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PROCEEDINGS OF THE 2ND INTERNATIONAL SYMPOSIUM OF PUBLIC HEALTH

# Achieving SDGs in South East Asia: Challenging and Tackling of Tropical Health Problems


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I Wayan Gede Artawan Eka Putra
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Organized by
Faculty of Public Health, Universitas Airlangga

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# FOREWORD

The point of Sustainable Development Goals (SDGs) has been determined in the consistent meeting in all countries. The health sector position is one of the key components in achieving the indicators. Special attention to the health sector focuses on community nutrition, national health systems, access to reproductive health and family planning and sanitation and clean water.

Based on that, Southeast Asian countries are seen as important part in formulating strategic and policy efforts to improve the effectiveness and efficiency of achieving the various goals of the SDGs. Therefore, the Doctoral Program of Health Science, Faculty of Public Health, Universitas Airlangga held The 2nd International Symposium of Public Health. This remarkable event is in collaboration with Faculty of Medicine, Widya Mandala Catholic University Surabaya and Magister Program of Public Health, Jember University. It's an honour to present **"Achieving SDGs in South East Asia: Challenging and Tackling of Tropical Health Problems"**.

We have tried to give our best contributing of our knowledge in the field of public health especially our contribution to help the problems on tropical health, health equity and quality of health care, clinical and community relationship to enhance public health, emerging and re-emerging diseases, nutrition-enhancing as strategic investment, global strategy framework for food security and nutrition, environmental and occupational health and mental health for achieving SDGs in South East Asia.

The aim of this symposium is to disseminate knowledge and share it to the public, especially in the scientific community, such as academics and practitioners in the field of health. The symposium focusing on formulation of policy recommendations for related parties to accelerate the achievement of the target of SDGs in the field of health. The results of this symposium are also expected to be an input for policy makers, from various levels in formulating programs to accelerate the SDGs goals' achievement. This international symposium will help us, to grasp and share more knowledge especially in public health science.

At last, we would like to ackowledge for all parties which are provide the valuable materials as well as financial support for the successful symposium. As chair of organizing committee, I would also like to say deep thank you for all committees; my colleagues, and also students in faculty of Public Health Universitas Airlangga, who have been working to be part of a solid team and amazing committee.

I am looking forward to seeing you at ISoPH in the near future.

Rachmad Suhanda
Chairman of the Committee

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# Severely Underweight Determinants of Children Under Five

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Abstract: The prevalence of malnutrition in Pekalongan has reached 17%. If such condition is not handled soon, malnutrition will create clinical manifestation with prognosis of death and chronic disability. The purpose of this study was determining the nutritional status determinants of children under five in Pekalongan. Explanatory research used quantitative approach and cross-sectional design. Variables were intake, social economy, and purchasing power. Population were 68.014 and samples taken were 135 children under five. This study used the proportional random sampling and data analysed with chi square. The research showed that those with malnutrition were 57 (42.2%), lack of nutrition were 26 (19.3%), and good nutrition were 52 (38.5%). There was a significant correlation among variables and nutritional status. Multivariate analysis showed that variable purchasing power (p=0,001) and variable of intake (p=0,008) affect nutritional status. A strong influence from purchasing power variables obtained Exp (B) = 8,291. Based on the result, 83 of 135 samples suffered from malnutrition. Suggestions for the intervention of malnutrition should be made directly with PMT and provision of IEC while the intervening should also be done indirectly through empowerment and strengthening of family economy.

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## 1 INTRODUCTION

Malnutrition problem cannot be regarded as simple health problems considering that vulnerable groups affected are infants and children as the next generation. If intervention is not carried out concerning this condition, it will lead to a lost generation (Almatsier 2003). Malnutritionis both a medical and social disorder (WHO 1999). This statement is supported by the Health Research (*Riskesdas*) in 2013 that found the prevalence of malnutrition and lack of nutrition on the National toddler reached 19.6%, which was significantly increased from *Riskesdas* 2007 which only reached 18.4%**.** Good nutrition is the foundation to proper growth and development in every human; it means that nobody suffers from any health complication. Malnutrition still remains a significant problem all over the world, especially among children under five years old (Mavis Pearl Kwabla Email et al. 2018).

