Selected risk factors related to underweight children aged 24-59 months in Jambi province, Indonesia

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Abstrak

Latar belakang: *Gizi kurang dengan berbagai penyebab merupakan penyebab utama angka kesakitan dan kematian di antara anak-anak di negara berkembang. Studi ini meneliti beberapa faktor risiko terhadap gizi kurang pada anak berumur 24-59 bulan di Provinsi Jambi.*

Metode: *Analisis menggunakan sebagian data Riset Kesehatan Dasar (Riskesdas) 2007 di Provinsi Jambi di antara anak berumur 24-59 bulan. Status gizi kurang dihitung menggunakan software WHO Anthro 2009 dengan batas nilai Z < –2 SD. Status gizi ibu dinilai dengan indeks massa tubuh berdasarkan WHO. Tingkat sosial ekonomi berdasarkan median pendapatan per kapita. Regresi Cox digunakan untuk menganalisis faktor determinan status gizi kurang.*

Hasil: *Proporsi anak dengan gizi kurang sebesar 26,9% (206/766). Dibandingkan ibu dengan status gizi normal, ibu yang kurus berisiko 20% lebih memiliki anak berat badan kurang [risiko relatif suaian (RRa) = 1,20; 95% interval kepercayaan (CI) = 0,88-1,65; P = 0,250]. Namun, ibu dengan kelebihan berat badan memiliki risiko 46% lebih rendah untuk memiliki anak kurang berat badan (RRa = 0,54; P = 0,003). Pekerjaan ayah dan status sosial ekonomi keluarga, ayah yang tidak mempunyai pekerjaan atau memiliki status sosial ekonomi keluarga yang rendah masing-masing berisiko 37% dan 42% lebih besar memiliki anak kurang berat badan. Anak-anak yang memiliki sumber air yang buruk memiliki risiko 22% lebih tinggi untuk kurang berat badan.*

Kesimpulan: *Ibu dengan status gizi kurang mempunyai risiko yang lebih besar memiliki anak gizi kurang. Sebaliknya, ibu kelebihan berat badan memiliki risiko yang lebih rendah untuk memiliki anak gizi kurang.* ***(Health Science Indones 2013;2:78-82)***

Kata kunci: *gizi kurang, balita, status gizi, malnutrisi*

Abstract

Background: Malnutrition with various causes is a major cause of morbidity and mortality among children in developing countries. This study examined several risk factors related to underweight among children aged 24-59 months in province of Jambi in Indonesia.

Methods: This analysis used a part of Basic Health Research (Riskesdas) 2007 data in the province of Jambi in Indonesia among children aged 24-59 months. Underweight status calculation used WHO Anthro 2009 software based on weight for age indicator with limit value of $Z < -2$ SD. Mother nutritional status was evaluated by body mass index (kg/m²) based on WHO category. Family socio-economic status was categorized by median of per capita income. Cox regression was used to analysis determinant factors of underweight.

Results: The proportion of underweight children was 26.9% (206/766). Compared with normal nutritional status of the mother, the underweight mother had 20% more risk to have underweight children [adjusted relative risk (RRa) = 1.20; 95% confidence interval (CI) = 0.88-1.65; P = 0.250). However, children of overweight mother had 46% lower risk to have underweight children (RRa = 0.54; P = 0.003). In term of father's occupation and family socioeconomic status, children with unemployed father or low family socioeconomic status had 37% (RRa = 1.37; P= 0.030) and 42% (RRa = 1.42; P = 0.004) higher risk to have underweight children, respectively. Children who had poor water source had 22% higher risk to be underweight.

