfeeding is still challenging. According to WHO reports of 2013 the rates of early initiation of breastfeeding and exclusive breastfeeding generally are still less than 50% [18]. Exclusive breastfeeding defined that infant receives only breastmilk (including breastmilk that has been expressed or from a wet nurse) and nothing else, except for ORS, medicines and vitamins and minerals [10]. Reports from Central Thailand, shows that prevalence of exclusive breastfeeding was only 2.4% in 2006 [21], while a study from Bangkok in 2013 showed that 10% of mothers exclusively breastfeeding for 6 months and about 14% of mothers did EBF for some duration of time [22]. Study from Hongkong showed that at 1 month, 3 months, 6 months and 12 months only 63%, 37.3%, 26.9%, and 12.5% of the infants respectively, were still receiving any breast milk and approximately one-half of breastfeeding mothers were exclusively breastfeeding [23]. A prospective survey in Danish in 2010 reported that at discharge 68% of the preterm infants were exclusively breastfed and 17% partially [24]. China also showed low coverage of early initiation of breastfeeding in 2010 with 59.4%, and the rate of exclusive breastfeeding was only 58.3% [25]. Similar problem also reported from Brazilian population with as low as 47.1% of mothers initiated breastfeeding within the first hour after birth [26].

Data from Basic Health Research from Republic of Indonesia in 2013 reported only 34.5% babies were given early initiation of breastfeeding and about 54.3% were given exclusive breastfeeding. West Java is one of the largest provinces and located near Jakarta the capital city of Indonesia, with the second lowest rate of EBF at less than 30%. In this province, Subang district has lowest coverage for early initiation of breastfeeding and exclusive breastfeeding [27]. Subang district has the highest population in West Java with mountainous and coastal regions. Subang has 30 sub-districts with many urban and rural characteristic differences, especially in breastfeeding practices, being less than 35%. Two sub-districts has been selected to

represent population, there were Pagaden sub-district and Subang sub-district. Both of these district were chosen because have the largest number of children aged 12-24 months and have the lowest rate of exclusive breastfeeding. While study in 2010 from West Java among others in Cigugur district shows equal rate of breastfeeding practices, with a percentage between urban and rural still less than 80% coverage, with the average of breastfeeding duration was 15 months [28].

However, breastfeeding rate in many provinces in Indonesia are still quite various. The ten provinces with lowest coverage (around 25-30%) respectively are Maluku, Papua, West Java, North Sulawesi, North Sumatera, Central Kalimantan, West Kalimantan, Banten, Aceh dan Babel Island [27]. These conditions are influenced by multiple factors [29]. According to secondary analysis of Indonesia Demographic and Health Surveys 2002/2003 and 2007, the infants in the Sumatera region were more likely to delay the initiation of breastfeeding than those from Java/Bali. Generally, compared to Java/Bali region, access and availability to health information, services and personnel in outer Java/Bali is more limited [30]. Similarly, urban and rural areas in Vietnam also showed differences in breastfeeding practices. High education level of mothers was associated with longer duration of exclusive breastfeeding in the rural area [31]. Study in 2009 in AL-Hassa province, Saudi Arabia showed statistically that rural (residence) was independent predictor of timely breastfeeding (OR 4.2) [32]. The objective of the study was to analyze the relationship between early initiation of breastfeeding with exclusive breastfeeding and breastfeeding duration in rural and urban areas of Subang, West Java-Indonesia.

METHODS

Setting and sampling

This cross-sectional study is conducted in Subang District, West-Java province-Indonesia from January to June 2013. The permission to conduct this study is obtained from the Ethic Commission of the university, the local government and the health office of Subang district. The number of samples is calculated by hypothesis test for two population proportions. Minimum number of samples acquired is 210 samples, then it is added by 10%, so that the needed minimal total samples are 231 mothers-babies. As many as 107 mothers who live in Pagaden sub-district (a rural area) and 136

mothers in Subang sub-district (an urban area) were included using cluster random sampling technique. Based on health services survey in Subang, both of two districts can represent the urban and rural areas.