*Balita* is children aged one until five years old. This period is important for human life process. This period will have a big effect on the growth and development.In 2013, total of children under five was 23,708,844. The number of children under five with severe underweight (malnutrition) was 4,646,939. The incident was incredible. While prevention programs and elimination programs had been routinely done (Depkes RI 2015)**.** The prevalence of severe underweight (malnutrition) in Central Java was 16%which means the absolute number of 480,441 children under five. While, the prevalence level of malnutrition in Pekalongan was 17%. In the previous year (2015), the total number of children suffering from malnutrition in Pekalongan was 73 children under five (Depkes RI 2015; Pekalongan 2016)**.**

Previous nutritional research had only partially looked at the related factors that correlated with severe underweight (malnutrition) such as assessing the correlation among social demographic factors, intake, with the purchasing power of poor nutrition. While Tysa Runingsari (2014) found no contribution of elements of social support in favour of nutritional status of children.

The important points of differences between this research and previous researches are this research, with model of causality of severe underweight (malnutrition) suffered bychildren under five in Pekalongan and its prevention efforts, presents more



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complex network analysis by exposing primary variable, dimensions and variable indicator that will be analysed by the efforts that have been taken by related stakeholder to determine adequate and appropriate intervention based on problem fundamental analysis.

Based on the explanation above, the amount of subject matter severe underweight (malnutrition) reaching prevalence rate as 17%, the manifestation of clinical prognosis of death, chronic, disability or also the possibility of recovery and previous research that examines only partially and did not look at aspects of the accuracy of the identified interventions, the research model of causality severe underweight (malnutrition) of children under five in Pekalongan and prevention efforts is important.This research aims to determine the determinant severe underweight (malnutrition) of children under five in Pekalongan regency.

# 2 METHOD

## 2.1 Research Design

The method used in this research was explanatory research design with a quantitative approach through an analytical survey method, a cross sectional design with variable (Intake, social, economic, and purchasing power) (Sugiyono, 2012).

## 2.2 Research Sample

The study population included the whole number of children under five in Pekalongan as 68.014 children. Large samples taken as many as 135 children under five. The sampling technique used was proportional random sampling (Bungin 2015). There were 135 respondents taken from 27 health centers in Pekalongan regency. Data was collected by questionnaire and interviews. The processing method used *chi square* test to determine the determinant correlated with the severe underweight (malnutrition) children under five.

# 3 RESULT

This research found that 135 children under five had nutritional status, namely 57 or (42.2%) suffered from severe underweight (malnutrition), 26 or (19.3%) lack of nutrition and 52 (38.5%) with good nutritional status.

Before discussing correlation and the variables, respondents' characteristics has to be known in advance. The characteristics of the respondents can be seen in the following table:

Table 1: Characteristics of children under five.

| Characteristics | Information | Total |
|---|---|---|
| Age | Minimum 11 months<br>Maximum 60 months<br>The mean 33.67 months | 135 |
| Gender | Male 62 (46%)<br>Women 73 (54%) | 135 |
| Height | Minimum 50 cm<br>Maximum 110 cm<br>The mean 82.9 cm | 135 |
| Weight | Minimum 5 Kg<br>Maksimum17 Kg<br>The mean of 10.24 Kg | 135 |
| Nutritional Status | Good 52 Children Under Five (38.5%)<br>Less than 26 Children Under Five (19.3%)<br>Severely Underweight 57 Children Under Five (42.2%) | 135 |

Some variables such as maternal knowledge about nutrition, socio-economic status, purchasing power, variety of food selection and intake are presented below:

Table 2: Variable frequency distribution of the research.

| No | Variable | Description | Freq (f) | Percentage (%) |
|---|---|---|---|---|
| 1. | Mothers' knowledge about nutrition | Good<br>Poor | 93<br>42 | 69<br>31 |
| 2. | Socio-economic status | High<br>Low | 49<br>86 | 36<br>67 |
| 3. | Purchasing power | High<br>Low | 54<br>81 | 40<br>60 |
| 4. | Variations in the selection of foodstuffs | Varied<br>Less varied | 49<br>85 | 34<br>63 |
| 5. | Intake | Sufficient<br>Insufficient | 68<br>67 | 51<br>49 |

From data on table 2, it can be concluded that the number of mothers who had good knowledge about nutrition for children under five was higher, namely 69% compared to those who had less knowledge, that was 31%.

