

# Indonesian Under Five Years of Age Children's Malnutrition: A Case Study of Fisherman Community in Jakarta Bay

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## ABSTRACT

**Background:** This study analyzed the determinants of malnutrition children under five years of age among the fishermen community in Jakarta Bay, Indonesia. **Methods:** This is a cross-sectional study which involved households having under five years of age children as samples. The study involved 100 children drawn using multi-stage random sampling. The nutritional status of children under five years of age was assessed by using an anthropometric index which is based on the ratio between body mass and age from WHO Standards. We used multiple logistic regressions to analyze the determinants. **Result:** The result indicates that the risks of malnutrition and under-nutrition affecting under five years of age children were high among fishermen community in Jakarta Bay with 5% and 15%, respectively. Risk factors were pregnant women who did not do prenatal visits on a regular basis (OR = 8.207;  $\beta$  = 2.105), poor sanitation (OR = 6.214;  $\beta$  = 1.827), head of family's occupation as a fisherman (OR = 4.120;  $\beta$  = 1.416), mother with high-risk pregnancy who was  $\leq 20$  or  $\geq 40$  years of age (OR = 3.484;  $\beta$  = 1.248), children who were often sick (OR = 3.423;  $\beta$  = 2.105), and poor household (OR = 2.480;  $\beta$  = 0.908). **Conclusions:** Children's nutrition issues among fishermen community were multidimensional in nature. Any intervention program, therefore, shall be integrated between health programs, poverty eradication, and sanitation improvement.

**Keywords:** Malnutrition, under five years of age children, fishermen community, Jakarta Bay, Indonesia

## 1. INTRODUCTION

Jakarta Bay is an area located in the northern part of Jakarta, the capital city of Indonesia. Historically, Jakarta Bay was known as a port area and a place where fishermen earn a living. However, the coastal strip has thrived and been a place where real estates, international ports, and business areas are found.

Nonetheless, the majority of fishermen who live in the bay are poor. They reside along the coast of Jakarta and live in houses with poor condition. Their dwelling places have no proper sanitation facilities, lack of access to clean water sources, and lack of domestic waste management systems. Moreover, this area is severely polluted [1, 2]. Not all residents are native people. Most of them came from different regions in Indonesia who tried to work and survive in the capital city. They do

not possess any official document which declares them as legal residents of Jakarta [3]. Low levels of quality of life, social, economic, and environmental conditions lead to various health issues, especially on children [4]. Numerous children under five years of age experience malnutrition. The Indonesian Ministry of Health suggests in North Jakarta, 14.9% of under five children suffered underweight, 23.7% of them were stunting, and 8.8% were wasting [5].

Malnutrition issues among children living in coastal areas are common [6]. Several factors associated with malnutrition are poverty [7-9], education [10, 11], health service [12, 13], and environment [14]. Poverty has a significant role in causing malnutrition problems in coastal areas [15, 16]. Their dependencies on natural conditions and limited funds make it difficult for fishermen to get a good income.

Besides poverty, the education levels of fishermen are low. This condition leads to a bad understanding of children’s nutritional intake which has impacts on their developments [17, 18]. Lack of access to health service worsens the existing situation. Regarding this matter, there are two issues i.e., inadequate health- service infrastructures and low levels of public willingness to use health service. Pregnant women and breastfeeding mothers who attain low levels of education and have no access to adequate health service are responsible for causing malnutrition among their children [19, 20].

Environmental issues can trigger high levels of malnutrition as well [21]. Numerous fishermen’s communities are known to have poor sanitation facilities and water sources. Lack of proper waste management systems causes litter contaminates in their neighborhood [1]. This undesirable condition increases the susceptibility of pregnant women, breastfeeding mother, and their children to malnutrition-causing bacteria [22, 23].

This study was conducted to analyze the nutritional status of children under five years of age among fishermen community in Jakarta Bay. The aim of this study is to critically examine children’s nutritional status and its determinants. Another purpose is to propose recommendations to improve the situation.