Conclusion: Underweight mothers had more risk to be underweight children; however, overweight mothers had lower risk to have underweight children. ***(Health Science Indones 2013;2:78-82)***

Key words: poor nutrition, under fives, nutritional status, malnutrition

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In the UNICEF concept, the direct cause of mal-nutrition is food consumption and infectious disease. Both are influenced by the availability of food and sanitation and inadequate water source facilities. These conditions are related to the level of socio-economic families and to the employment of parents.[1] The proportion of underweight is more common in underfive children who come from poor families.[2]

The role of mothers on the nutritional status of her children and families was very important. Parenting and food distribution within the family setting is determined by the mother.[2] Mother's nutritional status was closely related to nutritional status of her children. Underweight mother tends to have underweight children, and vice versa.[3,4]

Indonesian socio-economic survey in 2005 found that the nutritional status in underweight of under five children was 28%, and 15.5% in the age group 24-59 months. While, in the province of Jambi among 24-59 month of age 24.3% children were malnutrition (weight/age), and 14.8% (weight/height).[5] The Riskesdas 2007 noted that underweight in the province of Jambi were 18.4 %.[6]

Rapid growth occurs in infancy until the first two years of life (golden period of growth) – but this paper will focus on children aged 24-59 months. The growth curve after the age of 23 months is relatively flat, when in fact the formation of the brain continues rapidly.[7] Children were more active and the parents tend to reduce their attention because of the presence of other children or the large household, or considered the child was big enough. But the child will still require feeding patterns with adequate food intake and nutrition and so good parenting. In the physiological life cycle, this period is called "growth deceleration" and affects appetite.[8]

The purpose of this paper was to identify several factors associated with underweight among children aged 24-59 months in Jambi Province, Indonesia.

METHODS

This analysis used a part of National Basic Health Research (Riskesdas) 2007 data. Its design was cross sectional study. The Riskesdas covered all households and spread over 438 districts/cities in 33 provinces in Indonesia. Sample households as well as household members were similar to the list of Susenas 2007. Thus the calculation and sampling was also synonymous with Cor of Susenas 2007, with two stage sampling.

From each district/city census blocks (BS) were taken proportional to the number of households in each district/city (probability proportional to size). From each selected BS 16 households were then selected randomly (simple random sampling), and from each selected household, all household members were taken as individuals samples. The number successfully surveyed were 258,284 households with 972,989 family members.

The data used for this analysis were the Riskesdas data in Jambi Province. Riskesdas population was all households in Jambi province. The samples include 380 census block (BS), 6078 households and 24856 individual household members spread across 10 districts/cities.[9]

This original study had 1504 under five children subjects. For this analysis, a number subjects were excluded: those who had incomplete data (no weight or height data) or the presence of data outliers were dropped, such as too low or too high which were marked with special notation – flag - on the WHO Anthro software 2009), aged less than 24 months or 60 month or more, children who have Z score > + 2 SD. Finally for this analysis 766 subjects were available.

Underweight children were those who had the Z score of less than -2 SD based on weight/age. The risk factors were: child morbidity (no/yes; yes = was ever diagnosed by a professional health worker as suffering from diarrhea or respiratory infection over the last month); age of mother (15-20, 20-34, and 35-50 years), education of mother (high = graduating from high school and above; low = not graduated from high school and below); employment of mother (work = had a job to earn extra revenue that will reduce the time to be with and take care of her children; no = only perform work as a housewife so she have more time to observe her children); mother's body mass index – BMI - based on WHO criteria (normal = BMI 18.5 to 25.09; underweight if BMI ≤ 18.49; overweight = BMI ≥ 25.1.[10]

The characteristics of father; father's education (high = graduated from senior high school or higher; low = if not graduated from senior high school or lower); father's occupation (employee = working as a clerk/ its employees, civil/police, private sector employees, state/local enterprises, self-employment and services; not employee = working as traders, farmers, laborers, fishermen and not working); father's BMI - based on WHO criteria (normal, underweight, overweight). The socioeconomic status calculated based on the median income per capita [low/high; low = less than Rp. 277115 (USD 270] or otherwise.

Access to health facilities was based on access to the nearest health center and hospital can be achieved with a close range and fast (difficult = reaching the health care facilities more than 30 minutes (or more than 6 km from the house; *posyandu* (integrated village health service) utilization for 3 months prior to the survey (yes and no).

Cox regression analysis was used to identify the risk for underweight children using Stata software version 9.0.

RESULTS

Table 1 showed normal and underweight children were similarly distributed with respect to the child's gender and morbidity, age of mother and father, number of underfive children, number of household members, accessibility to health services, and *Posyandu* utilization.

