

THE RELATIONSHIP BETWEEN MOTHER'S OCCUPATION, ADEQUACY LEVELS OF ENERGY AND PROTEIN WITH INFANT'S NUTRITIONAL STATUS

Dian Anita Nilawati, Lailatul Muniroh

Department of Public Nutrition, Faculty of Public Health

Airlangga University Surabaya, Indonesia

Correspondence Address: Dian Anita Nilawati

Email: diannila441@gmail.com

ABSTRACT

Infant is one of vulnerable groups that have nutritional problems. High prevalence of nutritional problems could affect nutritional status that become an important concern. The determining factor of nutritional status includes nutritional intake and maternal occupation. The purpose of this study was to determine the relationship between maternal occupation and nutritional intake, with nutritional status of infants aged 6-12 months. This study used cross-sectional design, with nutritional status of infants as dependent variable; intake of the food energy sufficiency level and protein sufficiency level. Subject was selected by simple random sampling technique. The interview was conducted on 88 mothers of infants aged 6-12 months, which used questionnaire, form food recall 2x24 hours (breastfeeding and complementary feeding), and anthropometric measurements (W/L index). Data analyzed used Spearman-Rank test and Coefficient Contingency. The results of this study showed that most of the infants had normal nutritional status (76,1%). Maternal occupation ($p=0,025$) had correlation with nutritional status. The food energy sufficiency level ($p=0,047$) had correlation with nutritional status and protein sufficiency level ($p=0,016$) had correlation with nutritional status. The conclusion of this study is infant who get the sufficiency level of energy and protein sufficiency level adequate has normal nutritional status. Wasting infant tend to have inadequate energy and protein intake. This study suggest mothers to give complementary feeding appropriately the quantity and according to the stage of giving food to infant.

Keywords: maternal occupation, nutritional status of infant, the sufficiency level of energy, protein sufficiency level

ABSTRAK

Bayi merupakan salah satu kelompok yang rentan mengalami masalah gizi. Masih tingginya prevalensi masalah gizi yang dapat berdampak pada status gizi menjadi hal penting untuk diperhatikan. Faktor yang menjadi penyebab dari status gizi adalah pekerjaan ibu dan asupan gizi. Tujuan dari penelitian ini adalah untuk menganalisis hubungan antara pekerjaan ibu, tingkat kecukupan energi dan tingkat kecukupan protein dengan status gizi bayi umur 6-12 bulan. Penelitian dilaksanakan dengan rancangan cross sectional. Teknik sampling menggunakan simple random sampling. Penelitian dengan wawancara dilakukan menggunakan kuesioner, form food recall 2x24 hours (ASI dan MP-ASI), dan pengukuran antropometri (BB/PB). Data diolah dengan uji analisis Spearman Rank dan Coefisien Contingensi. Hasil penelitian menunjukkan sebagian besar bayi mempunyai status gizi normal (76,1%). Hasil uji statistik didapatkan adanya hubungan pekerjaan ibu ($p=0,025$) dengan status gizi bayi, hubungan tingkat kecukupan energi ($p=0,047$) dengan status gizi bayi dan tingkat kecukupan protein ($p=0,016$) dengan status gizi bayi. Kesimpulan dari penelitian adalah bayi yang tingkat kecukupan energi dan tingkat kecukupan protein adekuat maka mempunyai status gizi normal. Tingkat kecukupan energi dan protein semakin inadkuat maka bayi cenderung akan berstatus gizi kurus. Penelitian ini merekomendasikan kepada ibu untuk memberikan MP-ASI secara tepat kuantitasnya dan sesuai tahapan dalam pemberian makanan ke bayi.

Kata Kunci: pekerjaan ibu, status gizi bayi, tingkat kecukupan energi, tingkat kecukupan protein

INTRODUCTION

A problem in achieving the Sustainable Development Goals (SDGs) is malnutrition. Nutrition problems in developing countries include underweight,

stunting, and wasting. Data obtained from UNICEF (2014) show that Indonesia has 37% of children suffering from stunting, 12% suffering from wasting, and 12% being overweight.

Failed nutrition may lead to infant mortality. Paying attention to children's growth is one way to overcome this problem. The pattern of infant feeding should be concerned as their brain growth reaches around 75%. In the first 1,000 days of a child's life, exclusive breastfeeding for 6 months and providing quality and timely can also reduce the death rate of under two million by 6% (Bappenas., 2010).

In Indonesia, infants usually suffer from undernutrition and over nutrition. Excess or lack of nutrient intake in infants can affect the nutritional status and health status. Nutritional problems can be permanent and unrecoverable even though children meet their nutritional needs in the future (Adriani, 2012).