**2. MATERIALS AND METHODS**

This research was conducted in Jakarta Bay with fishermen communities as the study population. To select appropriate study locations, we examined geographical and social settings which fitted the fishermen residential areas such as located right in the northern coast of Jakarta and the main occupation of people living there was fishermen. Two locations were chosen, Penjaringan and Pluit sub-districts.

Study samples were selected by unnecessary using multi-stage random sampling. The sample base of this study was households having children under five years of age. No more than 100 households were involved, consisting of 78 households from Penjaringan sub-

district and 22 households from Pluit sub-district.

We assessed nutritional status of children by utilizing the anthropometric index based on the ratio between body mass and age. This index was derived from WHO standards with Z-score and standard deviation score (SD). A child would be considered having malnutrition if the anthropometric index was Z-score

< -3.0 SD, under-nutrition if it was Z-score of -3.0 to < -2.0 SD, normal if it was Z-score of -2.0—2.0 SD, and overnutrition if it was > 2.0 SD [24, 25]. All risk factors were analyzed by using multiple logistic regression analysis. Determinants examined in this study were household conditions, parents’ occupation, breastfeeding and supplementary feeding status, and health status.

**3. RESULT**

***Socio-demographic characteristics***

Table 1 reveals the socio-demographic characteristics of the respondents. The result of the univariate analysis showed that the proportion of respondents by fisherman village location were 78.0% of them live in Penjaringan sub-district and 22.0 of them in Pluit sub- district. The proportion of respondents based on indigenous people category (*Betawi*) were 47.0%, while non-indigenous people were 53.0%. Based on gender, 94% were male and 6% were female. Regarding a number of family members, the majority (66.0%) were 1-4 people, while a number of family members of 4 and above were 34.0%.

Based on the education of the head of a family, the majority (77.0%) of the respondent were junior and senior high school, while 18.0% of them were primary school, and 5.0% were university. Most of the heads of family aged 20-35 years (57.0%), while 35.0% of them aged 36-45 years, and 8.0% aged 46 years and above. Regarding the work of the head of a family, 86.0% were fishermen (on fishing and off fishing), 11.0% were non-fisherman, and 3.0% were unemployed.

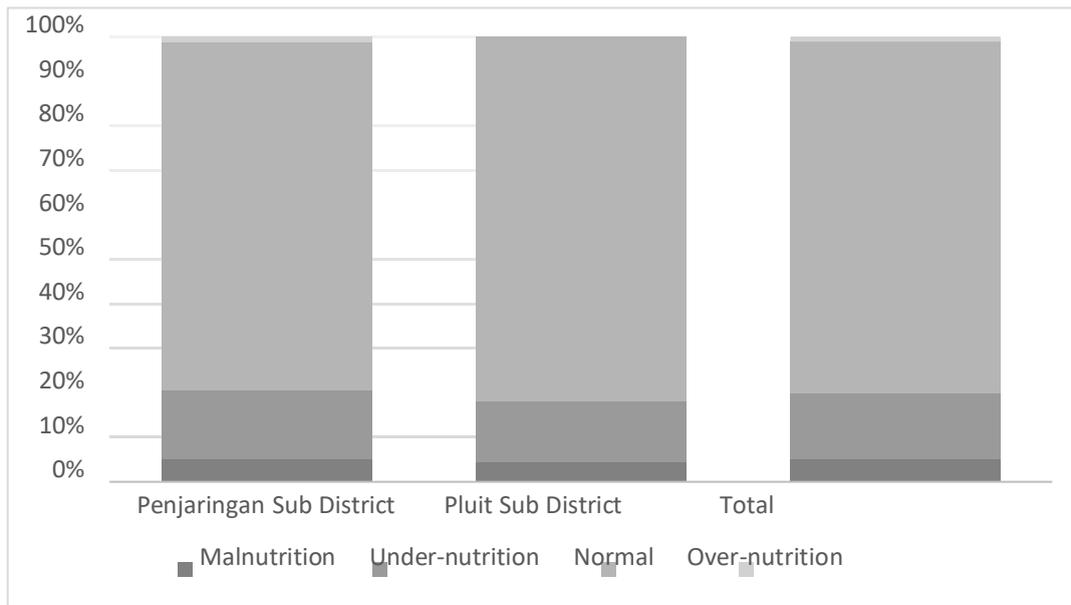
**Table 1.** Socio-demographic characteristics of the respondents