Definition of urban and rural areas in this study is urban whereas populations and housing developments are located in urbanized areas, such as cities and towns. Urban areas feature densely populated landscapes, and typically have census-determined population densities of more than 1,000 residents per square mile. While rural refers to territory, populations and housing units located outside urbanized areas or clusters. In contrast with urban, rural areas generally have fewer than 500 people per square mile, and fall outside the borders of urbanized areas, urban clusters and their surrounding census blocks.

In Pagaden sub district (a rural area), the samples come from 10 villages. Each village is represented by one Posyandu (integrated service center) and the samples are randomly selected, as many as 10-11 samples for each Posyandu. The similar method is used in Subang sub-district which has 8 villages. A total of 243 mothers who have babies aged between 12-24 months are interviewed using the questionnaire. All the subjects (respondents) had signed the informed consent to participate in this study.

Data collection

The mothers are interviewed using the questionnaire. The inclusion criteria are mother's aged <40 years who have normal birth, singleton birth, babies birth at term, birth weight ≥ 2500 grams, not disabled, and are willing to engage in this study. All of the mothers also have completed the socio-economic data. The data is collected by midwives and nutrition workers who were oriented towards the study and trained in data collection. Exclusive breastfeeding and breastfeeding duration are the dependent variables. While early initiation of breastfeeding is the independent variable. Dependent and independent variables are assessed using standard questionnaire adopted from WHO and modified by the Ministry of Health. Mother's characteristics consisting of mother's age, education, occupation, knowledge, birth history (mode of delivery); babies birth weight, husband's and midwife's role in breastfeeding and post-partum maternal nutrition status that are measured by MUAC scores (Mid Upper Arm Circumference) are covariate variables. Mother's characteristics are collected using the questionnaire by interviewing

Table 1 Maternal characteristics and social support

Variables	Rural (n=107)		Urban (n=136)		Total (Rural + Urban) (N=243)	
	N	%	N	%	N	%
Maternal characteristics						
Maternal age at childbirth (years)						
<20	21	19.6	8	5.9	29	11.9
20-30	68	63.6	79	58.1	147	60.5
31-40	18	16.8	49	36.0	67	27.6
Education (total years)						
Elementary school (≤6 years)	31	30.0	21	15.4	52	21.4
Junior high school (7-9 years)	38	35.5	45	33.1	83	34.2
Senior high school (> 9 years)	38	35.5	70	51.5	108	44.4
Occupation						
Housewife	87	81.3	89	65.4	176	72.4
Working mothers	20	18.7	47	34.6	67	27.6
Knowledge about breastfeeding						
Poor	42	39.3	14	10.3	56	23.1
Fairly	51	47.7	84	61.8	135	55.5
Good	14	13.0	38	27.9	52	21.4
Birth history/mode of delivery						
Vaginal delivery	96	89.7	100	73.5	196	80.7
Caesarian section	11	10.3	36	26.5	47	19.3
Maternal nutrition status of post- partum (MUAC)						
≥23.5 cm	68	63.6	114	83.8	182	74.9
<23.5 cm	39	36.4	22	16.2	61	25.1
Social support (role of husband and midwives)						
Husband						
Yes	90	84.1	112	82.4	202	83.1
No	17	15.9	24	17.6	41	16.9
Midwives						
Yes	75	70.1	95	69.9	170	70.0
No	32	29.9	41	30.1	73	30.0

the mothers. Post-partum maternal nutrition status (Mid upper arm circumference) is collected using the secondary data from health record books of mother and child.