However, it was inversely proportional to the characteristic of nutrition status of children under

five as shown on table 1 in which the status of severe underweight (malnutrition) had more proportion than that of good or lack of nutrition, as many as 57 children under five (42.2%).

Itcan be explained by the findings, of the 135 respondents surveyed, those who had a lower socio-economic status had a greater proportion, as many as 86 respondents (67%) compared to respondents who had a high socio-economic status as many as 49 respondents (36%). Low socio-economic status resulted in low purchasing power as many as 81 respondents (60%) which exceeded the number of high purchasing power proportion as 54 people (40%). Low purchasing power will affect the variation of foodstuff selection. Respondents with less varied foodstuff had higher proportion than respondents who had more varied foodstuffs as 85 people (63%). Both variables of intake groups had similar proportion. Some relationship between variables is presented in bivariate analysis, they are as follows

## 3.1 The Correlation Socio-Economic Status and Intake

The correlation between socio-economic status of families and intake appears in the following table below:

Table 3: Table correlation socio-economic status and intake.

| Socio-economic status | Intake | | Total |
|---|---|---|---|
| | Insufficient | Sufficient | |
| Low | 56 (83.6%) | 30 (44.1%) | 86 |
| High | 11 (16.4%) | 38 (55.9%) | 49 |
| Total | 67 | 68 | 135 |
| P value: 0.000 OR: 6.44 | | | |

Table 3 shows that the number of families which had low socio-economic status and children suffering from malnutrition as 64 respondents (74,4%) was higher than that of respondents from low socio-economy having children with good nutrient as 22 respondents (25,6%). On the other hand, the number of respondents with high socio-economy but had children suffering from malnutrition was 19 respondent (38,8%). The number was lower than that of respondents with high socio-economy and had children with good nutrient as 30 (61,2%). There is a significant correlation between socio-economic status with intake (*p* value= 0,000), OR = 6,44. Thus, it can be concluded that low family socio-economic status has six times greater risk to cause children under five suffering from malnutrition.

## 3.2 The Correlation between Purchasing Power and Intake

The purchasing power is defined as the ability of families to buy foodstuffs to meet family nutritional intake.

Table 4: The correlationbetween purchasing power and intake.

| Purchasing power | Intake | | Total |
|---|---|---|---|
| | Insufficient | Sufficient | |
| Low | 53 (65.4%) | 28 (34.6%) | 81 |
| High | 14 (25.9%) | 40 (74.15) | 54 |
| Total | 67 | 68 | 135 |
| P value: 0.000 OR: 5.403 | | | |

Table 4 shows that the number of respondents with low purchasing power and had children under five suffering from malnutrition was 53 (65.4%). The number was more than that of respondents who had low purchasing power but sufficient intake as 28 respondents (34.6%). The group of respondents who had high purchasing power but children suffering from malnutrition were as 14 respondents (25.9%), fewer than that of group of respondents who had high purchasing power and children with good nutrient, as many as 40 respondents (74.15%). There is a significant correlation between the variables of purchasing power with intake (*p* value = 0.000), OR = 5.403. Thus, it can be concluded that the purchasing power of low-risk families were five times greater to cause malnutrition.

## 3.3 The Correlation between Socio-Economic Status and Nutritional Status of Children Under Five

Table 5: Table of the correlation between socio-economic status and nutritional status of children under five.

| Socio-economic status | Nutritional status of Children Under Five | | Total |
|---|---|---|---|
| | Severely Underweight | Good nutrition | |
| Low | 64 (74.4%) | 22 (25.6%) | 86 |
| High | 19 (38.8%) | 30 (61.2%) | 49 |
| Total | 83 | 52 | 135 |
| P value: 0.000 OR: 4.593 | | | |

Table 5 shows that the number of group of respondents who had poor socio-economic status had children suffering from malnutrition were 64 respondents (74.4%); more than that of the group of respondents who had low socio-economic status and children with good nutritional status as 22 respondents (25.6%). The group of respondents who had high socio-economic status with children suffering from malnutrition was as 19 respondents (38.8%); fewer than that of the group of respondents who had high socio-economic status and children with good nutritional status as 30 (61.2 %). There is a significant correlation between socio-economic variables with the nutritional status of children (*p* value = 0,000), OR = 4.593. So it can be concluded that family with low socio-economic statusis four times greater to causes malnutrition among children under five.