Characteristics	N	%
Fisherman village location/sub district		
Penjaringan	78	78.0
Pluit	22	22.0
Indigenous peoples		
Yes	47	47.0
No	53	53.0
Gender		
Male	96	96.0
Female	6	6.0

Number of family members		
1-4	66	66.0
5 and above	34	34.0
Education of the head of family		
Primary school	18	18.0
Junior and senior high school	77	77.0
University	5	5.0
Age of the head of family (years)		
20-35	57	57.0
36-45	35	35.0
46 and above	8	8.0
Work of the head of family		
Fisherman (on fishing and off fishing)	86	86.0
Non fisherman	11	11.0
Unemployment	3	3.0

**Table 2.** The estimation results of under five years of age children's malnutrition, wald test, significance and odds ratio (OR)

Variables	B	Wald	Significance	Exp (B) or Odds Ratio
Household conditions				
o Female head of family	0.157	0.007	0.932	1.170
o Maternal age ( $\leq 20$ and $\geq 40$ years old)				
o Highest education attained by the head of family (junior high school)	1.248	1.984	0.159	3.484
o Highest education attained by mother (junior high school)	1.028	1.649	0.199	2.794
o Migrant status	0.271	0.107	0.744	1.311
o Low economic status				
o Inadequate sanitation facilities	-0.331	0.266	0.606	0.717
	0.908	1.730	0.188	2.480
	1.827	1.783	0.182	6.214
Occupational status				
o Head of family as a fisherman	1.416	3.437	0.064	4.120
o Working mother	1.390	3.124	0.077	4.013
Breastfeeding and supplementary feeding status				
o Breastfeeding for more than 6 months	-0.897	1.120	0.290	0.408
o No supplementary feeding until 6 months old	-0.251	0.101	0.751	0.788
Health status				
o Under five years of age children without access to health service facilities	0.794	1.199	0.273	2.212
o Under five years of age children with frequent illnesses	1.230	2.197	0.138	3.423
o Under five years of age children who did not get vitamin A supplementation	0.646	0.638	0.425	1.907
o Pregnant mother who did not check their pregnancy regularly	2.105	6.222	0.013	8.207
o Pregnant mother who did not consume daily oral iron supplementation	0.751	0.622	0.430	2.119
Constants	-4.413	3.676	0.055	0.012
-2 In likelihood	73.634			
Cox & Snell R <sup>2</sup>	0.206			
Nagelkerke R <sup>2</sup>	0.327			
Chi-square	22.324			



**Figure 1.** Children under five years of age nutritional status assessment result among fishermen community in Jakarta Bay

**Nutritional status**

The result of children’s nutritional status assessment showed that the prevalence of those suffering malnutrition remained high. About 5% of under five years of age children had malnutrition, while those having under-nutrition status were not less than 15%. Figure 1 presents a summary of children’s nutritional status assessment results in both study locations. Further analysis showed that Penjaringan sub-district had a higher percentage of children with malnutrition compared to Pluit sub-district. In Penjaringan sub-district, the proportion of malnutrition was 5.1% and under-nutrition was 15.4%. As a comparison, in Pluit sub-district, the proportion of children with malnutrition was 4.5%, while the proportion of children diagnosed with under-nutrition was not more than 13.6%.