Study outcome

There are two outcomes used in this study. But, the key variable is the exclusive breastfeeding. Both the variables are assessed according to WHO definition. Babies were considered exclusively breastfed if they were still breastfed for six months and reported not consuming any other food/liquid other than breast milk, oral rehydration therapy, drops, syrups, within the last 24 hours. Other categories are predominant/full breastfeeding (babies given any liquid other than breast milk but not given complementary foods) and partial breastfeeding (babies given complementary foods other than breastmilk and liquid) [10]. Breastfeeding duration was expressed as the proportion of babies who given breastmilk more than 12 months, 6-12

months, and less than 6 months.

Data analysis

The data is analyzed by using SPSS version 16.0. Chi-squared test is used to assess significance for comparison between categorical variables. Multivariate analysis is employed to assess the correlation between a predictor and study outcomes, after controlling for other covariates. Significant predictor of early initiation of breastfeeding at bivariate analysis is entered into a logistic regression analysis, to determine the independent predictors for outcome variables. By using 95% confidence intervals (CI), *p-value* ≤ 0.05 and adjusted Odds Ratio (OR), the data is calculated.

RESULTS

Maternal characteristics

In rural areas, the proportion of mothers aged less than 20 years indicates three times higher (19.6%) than mothers in urban (5.9%). Less

Table 2 Early initiation of breastfeeding, exclusive breastfeeding and breastfeeding duration

Variables	Rural (n=107)		Urban (n=136)		Total (Rural + Urban) (N=243)	
	N	%	N	%	N	%
Early initiation of breastfeeding						
≥ 1-2 hours	28	26.2	54	39.7	82	33.7
< 1 hour	56	52.3	72	52.9	128	52.7
No Early initiation of breastfeeding	23	21.5	10	7.4	33	13.6
Exclusive breastfeeding						
Exclusive breastfeeding	32	29.9	62	45.6	94	38.6
Predominant	38	35.5	45	33.1	83	34.2
Partial	37	34.6	29	21.3	66	27.2
Breastfeeding duration (months)						
>12	59	55.1	42	30.9	102	42.0
6-12	38	35.6	71	52.2	110	45.3
<6	10	9.4	23	16.9	31	12.7

Table 3 Factors associated with Exclusive Breastfeeding and Breastfeeding Duration

Variables	Category	Exclusive breastfeeding			Breastfeeding duration (>12 months)		
		<i>p-value</i>	AOR	95% CI	<i>p-value</i>	AOR	95% CI
Early initiation of breastfeeding	< 1hour	0.000	2.34	1.31- 4.18	0.036	1.68	1.39-4.46
Type of residence	≥ 1-2 hours						
	Rural	0.021	1.79	1.21-4.16	0.048	1.52	1.24-8.24
	Urban						
Maternal characteristics							
Age	≤30	0.340	0.86	0.78-1.24	0.675	0.78	0.98-1.64
	>30						
Education	Low	0.042	1.55	0.96-2.16	0.822	0.84	0.45-1.79
	High						
Occupation	Working mothers	0.641	0.45	0.67-0.11	0.072	0.490	0.78-1.96
	Housewife						
Knowledge	Poor	0.030	1.66	1.52-5.73	0.062	1.36	1.04-1.62
	Fairly/good						
Birth history (mode of delivery)	Caesarian section	0.001	2.04	1.28-3.09	0.055	1.67	1.28-4.38
	Vaginal delivery						
Maternal nutrition status of post-partum (MUAC)	<23.5 cm	0.084	1.02	0.95-1.54	0.031	1.26	0.97-1.35
	≥23.5 cm						
Social support (role of husband and midwives)							
Husband	No	0.716	0.48	0.88-1.40	0.049	1.38	1.14-6.58
	Yes						
Midwives	No	0.044	1.82	0.84	0.124	1.06	0.94-2.16
	Yes						

educated mothers (only finished elementary school) in rural almost two times is higher (30.0%) than mothers in urban (15.4%). Generally, mothers in rural are housewife (81.3%), but in urban around 35% mothers are working mothers. Totally, only 21.4% mothers have good knowledge about breastfeeding with proportion of the mother's knowledge in urban is higher (61.8%) than rural (47.7%). The questions of breastfeeding knowledge consists of definition of early initiation of breastfeeding and exclusive breastfeeding,

recommendation of breastfeeding duration, the importance of breastfeeding practices for maternal and child health status, the risk of early complementary feeding/formula/other liquid which given to babies before six months, and child growth and development during at first 2 years after life (the data is presented in Table 1).