Nutritional status contributes to the quality of Human Resources (HR), especially in terms of intelligence, productivity, and creativity. Poor infant's nutritional status can inhibit physical, mental, and cognitive growth. Factors that cause nutritional problems in infants can be divided into two, namely direct and indirect factors. Direct factors are related to food intake and infections, while indirect factors are concerned about work, knowledge, care patterns, social condition, economic condition, health services, etc. (Adriani, 2012).

One of the indirect factors affecting infant's nutritional status is mother's occupation. Working mothers do not have enough time to pay attention to their infants' adequacy level of food intake. If they do, infants can effectively improve their nutritional status (Kusumawati, 2014).

Moreover, inadequate breastfeeding is one of the direct factors for nutritional problems in infants. The World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) have recommended that children get breastfed for at least 6 months and Insiani Early Breastfeeding. In addition to improving infants' health, breastfeeding can also prevent obesity. Belfield and Kelly (2010)

explain that breastfeeding can increase the probability of healthy condition and prevent obesity in infants. Giving supplementary food too early results in insufficient quality nutrients because infants cannot get breastfeeding optimally.

Nutritious food is the main capital of growth for infants (Walyono, 2010). Supplementary food should be given when an infant is 6 months old. Providing balanced nutritious supplementary food supports optimal growth and development. If breastfeeding is insufficient or supplementary food given do not meet the nutritional needs of the body, infant will suffer from malnutrition (Kurniasih, et al.c, 2010). Insufficient nutritional intake that causes malnutrition ultimately increases infant morbidity and mortality rate (Dietz, 2008).

Infants are the most vulnerable to nutritional problems compared to other age groups. They need food with high calories, protein, various vitamins and minerals.

Infancy is a part of the first two years of life known as the golden age in which infants experience very rapid growth and development. Nutrition determines human health and well-being (Sari, 2010).

The 2013 Basic Health Research shows that 5.7% Indonesian toddlers suffer from malnutrition, and 13.9%. Indonesian toddlers suffer from malnutrition. The prevalence of malnutrition and undernourishment in children increased from 2007 to 2013, while the prevalence of underweight in toddlers was 6.8%. The prevalence of obesity in toddlers reached 11.9%. East Java province is one of the provinces which has high nutritional problems as indicated by the prevalence of underweight and obesity issues in 2015 at 15.6% and 2.2%, respectively (Surabaya District Health Office, 2015).

Surabaya city also has high prevalence of malnutrition. The prevalence of underweight and obesity in Surabaya city was 16.9% and 3.1%, respectively. Data collected in the working area of the Tanjungsari Primary Healthcare Center in

2015 show according to Body Weight/Age index, 4.9% toddlers were underweight. While in Surabaya, 22.8% toddlers were underweight (Surabaya District Health Office, 2015). The high prevalence of underweight and obesity and other malnutrition can be influenced by various factors including adequacy levels of energy and protein. Overlooking the nutritional problems in infants, this study aimed to analyze the relationship between mother's employment, adequacy level of energy, and adequacy level of protein with the nutritional status of infants aged 6-12 months in the working area of Tanjungsari Primary Healthcare Center, Surabaya.

METHODS

This study used a cross-sectional research design, in which data were collected at the same time and place (Notoatmodjo, 2010). This research design was done by identifying mother's work and measuring adequacy levels of energy and protein that infants received Tanjungsari Primary Healthcare Center. This study was conducted in the working area of Tanjungsari Primary Healthcare Center in Surabaya from October 2016 to February 2017.

The research population was mothers who had infants aged 6-12 months and lived in the working area of the Tanjungsari Primary Healthcare Center in Surabaya. The research sample was selected using a simple random sampling technique from the population that met the criteria. There were 88 mothers willing to be involved. Their infants should have no LBW history and no birth defects. The sampling frame was obtained from the baby cohort book Tanjungsari Primary Healthcare Center provided by the primary healthcare center.