**Risk factors of malnutrition**

A multivariate test with logistic model showed that G-value or -2 in likelihood was 73.634, Cox & Snell R2 value was 0.206, and Nagelkerke R2 value was 0.327. These data showed that dependent variables only contributed 32.7% to independent variables, while the rest (67.3%) were explained by the other variables. However, this could be neglected because the analysis was more directed to calculate the odds ratio (OR).

There were two approaches in the logistic model, which were the odds ratio (OR) and Wald test. OR indicated the magnitude of probability obtained from variable tests. On the other hand, the Wald test showed variables significance association by comparing scores from the Wald test to the  $\chi^2$  table.

Seven factors of household conditions consisting of female head of the family, mother’s age ( $\leq 20$  and  $\geq 40$  years of age), education attained by the head of the family, education attained by the mother, migrant status, household economic status, and sanitation facility. The result suggested that households with a female head of the family had 1.2 times greater risk of having children with malnutrition compared to those with a male head of the family (OR=1.170,  $\beta = 0.157$ ). Mothers with a high-risk pregnancy ( $\leq 20$  and  $\geq 40$  years of age) had 3.5 times the risk of having under five years of age children with malnutrition compared to those without a high-risk pregnancy (OR=3.484,  $\beta = 1.248$ ).

Heads of the family who completed junior high school as their highest level of education had 2.8 times the risk of having under five years of age children with malnutrition compared to those who attained higher education (OR=2.794,  $\beta = 1.028$ ). Regarding maternal education, those who completed junior high school as their highest level of education had a 1.3 times greater risk compared to mothers with higher education (OR=1,311,  $\beta = 0.271$ ).

The further finding suggested that comer residents had lower risk to have children with malnutrition compared to local residents with OR of 0.7 ( $\beta = -0.331$ ). Households with low economic status had a 2.5 times greater risk to have children diagnosed with malnutrition compared to those with better economic status (OR=2.480,  $\beta = 0.908$ ). The most interesting aspect of our findings was houses complemented with poor sanitation facilities had 6.2 times greater risk of developing under five years of age children with malnutrition compared to houses with proper sanitation facilities (OR=6.214,  $\beta = 1.827$ ).

Based on parental occupation, two variables were observed: the head of the family working as a fisherman and wives who also worked. The result showed that households where the head of the family worked as a fisherman had 4.1 times greater risk of having under five years of age children with malnutrition compared to those where the head of the family had another occupational status (OR=4.120,  $\beta = 1.416$ ). Households where mothers also worked to support their families had 4.0 times higher risk of having children diagnosed with malnutrition compared to those with stay-at-home mothers (OR=4.013,  $\beta = 1.390$ ).

Regarding the breastfeeding and supplementary feeding status, we examined mothers who breastfed their children for more than 6 months and those who did not provide supplementary feeding to their children aged 0-6-months-old. It was known that mothers who breastfed their children for more than 6 months had 60% lower risk of having their children diagnosed with malnutrition compared to those who did not (OR=0.408,  $\beta = -0.897$ ). On the other hand, women who provided supplementary feeding had a 22% lower risk of having under five years of age children with malnutrition compared to those who did not (OR=0.778,  $\beta = -0.251$ ).

There were five variables studied to define health status as a determinant. We examined under five years of age children who did not gain access to health service facilities, those who suffered frequent illnesses, those who did not get vitamin A supplementation, pregnant mother who did not check their pregnancy on a regular basis, and pregnant mother who did not take daily oral iron supplementation during gestation.

The result indicated that a pregnant mother who did not check their pregnancy regularly had 8.2 times the risk of having under five years of age children with malnutrition compared to those who did (OR=8.207,  $\beta = 2.105$ ). Children with frequent illnesses had 3.4 times the risk of developing malnutrition compared to those who were rarely ill (OR=3.423,  $\beta = 1.230$ ).