There is 19.3% of mothers who have delivery by caesarian section. On the other hand, the maternal nutrition status is measured by MUAC score. It uses the secondary data that is collected

Table 4 Logistic regression analysis of significant independent predictors of exclusive breastfeeding and breastfeeding duration

Variables	Exclusive breastfeeding				Breastfeeding duration			
	B	p-value	Exp (B)	95% CI	B	p-value	Exp (B)	95% CI
Early Initiation of breastfeeding	1.26	0.000	2.14	1.19-4.18	0.54	0.036	1.78	1.57-7.84
Type of residence	0.64	0.024	1.62	1.04-5.62	0.31	0.046	1.52	2.26-8.52
Birth history	-0.51	0.031	1.47	0.68-1.79	-0.62	0.72	1.02	0.97-1.61
Support/role of midwives	0.174	0.046	1.53	1.22-3.65	0.78	0.152	1.17	1.33-5.56

from maternal and child health books. MUAC is measured by atrained midwife in Posyandu. Atape measure which uses colour-banded numeric MUAC that reflects threshold values of MUAC with a change of colour can reduce the problems of numerical errors. Table 1 shows that a quarter (25.1%) of mothers have less than 23.5 cm of MUAC. This indicates that the rate of mothers who get chronic energy deficiency is still high, with mothers in rural (36.4%) proportion is higher than urban (16.2%). Table 1 also shows, the most mothers get social support from husband (83.1%) and midwives (70.0%). The proportion of husband's support for successful early initiation of breastfeeding, exclusive breastfeeding and breastfeeding duration is similar between mothers in rural (84.1%) and urban (82.4%).

Early initiation of breastfeeding, exclusive breastfeeding and breastfeeding duration

Early initiation of breastfeeding within one hour after birth as defined by WHO, was higher in urban (39.7%) than rural (26.2%) areas. In rural the rate of babies who were given partial breastfeeding was higher (34.6%) than urban (21.3%). It was shown that rural proportion (56.1%) of babies who have been given breastfeeding for more than 12 months is two times higher than urban (30.9%). The data is presented in Table 2.

Factors related to exclusive breastfeeding and breastfeeding duration

Breastfeeding practices are influenced by multifactorial causes. In this study, chi-square test showed six variables early initiation of breastfeeding (≥ 1 hour), type of residence (rural/urban), mother's education, knowledge about breastfeeding, birth history, and midwife's support had significant association with exclusive breastfeeding (p -value < 0.05). Among these early initiation of breastfeeding showed the highest AOR (2.34; 95% CI:1.31-4.18). In relation to breastfeeding duration, four variables early initiation of breastfeeding, type of residence, maternal nutrition of post-partum, and

husband's support were significantly associated with p -value < 0.05 , among these early initiation of breastfeeding ≥ 1 -2 hours after birth had highest AOR (1.68; 95% CI:1.39-4.46), Table 3.

Multiple logistic regression (Table 4) showed that early initiation of breastfeeding had significant relationship and had the highest AOR with exclusive breastfeeding (95% CI 1.31-4.18). The babies who had early initiation of breastfeeding in ≥ 1 -2 hours are 2.34 times more likely to be given exclusive breastfeeding than the babies who are given early initiation of breastfeeding < 1 hour or babies who are not given early initiation of breastfeeding. Early initiation of breastfeeding also had significant relationship with breastfeeding duration (AOR:1.78, 95% CI (1.57-7.84). Infants who had early initiation of breastfeeding in ≥ 1 -2 hours were 1.78 times more likely to be breastfed for > 12 months compared to early initiation of breastfeeding in < 1 hour. This table also showed that mothers in urban are 1.79 times more likely to exclusively breastfeed than mother in rural (95% CI, 1.21 to 4.16). While mothers in rural 1.52 times more likely to breastfeed their babies ≥ 12 months than mothers in urban (95% CI, 1.24 to 8.24).