Measurement of infant's nutrition status based on Body weight/body length used a digital scale and length board. The results of the measurements were then compared to those that followed the WHO-

MGRS standard. Data were collected through questionnaire-based interview and 2x24 hour food recall form instead. Nutritional intake was calculated from the volume, energy, and protein of breast milk. If infants drink breast milk for 15 minutes, they would get the volume as follows:

$$\text{ASI} = \frac{500 \text{ ml}}{X} = y \text{ ml}$$

$$\text{Breast milk energy} = \frac{500 \text{ ml}/100\text{ml} \times 67 \text{ Kkal}}{X} = Z$$

$$\text{Breast milk protein} = \frac{500 \text{ ml}/100\text{ml} \times 1.2 \text{ g}}{X} = t \text{ gram}$$

Information :

X = the highest frequencies during the study

Furthermore, the volume, energy, and protein in the first day and so forth were totaled and averaged. The average consumption of energy and protein of breast milk was summed with energy and protein intake of supplementary food. Then, the data of summed energy and protein intake were compared to the energy and protein adequacy standard. Data were analyzed and presented in the forms of frequency distribution, cross-tabulation, and percentages. To determine the relationship between mother's occupation and infant's nutritional status, this study performed a contingency coefficient test. Meanwhile, the Spearman Rank test was performed to find the relationship between adequacy levels of energy and protein with infants' nutritional status. This study has passed the ethical clearance with No: 13-KEPK.

RESULTS

Respondents' Characteristics

Respondents in this study were 88 mothers who had infants aged 6-12 months and who lived in the working area of Tanjungsari Primary Healthcare Center. Table 1 shows that most of the respondents

had female babies aged 12 months old. The rest had babied at least aged 9 months old.

Table 1. Frequency Distribution of Infants' Characteristics in the Working Area of Tanjungsari Primary Healthcare Center, Surabaya, 2016.

Independent Variable	Category	n	%
Age	6 months	10	11.4
	7 months	10	11.4
	8 months	10	11.4
	9 months	5	5.7
	10 months	18	20.5
	11 months	12	13.6
	12 months	23	26.1
Gender	Male	39	44.3
	Female	49	55.7

Mothers' age was categorized into age groups of <20 years, 20-35 years, and >35 years. Table 2 shows that most of the mothers were in the age group of 20-35 years (89.8%). These results indicate that they had been in early adulthood. The majority were 30 years old. This study categorized birth spacing into 2 groups: close (<24 months) and enough birth spacing (≥24 months or single/first child). Most of the mothers had spaced one birth to another (98.9%); in other words, their infants had sufficient age difference. In terms of breastfeeding, most of the mosthers still breastfed infants during 6-12 months.

Mother's occupation

Figure 1 shows that 63.6% of the mothers did not work. In accordance with the results of the interview, they worked as private employees.

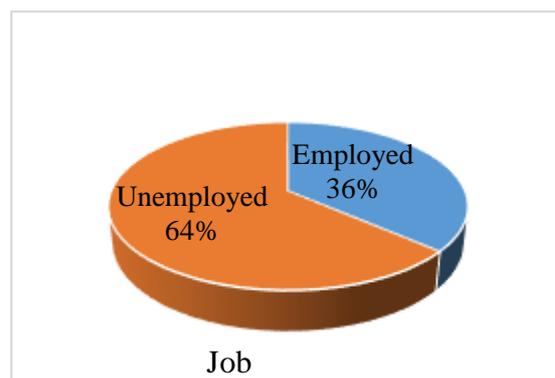


Figure 1. Frequency Distribution of Mothers' Characteristics by Occupation.

Table 2. Frequency Distribution of Mothers' Characteristics in the Working Area of the Tanjungsari Primary Healthcare Center,

Independent Variable	Category	n	%
Age	20-35 Years	79	83.3
	>35 Years	9	10.2
Birth Distance	Close	1	1
	Sufficient	78	99
Infant feeding	Breast Milk	50	56.8
	No Breast Milk	38	43.2

Surabaya, 2016.

Adequacy level of energy

Adequacy level of energy was categorized into two types. The infants were considered to have adequate energy intake if the adequacy level of energy was at ≥77% RDA. While inadequate level of energy reached <77% RDA.

Table 3. Frequency Distribution of Adequacy Level of Energy in Infants Aged 6-12 Months in the Working Area of the Tanjungsari Primary Healthcare Center, Surabaya, 2016.

Nutritional status	n	%
Very thin	0	0.0
Thin	7	8.0
Normal	67	76.1
Fat	6	6.8
Very fat	3	3.4

Table 3 illustrates that the infants had adequate level of energy (69.3%).

Adequacy Level of Protein

Adequacy level of protein also used the same categories. Infants were considered adequate protein if the adequacy level of protein reached $\geq 77\%$ RDA. Contrastly, those with the adequacy level of protein at $<77\%$ RDA would be considered to have inadequate protein. Based on Table 4, this study explains most infants had adequate levels of protein (77.3%).