Furthermore, those without access to health service facilities had 2.2 times greater risk of developing malnutrition compared to those who had access (OR=2.212,  $\beta = 0.794$ ). Pregnant mother who did not take daily oral iron supplementation during pregnancy had 2.1 times the risk of having their children with malnutrition compared to those who did (OR=2.119,  $\beta = 0.751$ ). Lastly, children who did not get vitamin A supplementation had a 90% higher risk of developing malnutrition compared to those who were supplemented (OR=1.907,  $\beta = 0.646$ ).

#### **4. DISCUSSION**

Malnutrition issues in children under five years of age have become inseparable parts of fishermen's life in Indonesia, especially in Jakarta Bay. Comprehensive measures are needed to address the issues and prevent all causes. The phenomenon of fishermen's life in Jakarta Bay is full of economic, social, and environmental

problems. Economic issues such as unemployment and low-paid jobs are leading factors to poverty in the fishermen community. This factor has adverse impacts on children's nutritional status [26, 27].

Poverty creates a situation where pregnant women, breastfeeding mother, and their children lack access to balanced nutrition intake. In the poverty situation, pregnant women and breastfeeding mothers do not have good nutritional intakes [28, 29]. Pregnant women and breastfeeding mothers whose needs for good nutritional intake fail to be fulfilled are prone to suffer chronic energy deficiency. This condition could risk them to give birth to an infant with low birth weight [30]. Likewise, breastfeeding mothers coming from poor households could not fulfill sufficient nutritional intake for their babies [31]. In fact, the first thousand days of life is an important period for children's growth [32, 33].

Another finding suggests that high risks of malnutrition in children who are under five years old are caused by women with a high-risk pregnancy, which are those who are 20 years of age or younger and 40 years or older. This indicates that a reproductive aspect may become an important factor to ensure a fetus in the womb to get good nutritional supplies [34].

Pregnant women who are 20 years old or younger tend to be categorized that their nutritional intakes and their reproductive organs have not been perfectly developed. These factors could impose adverse effects on the growth of their fetus. On the other hand, in pregnant women who are 40 years of age or older, the nutritional absorption by a fetus might be suboptimal. Women within this age group are more susceptible to various diseases due to the decreasing health condition. Poor access to maternal health care facilities is also a threat to under five years of age children's nutritional status [35]. Women who do not check their pregnancy regularly have a high risk to give birth to a baby with malnutrition [36]. Ideally, a pregnant woman should do prenatal visits at least four times at maternal health care. Low access is caused by inadequate maternal health care facilities and the unwillingness of pregnant women to check their pregnancy.

Environmental issues in fishermen communities appear to be prevalent, not to exclude Jakarta Bay which is infamous by its slum areas. Previous studies argued that bacterial contamination due to poor sanitation caused many under five years of age children to suffer nutritional problems [37]. Bacterial infections lead to an impaired digestive system in children, so their nutritional absorption rates become low [38]. In addition, bacteria cause numerous diseases which could adversely impact their growth [39].

This study will contribute to be a reference for the government to address nutritional issues in under five years of age children, particularly those who reside in fishermen communities in Jakarta Bay. Intervention programs should be integrated, not only directly dedicated to children with malnutrition and pregnant women but also

incorporated to other existing intervention programs. These include poverty eradication, sanitation improvement, maternal and neonatal health care improvement, and health education for adolescents discussing the risks of early marriage and reproductive health.

## 5. CONCLUSIONS

Children's nutrition issues among fishermen community were multidimensional in nature. Any intervention program, therefore, shall be integrated between health programs, poverty eradication, and sanitation improvement.

## ACKNOWLEDGMENT

We are grateful to the Jakarta Provincial Government, who gave permission to conduct this study. We also would like to thank the Research and Community Service Institution of Universitas Pembangunan Nasional (UPN) Veteran Jakarta-Indonesia and Ministry of Research, Technology and Higher Education of the Republic Indonesia for their institutional support throughout this study.

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