DISCUSSION

Only 33.7% of 234 babies were given early initiation of breastfeeding as per WHO recommendation to put the babies to breast within first one hour after life for at least 1-2 hours (Table 2). According to WHO rating scale, breastfeeding initiation rates in this study was at a fair level, but still less than national as average of 34.5% [1, 2]. A key finding in this study was that early initiation of breastfeeding and exclusive breastfeeding was more common in the urban area than in the rural area. In this study, the rate of early initiation of breastfeeding in rural was 26.2% compared to urban rate of 39.7%. Generally, Indonesia Demographic and Health Survey in 2007 showed the rate of early initiation of breastfeeding in urban (43.1%) was lower compared to rural (56.9%) [30]. Overall, the rate of early

initiation of breastfeeding is similar to Vietnam, which is less than 40%. But, in Vietnam this rate was more in the urban areas compared to the rural [31]. In Al Hassa Province, Saudi Arabia only 11.4% were given timely initiation of breastfeeding with the urban rate was 5.8% lower than rural (19.2%) [32]. Conversely, the rate of babies who breastfeed more than 12 months was higher in rural (56.1%) compared to urban (30.9%).

In a previous study from Indonesia, an increased likelihood for delayed initiation of breastfeeding was observed amongst infants delivered in government-owned health facilities. It was reported that up to 50% of infants delivered in hospital, midwife's house, or maternity clinics received either free or purchased formula milk in the first days after delivery, although the International Code of Marketing of Breast-milk Substitutes has been adopted in Indonesia [30]. Some other studies have shown other factors to be associated with the breastfeeding practice differences between urban and rural areas. Breastfeeding is multi-factorial in nature and different factors will be at play depending on individual circumstances [32]. The difference in mother's education level, occupation, knowledge about the importance of breastfeeding, and health facilities can influence the pattern of breastfeeding practices between urban and rural areas [29].

In this study, early initiation of breastfeeding was not only related to exclusive breastfeeding, but also related to breastfeeding duration. Likewise early initiation of breastfeeding, the rate of exclusive breastfeeding are low compared to data from other developing countries such as in Thailand, Hongkong, Laos and Northern Ethiopia [22, 23, 33, 34]. After exclusive breastfeeding period, breastfeeding practices should be continued until babies are 2-years of age. The previous study in line with this results, that found the breastfeeding initiation associated with an inadequate breastfeeding duration [24, 35]. Type of residence also show significant association with early initiation of breastfeeding (p value = 0.024) and breastfeeding duration (p value = 0.046). Mothers in urban areas is 1.62 times more likely to exclusively breastfeed than mothers in rural areas. However, mothers in rural areas, have 1.52 times more likely to breastfeed longer than mothers in urban areas. Mothers in rural areas have lower knowledge about exclusive breastfeeding than mothers in urban areas. But they have the opportunity to breastfeed in a longer period because

they commonly as a housewife [30].

CONCLUSION

There is a significant relationship between early initiation of breastfeeding and exclusive breastfeeding and breastfeeding duration. These results can be additional evidence of early initiation of breastfeeding and the advantage to increase exclusive breastfeeding. It also strengthens the evidence that early initiation of breastfeeding can sustain breastfeeding period until time of weaning period. Concerning with previous studies that have a similar study, it will be an evidence based on the research that can support to assign a strategic local regulations regarding in early initiation of breastfeeding and exclusive breastfeeding. These results indicate that breastfeeding practices are significantly influenced by socio-demographic factors particularly type of residence (urban and rural area). Therefore, the findings will provide insight to promote breastfeeding practices by evidence-based and effective public health strategies in communities. Educational strategies also need to improve the knowledge of breastfeeding for mothers in urban and rural areas.