Table 4. Frequency Distribution of Adequacy Level of Protein in Infants Aged 6-12 Months in the Working Area of the Tanjungsari Primary Healthcare Center, Surabaya, 2016.

Nutritional status	n	%
Adequate	61	69.3
Inadequate	27	30.7

Infant's Nutritional Status

Infants' nutritional status measurements were categorized into 5 groups: very thin, thin, normal, fat, and very fat.

Table 5. Distribution of Frequency of Nutritional Status in Infants Aged 6-12 Months based on Body Weight/Body Leght

Nutritional status	n	%
Adequate	7	77.3
Inadequate	67	22.7

This study presents that most of the infants had normal nutritional status (76.1%), but 8% of them were underweight

Table 6. The relationship between Adequacy Levels of Energy and Protein Adequacy Levels with Nutritional Status of Infants Aged 6-12-Months in the Working Area of the Tanjungsari Primary Healthcare Center in Surabaya in 2016.

Variables	Categories	Nutritional status									
		Very thin		Thin		Normal		Fat		Very Fat	
		n	%	n	%	n	%	n	%	n	%
Mother's Occupation	Employed	5	12.6	18	56.3	4	12.5	2	6.3	3	9.4
	unemployed	2	3.6	49	87.5	2	3.6	1	1.8	2	3.6
Adequacy Level of Energy	Adequate	2	3.3	47	77.0	5	8.2	3	4.9	4	6.6
	Inadequate	5	18.5	20	74.1	1	3.7	0	0.0	1	3.7
Adequacy Level of Protein	Adequate	3	4.4	52	76.5	6	8.8	3	4.4	4	5.9
	Inadequate	4	20.0	15	75.0	0	0.0	0	0.0	1	5.0

Table 7. The Relationship between Independent Variables and Nutritional Status of Infants Aged 6-12 Months in the Working Area of Tanjungsari Primary Healthcare Center, Surabaya in 2016.

Variables	p	Notes	r
Mother's occupation	0.025	There is a relationship	0.335
Adequacy level of energy	0.016	There is a relationship	0.257
Adequacy level of protein	0.020	There is a relationship	0.247

Table 6 shows that infants with adequate energy levels had a normal nutritional status (77%). Furthermore, those with adequate protein levels had a normal nutritional status as well (76.5%). However, some babies had underweight status although they had adequate energy levels.

In Table 7, the analysis shows there was a weak relationship between adequacy level of energy and infant nutritional status ($p=0.016$; $r=0.257$).

Moreover, adequacy level of protein had a weak relationship with infants' nutritional status ($p=0.02$; $r=0.247$).

DISCUSSION

Respondents' Characteristics

Age is an indicator for determining individual's productivity. Older people compared to younger people have less productivity due to the less fit physical condition and health. Age will affect parental roles in providing nutrition to infants. It can be seen from this study where most of the mothers were in the age of 20-35 years. According to Mubarak (2012), there will be physical and psychological changes in older ages. Psychological or mental aspects in older ages become more mature. The mothers had enough knowledge and experience about giving nutrition for their infants.

Too close births can interfere child's physical and mental growth. Mothers tend

to not have much time to prepare food for babies at the same time, and maternal health condition was not fully fit. Too close births, as a result, affect mothers' psychological condition which can hinder breast milk production (Soetjningsih., 2016).

The results indicate that almost all infants with normal nutritional status had adequate birth spacing (more than 24 months). The birth spacing is sufficient to help parents formulate the optimal care for their children, for instance providing nutritious food (Adriani, 2012).

Hasnain, and Sophie, (2010) and (Umata, et al., 2003) further support this finding by stating that babies born more than 24 months after previous birth did not experience nutritional problems. Research conducted by Candra (2013) also finds that babies with birth spacing of more than two years were not at risk of nutritional problems because their parents took care of them optimally and monitored their nutrition intake.

Breast milk is a very important for infants because it provides infant's nutritional needs and contains immune substances that can enhance health. Breastfeeding for infants is highly recommended because it can support the early stages of infant growth.

The results show that most infants were breastfed. Similarly, research by Ratnaningsih, (2011) explains there was a relationship between the period of breastfeeding and nutritional status of

infants aged 6-12 months in Demak regency. Giri, (2013) also discovers a relationship between exclusive breastfeeding with nutritional status of infants aged 6-24 months.

The relationship between mother's occupation and infant's nutritional status

Mother's occupation determines to which extent mothers pay attention to their infants' growth. Working mothers usually had little time to spend with their infants, and thus they put less attention on their infant growth (Ariningsih, and Rachman, 2008).