Compared with respective reference groups, subject who had low mother and father education, living in urban area was more likely to have a higher risk for having underweight children. Furthermore, compared with father's nutritional status, children who had underweight father were more likely to have higher risk to be underweight children. On the other hand, children who had overweight father were less likely to be underweight children. In terms of gender, female children had lower risk to be underweight children.

The final model (Table 2) showed that compared with normal nutritional mother status, underweight mothers had 20% more risk to have underweight children [adjusted relative risk (RRa) = 1.20; 95% confidence interval (CI) = 0.88-1.65; P = 0.250]. However, children of overweight mother had 46% lower risk to be underweight (RRa = 0.54; P = 0.003). In terms of father's occu[ation and family socioeconomic status, children with unemployed father or had low family socioeconomic status had 37% (RRa = 1.37; P= 0.030) and 42% (RRa = 1.42; P = 0.004) higher risk to be underweight respectively. Children who had poor water source had 22% higher risk to be underweight children.

DISCUSSION

In interpreting the findings, several limitations of this study have to considered. The data originated from a large national survey conducted by the Ministry of Health. Efforts had been made for better quality of the data, among others, all the data collectors had been trained and practiced to conduct interviews and fill the questionnaire before going to the field to collect data. The data collected were verified and supervised by field coordinators.

This study noted that father's occupation, family socioeconomic status, and water sources were related to the status of underweight children. Results of this study is similar with previous studies by Sartika and Aries et al.[2,11] Aries et al. found that the factors contributing to the incidence of malnutrition among children aged 0-36 months were households access to drinking water sources of more than 5 meters, and households that received cash funding from government, and households receiving rice for poor people.[11] While Sartika noted that the determinant factors related to underweight among children of under five were the work of parents, socioeconomic status and sources of clean water. Other different factors found by Sartika were utilization of health services, gender of child, breastfeeding up to 2 years, diarrheal diseases, respiratory infections, number of family members and the availability of latrines.[2]

Work is an activity undertaken to obtain money or income. Family income affects the buying power, food availability and the ability of the family to have an adequate water system that meets the requirements of health.

The main finding of this study was that mother's nutritional status caused malnutrition among children aged 24-59 months. Mothers who were underweight increased the risk of having an underweight child, and on the other hand mothers who were overweight had lower risk having an underweight child. These findings were similar with the other studies.[3,4,12,13]

Pradhan in Nepal found that maternal BMI was significantly associated with nutritional status of children. Similarly with Steyn et al, a study in South Africa found that overweight mothers were associated with an increased value of the Z-score infants than mothers who were not overweight.

While Alasfoor et al. found that a short mother increased the risk of having underweight children than mothers with taller body posture.[12] But the study did not find a significant association between maternal BMI and underweight in children aged 6-35 months in Oman. Analysis by Fuada et al. in Indonesia found that in urban areas the most dominant factor contributing to the onset of acute nutritional status was socio-economic level, but in rural areas it was the parental height.