STRENGTHS AND LIMITATIONS

Information bias from mothers and interviewer are limitations of this study. Commonly, there are various perceptions among mothers about early initiation of breastfeeding and exclusive breastfeeding. The number of samples in this study is still limited, they are only taken from two sub-districts.

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REFERENCES

1. Ministry of National Development Planning of Republic of Indonesia [PPN/Bappenas]. The report of millennium development goals achievements in Indonesia in 2011. [updated: 2013 May 17; cited 2015 October 28]. Available from: <http://www.bappenas.go.id/>
2. World Health Organization [WHO], United Nations Children's Fund [UNICEF]. Short-term effect of breastfeeding: a systematic review on the benefits of breastfeeding. Geneva: WHO; 2013.
3. Sally M, McGregor G, Fernald LC, Sethuraman K. Effects of health and nutrition on cognitive and

- behavioural development in children in the first three years of life: part 1: low birthweight, breastfeeding, and protein-energy malnutrition. *Food and Nutrition Bulletin*. 1999; 20(1): 53-75
4. Riordan J. Breastfeeding and human lactation. 3th ed. USA: Joanes and Bartlett Publisher; 2005.
 5. Drewett R. The nutritional psychology of childhood. New York: Cambridge University Press; 2007.
 6. Oakley LL, Henderson J, Redshaw M, Quigley MA. The role of support and other factors in early breastfeeding cessation: an analysis of data from a maternity survey in England. *BMC Pregnancy and Childbirth*. 2014; 14(1): 1-12. doi: 10.1186/1471-2393-14-88 [cited 2015 January 12]. Available from: <http://www.biomedcentral.com/1471-2393/14/88>
 7. Haschke F, Haiden N, Detzel P, Yarnoff B, Allaire B, Haschke-Becher E. Feeding patterns during the first 2 years and health outcome. *Ann Nutr Metab*. 2013; 62 (Suppl. 3): 16-25. doi: 10.1159/000351575 [cited 2015 May 10]. Available from: <http://https://www.karger.com/Article/Pdf/351575>.
 8. Debes AK, Kohli A, Walker N, Edmond K, Mullany LC. Time to initiation of breastfeeding and neonatal mortality and morbidity: a systematic review. *BMC Public Health*. 2013; 13(Suppl. 3): S19. doi: 10.1186/1471-2458-13-S3-S19 [cited 2015 March 10]. Available from: <http://biomedcentral.com/1471-2458/13/S3/S19>
 9. Angelsen NK, Vik T, Jacobsen G, Bakketeig LS. Breast feeding and cognitive development at age 1 and 5 years. *Arch Dis Child*. 2001 Sep; 85(3): 183-8. [cited 2015 February 18]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11517096>
 10. World Health Organization [WHO], United Nations Children's Fund [UNICEF]. Global strategy for infant and young child feeding. Geneva: WHO; 2003.
 11. Widstrom AM, Lilja G, Aaltomaa-Michalias P, Dahllof A, Lintula M, Nissen E. Newborn behaviour to locate the breast when skin-to-skin: a possible method for enabling early self-regulation. *Acta Paediatr*. 2011 Jan; 100(1): 79-85. doi: 10.1111/j.1651-2227.2010.01983.x [cited 2015 June 19]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20712833>
 12. Kohlhuber M, Rebhan B, Schwegler U, Koletzko B, Fromme H. Breastfeeding rates and duration in Germany: a Bavarian cohort study. *Br J Nutr*. 2008 May; 99(5): 1127-32. doi: 10.1017/S0007114508864835 [cited 2015 January 20]. Available from: <http://www.researchgate.net/publication/5558678>