The results of this study indicate that most of the mothers were unemployed. In fact, mother's occupation had a relationship with infant's nutritional status. This is in line with research conducted by Sulistyorini and Rahayu (2009), who find a relationship between mother's occupation and infant's nutritional status. In other words, unemployed mothers had infants with better nutritional status. Farhanah and Naleena, (2012), also further elaborates that the occupational status of mothers could play an important role in determining child feeding practices which can affect infant's health and nutritional status. It means unemployed mothers could feed children better according to the age of the baby. Little time spent with babies will affect parental role. Poor parental role, therefore, will affect nutrition intake for infants as babies still depend on their caregivers.

The relationship between adequacy levels of energy and protein with infant's nutrition status

Giving supplementary food too early can increase allergic reactions as babies' digestive tract is not perfect yet to process solid foods which result in an increased risk of infection and obesity (Barasi, 2007).

Good nutrition intake is inseparable from parental role in managing child feeding pattern. Breastmilk only gives

babies minimum food intake until they are at the age of 6 months. When babies are older, they need more nutrients from supplementary food (MP-ASI). Baby's digestive system requires an adaptation process to solid food unless they will be prone to diarrhea due to imperfect digestion. So that breast milk must still be given as an immune substance (Nur and Marissa, 2014). If babies are ready to digest solid foods but not given supplementary food yet, they will delay the process of development and growth (Barasi, 2007).

The more adequate breastfeeding, the better the infant's nutritional status. Supplementary food only adds more nutrients as a baby gets older. Nutritious food is required to produce energy, protein, and all nutrients that fit the baby's needs. As infancy physical and mental growth occurs very quickly, intelligence and agility are more visible. Failing to meet the needs will affect poor nutritional status (Adriani, 2012).

The results show that most of the infants with adequate energy intake had normal nutritional status. In other words, adequacy level of energy had a relationship with infant's nutritional status ($p= 0.016$). Futher, Meipita, (2009) discovers a relationship between adequacy level of energy produced from supplementary food with the nutritional status of infants aged 6-12 months.

Afriyani's research (2016) also finds a significant relationship between nutrient intake and wasting cases at Talang Betutu Primary Healthcare Center in Palembang city. Wasting is a type of malnutrition in which infant's weight does not go right with the height or the z score of more than -2SD. Wasting in children can disrupt child growth and even lead to death. A child who gets enough nutrient intake is less likely to experience wasting or nutritional problems. Ernawati's research (2009) finds a relationship between adequacy level of energy and child's nutritional status as well.

The low energy intake may be due to several factors including the frequency of

feeding and amount of foods, appetite, and infectious diseases (Astari, 2005). It is also important to pay attention to the process of food preparation and food hygiene (Soetjningsih., 2016).

Research by Meilyasari and Isnawati, (2014) in Purwokerto shows that low energy and protein intake in infants was related to nutritional problems. Lack of nutrition intake, especially energy and protein in the long term, can cause baby's weight loss, susceptibility to infection, and growth and development problems (Dewey and Mayers, 2011).

This finding is relevant to Ningrum's study (2004), which find that good complementary feeding that fulfills babies' nutrient needs could reduce the occurrence of less protein energy in infants in the Muktiharjo Kidul sub-district, Pedurungan district, Semarang city. Another previous study conducted by Setiani (2012) shows a relationship between the risk of infectious diseases and the nutritional status of infants aged 6-12 months. Infants who had an infectious disease were twice more likely to have poor nutritional status as the immune system did not defend children from infectious diseases.

Feeding style for children should be concerned to meet the nutrition intake, such as protein. Infants aged 6-12 months need not only breast milk but also supplementary food to fulfill higher nutrition needs (Istiany, A., 2014).

Like energy, protein with the right proportion is necessary in early growth. Insufficient nutrition intake will cause infection and even growth disorders (Fitriana, 2013). Therefore, supplementary foods in addition to breast milk could provide protein intake for infants older than 6 months (Darmayanti, 2014).

CONCLUSION

In summary, most of the mothers in the working area of Tanjungsari Primary Healthcare Center in Surabaya were aged between 20-35 years and unemployed.

Most of them breastfed their babies and had sufficient birth spacing.

Their infants mostly had adequate energy and protein levels. This also was dealing with their nutritional status which this study finds normal.

Mother's occupation had a relationship with infants' nutritional status. In the same way, adequacy levels of energy and protein were related to infants' nutritional status.

Mothers should give supplementary foods appropriate for infants' age to support optimal growth and normal nutritional status. It is recommended that working mothers pay more attention to provide nutritional supplementary food for their babies

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