Table 1. Some characteristics of children and risk of underweight children

	Normal (n= 560)		Underweight (n= 206)		Crude relative risk	95% confidence interval	P
	n	%	n	%			
Child's gender							
Male	269	70.4	113	29.6	1.00	Reference	
Female	291	75.8	93	24.2	0.82	0.62-1.08	0.153
Child's morbidity							
No	440	73.6	158	26.4	1.00	Reference	
Yes	120	71.4	48	28.6	1.08	0.78-1.49	0.635
Age of mother							
15-19	5	71.4	2	28.6	1.00	Reference	
20-34	422	71.7	167	28.4	0.99	0.25-4.00	0.991
35-50	133	78.2	37	21.8	0.76	0.18-3.16	0.708
Education of mother							
High	154	79.0	41	21.0	1.00	Reference	
Low	406	71.1	165	28.9	1.37	0.98-1.93	0.068
Job of mother							
Not work	362	73.7	129	26.3	1.00	Reference	
Work	198	72.0	77	28.0	1.07	0.80-1.41	0.658
Age of father							
20-24	541	72.8	202	27.2	1.00	Reference	
25-65	19	82.6	4	17.4	0.64	0.24-1.72	0.376
Education of father							
High	179	77.5	52	22.5	1.00	Reference	
Low	381	71.2	154	28.8	1.28	0.93-1.75	0.125
Nutritional status of father							
Normal	434	73.6	156	26.4	1.00	Reference	
Underweight	65	63.7	37	36.3	1.37	0.96-1.96	0.084
Overweight	59	81.9	13	18.1	0.68	0.39-1.20	0.186
Number of underfive children							
1	458	72.8	171	27.2	1.00	Reference	
2-3	102	74.4	35	25.6	0.94	0.65-1.35	0.738
Number of household members							
3-4	344	73.4	125	26.6	1.00	Reference	
5-13	216	72.7	81	27.3	1.02	0.77-1.35	0.872
Accessability to health services							
Easy	404	74.3	140	25.7	1.00	Reference	
Difficult	156	70.6	65	29.4	1.14	0.85-1.53	0.374
Posyandu utilization						'	
Yes	316	74.0	111	26.0	1.00	Reference	
No	244	72.0	95	28.0	1.10	0.82-1.42	0.591
Geographic							
Urban	138	78.4	38	21.6	1.00	Reference	
Rural	422	71.5	168	28.5	1.32	0.93-1.88	0.123

Table 2. Relationship between sociodemographic, mother's nutritional status characteristics and the risk of underweight children

	Normal (n= 560)		Underweight (n= 206)		Adjusted relative risk*	95% confidence interval	P
	n	%	n	%			
Mother's nutritional status							
Normal	381	71.2	154	28.8	1.00	Reference	
Underweight	48	62.3	29	37.7	1.20	0.88-1.65	0.250
Overweight	131	81.1	23	37.7	0.54	0.37-0.81	0.003
Father's job							
Employee	213	51.0	50	19.0	1.00	Reference	
Not employee	347	9.0	156	31.0	1.37	1.03-1.81	0.030
Family socioeconomic							
High	309	79.4	80	20.6	1.00	Reference	
Low	251	66.6	126	33.4	1.42	1.12-1.81	0.004
Water source							
Good	371	76.3	115	23.7	1.00	Reference	
Poor	189	67.5	91	32.5	1.22	0.97-1.54	0.092

*Adjusted to each other among risk factors listed on this table, child's gender, mother's and father's education, father's nutritional status, and geographic area.

Another results of this analysis found that maternal nutritional status was the most dominant factor related to underweight among children aged 24-59 months. Maternal nutritional status becomes very influential on the nutritional status of children. It might be due to the fact that overweight mother reflects the availability of food in the household because of if the father remained as an employee the family socioeconomic level is relatively high, which will also be accompanied by the ability to obtain a good source of clean water by the family.

This study noted that unemployed father or had low compared to high family socioeconomic status had 37% higher risk to have underweight children. Malnutrition is associated with poverty and disease. The three factors - malnutrition, poverty and disease - are interlinked in such a way that each contributes to the sustained presence and effect of the other. Due to poverty, a significant portion of the population is unable to procure enough food. And ultimately, they become malnourished and vulnerable to diseases like diarrhea and parasitic infection.[14]

Although not statistically significant, this study found that children whose family had difficult access to health services had greater risk (14%) to be underweight (Table 1). In Jambi province, 10% of the people were poor in 2006. This figure fluctuated from 1993 to 2000.[15] In 2007 there were 700620 poor people, and only 33.6% had accessibility of health services.[16]

Malnutrition wa a potential cause of poverty through education and low productivity.[5] It was also emphasized by Jahari that the factors associated with malnutrition were socio-economic factors, poverty, child feeding practices, and factors associated morbidity, and low community participation in efforts to improve nutrition through Posyandu.[17] Prior to this analysis in Jambi province, it was found that a visit to the Posyandu by underfive mother were only 63%. There were 37% who did not take advantage of Posyandu services.[18]

In conclusion, underweight mother had more risk to have underweight children; however, overweight mother had lower risk to have underweight children.

Acknowledgments

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