 13. Sundaram ME, Labrique AB, Mehra S, Ali H, Shamim AA, Klemm RD, et al. Early neonatal feeding is common and associated with subsequent breastfeeding behavior in rural Bangladesh. *J Nutr*. 2013 Jul; 143(7): 1161-7. doi: 10.3945/jn.112.170803 [cited 2015 February 23]. Available from <http://www.jn.nutrition.org/content/143/7/1161>
 14. Said M, Pratomo H. Mother education and breastfeeding duration in increasing elementary school students intelligence. *Jurnal Kesehatan Masyarakat Nasional* [Journal of the National Public Health]. 2013 Nov; 8(4): 169-74.
 15. Dee DL, Li R, Lee LC, Grummer-Strawn LM. Associations between breastfeeding practices and young children's language and motor skill development. *Pediatrics*. 2007 Feb; 119(Suppl. 1): S92-8. doi: 10.1542/peds.2006-2089N [cited 2015 May 16]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17272591>
 16. Labayen I, Ruiz JR, Ortega FB, Loit HM, Harro J, Villa I, et al. Exclusive breastfeeding duration and cardiorespiratory fitness in children and adolescents. *Am J Clin Nutr*. 2012 Feb; 95(2): 498-505. doi: 10.3945/ajcn.111.023838 [cited 2015 April 13]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22237059>
 17. Chantray CJ, Howard CR, Auinger P. Full breastfeeding duration and associated decrease in respiratory tract infection in US children. *Pediatrics*. 2006 Feb; 117(2): 425-32. doi: 10.1542/peds.2004-2283 [cited 2015 February 10]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16452362>
 18. World Health Organization [WHO]. Indicators for assessing infant and young child feeding practices: conclusions of a consensus meeting held 6-8 November 2007 in Washington D.C., USA. Geneva: WHO; 2008.
 19. Scott JA, Ng SY, Cobiac L. The relationship between breastfeeding and weight status in a national sample of Australian children and adolescents. *BMC Public Health*. 2012; 12: 107. doi: 10.1186/1471-2458-12-107 [cited 2015 June 28]. Available from: <http://www.biomedcentral.com/1471-2458/12/107>
 20. Kirk SF, Sim SM, Hemmens E, Price SL. Lessons learned from the implementation of a provincial breastfeeding policy in Nova Scotia, Canada and the implications for childhood obesity prevention. *Int J Environ Res Public Health*. 2012 Apr; 9(4): 1308-18. doi: 10.3390/ijerph9041308 [cited 2015 January 19]. Available from: <http://www.mdpi.com/1660-4601/9/4/1308>
 21. Thailand National Statistical Office. Thailand multiple indicator cluster survey: December 2005-February 2006: final report. Bangkok: National Statitctical office; 2006.
 22. Barnes SB, Perngarn U. Exclusive breastfeeding experiences among mothers in Bangkok, Thailand: findings from a mixed-methods study. *J Health Res*. 2013 Feb; 27(1): 19-25.
 23. Tarrant M, Fong DY, Wu KM, Lee IL, Wong EM, Sham A, et al. Breastfeeding and weaning practices among Hong Kong mothers: a prospective study. *BMC Pregnancy Childbirth*. 2010; 10: 27. doi: 10.1186/1471-2393-10-27 [cited 2015 July 03]. Available from: <http://www.biomedcentral.com/1471-2393/10/27>
 24. Maastrup R, Hansen BM, Kronborg H, Bojesen SN, Hallum K, Frandsen A, et al. Factors associated with exclusive breastfeeding of preterm infants. Results from a prospective national cohort study. *PLoS One*. 2014; 9(2): e89077. doi: 10.1371/journal.pone.0089077 [cited 2015 March 25]. Available from: <http://www.plosone.org>

25. Guo S, Fu X, Scherpbier RW, Wang Y, Zhou H, Wang X, et al. Breastfeeding rates in central and western China in 2010: implications for child and population health. *Bull World Health Organ.* 2013 May; 91(5): 322-31. doi: 10.2471/blt.12.111310 [cited 2015 May 10]. Available from: <http://www.who.int/bulletin/volumes/91/5/12-111310/en/>
26. Vieira TO, Vieira GO, Giugliani ER, Mendes CM, Martins CC, Silva LR. Determinants of breastfeeding initiation within the first hour of life in a Brazilian population: cross-sectional study. *BMC Public Health.* 2010; 10: 760. doi: 10.1186/1471-2458-10-760 [cited 2015 February 2]. Available from: <http://www.biomedcentral.com/1471-2458/10/760>
27. Ministry of Health of Republic of Indonesia. The center of data and Information of Ministry of Health: the situation and analysis of exclusive breastfeeding in Indonesia. [updated: 2014 August 7; cited 2015 January 4]. Available from: <http://www.depkes.go.id/resources>.
28. Susilowati, Kusharisupeni S, Fikawati S, Achmad K. Breast-feeding duration and children's nutritional status at age 12-24 months. *Paediatrica Indonesiana.* 2010 Jan; 50(1): 56-61.
29. Kogan MD, Singh GK, Dee DL, Belanoff C, Grummer-Strawn LM. Multivariate analysis of state variation in breastfeeding rates in the United States. *Am J Public Health.* 2008 Oct; 98(10): 1872-80. doi: 10.2105/AJPH.2007.127118 [cited 2015 January 5]. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2636475>
30. Titaley CR, Loh PC, Prasetyo S, Ariawan I, Shankar AH. Socio-economic factors and use of maternal health services are associated with delayed initiation and non-exclusive breastfeeding in Indonesia: secondary analysis of Indonesia Demographic and Health Surveys 2002/2003 and 2007. *Asia Pac J Clin Nutr.* 2014; 23(1): 91-104. doi: 10.6133/apjcn.2014.23.1.18 [cited 2015 February 11]. Available from: <http://www.cmamforum.org>
31. Thu HN, Eriksson B, Khanh TT, Petzold M, Bondjers G, Kim CN, et al. Breastfeeding practices in urban and rural Vietnam. *BMC Public Health.* 2012; 12: 964. doi: 10.1186/1471-2458-12-964. [cited 2015 February 10]. Available from: <http://biomedcentral.com/1471-2458/12/964>
32. El-Gilany AH, Sarraf B, Al-Wehady A. Factors associated with timely initiation of breastfeeding in Al-Hassa province, Saudi Arabia. *East Mediterr Health J.* 2012 Mar; 18(3): 250-4. [cited 2015 January 21]. Available from: <http://applications.emro.who.int/emhj/v18/03/>
33. Kounnavong S, Pak-Gorstein S, Akkhavong K, Palaniappan U, Berdaga V, Conkle J, et al. Key Determinants of Optimal Breastfeeding Practices in Laos. *Food and Nutrition Sciences.* 2013; 4(10): 61-70. doi: 10.4236/fns.2013.410A010 [cited 2015 April 10]. Available from: <http://www.scirp.org/journal/fns>
34. Alemayehu M. Factors Associated with Timely Initiation and Exclusive Breast Feeding among Mothers of Axum Town, Northern Ethiopia. *Science Journal of Public Health.* 2014; 2(5): 394. doi: 10.11648/j.sjph.20140205.14 [cited 2015 May 17]. Available from: <http://www.sciencepublishinggroup.com/j/sjph>.
35. Dubois L, Girard M. Social determinants of initiation, duration and exclusivity of breastfeeding at the population level: the results of the Longitudinal Study of Child Development in Quebec (ELDEQ 1998-2002). *Can J Public Health.* 2003 Jul-Aug; 94(4): 300-5. [cited 2015 June 5]. Available from: <http://journal.cpha.ca/>