People with low socio-economic status become the most vulnerable party dealing with food security since purchasing power is main determinant of the ability to afford nutritious food. In 2012, the World Bank reported that 19.9% of the Jamaican population lived under the poverty, an increase from 9.9% in 2007(Silveira et al. 2017).

This is also in accordance with research done in Sub-Saharan African pre-school children that shows malnutrition was suffered by group of people with the lowest socio-economic (Lesiapeto 2009).

## 3.4 The Correlation between Purchasing Power and Nutritional Status of Children Under Five.

Table 6: The correlation between purchasing power and nutritional status children under five.

| Purchasing power | Nutritional status of Children Under Five | | Total |
|---|---|---|---|
| | Malnutrition | Good nutrition | |
| Low | 67 (82.7%) | 14 (17.3%) | 81 |
| High | 16 (29.6%) | 38 (70.4%) | 54 |
| Total | 83 | 52 | 135 |
| P value: 0.000 OR: 5.004 | | | |

Table 6 shows that the number of group of respondents who had low purchasing power and children suffered from malnutrition was 67 respondents (82.7%); more than that of the group of respondents who had low purchasing power and children with good nutritional status as 67 respondents (82.7%). The number of group of respondents who had high purchasing power but had children with malnutrition was 16 respondents (29.6%); fewer than that of group of respondents with high purchasing power and children with good nutritional status as38 (70.4%). There is a significant correlation between purchasing power and nutritional status of children (*p* value = 0,000), OR = 11.33) Thus, it can be concluded that the low purchasing power has 11 times greater risk in causing malnutrition among children under five**.**

## 3.5 The Correlation between Intakeand Nutritional Status of Children Under Five

According to UNICEF, food intake is a direct factor determining the nutritional status of children under five. Sufficient food intake is the total energy accordance with AKG for children under five.

Table 7: Table of the correlation between intake and nutritional status children under five.

| Intake | Nutritional Status of Children Under Five | | Total |
|---|---|---|---|
| | Malnutrition | Good nutrition | |
| Insufficient | 54 (80.6%) | 13 (19.4%) | 67 |
| Sufficient | 29 (42.6%) | 39 (57.4%) | 68 |
| Total | 83 | 52 | 135 |
| P value: 0.000 OR: 5.586 | | | |

Table 7 shows that the number of respondents with insufficient intake resulting in malnutrition was 54 respondents (80.6%); more than that of group of respondents who had insufficient intake and children with good nutritional status as 13 respondents (19.4%). The number of respondents who had sufficient intakes and children suffering from malnutrition was 29 respondents (42.6%); fewer than that of the group of respondents who had sufficient intake and children with good nutritional status as 39 (57.4%). There is a significant correlation between intake variable and nutritional status of children (p value = 0,000), OR = 5.586. Hence, it can be concluded that the insufficient intake of children under five who had five times greater risk in causing malnutrition among children under five.

In this discussion, malnutrition can occur because it is started by a history of infection. The history of infection mechanisms results in undisturbed nutritional status and affects the intake that increase infectionsand will in-turn worsen undernutrition by increasing nutritional needs and nutrient loss,and reducing nutrient intake(C. Garza & Onts 2005).

The correlation between variables of socio-economic status and purchasing power against intake of Children under five is presented in the following table:

Table 8: The correlation between variables of socio-economic status and purchasing power against intake of children under five.

| | Variable | Sig. | Exp (B) |
|---|---|---|---|
| Step 1 | Socio-Economic Status | 0,003 | 3,916 |
| | Purchasing Power | 0,011 | 3,044 |

Table 8 shows that socio-economic status ($p$= 0.003) and purchasing power ($p$=0.011) affect intake of children under five. Strong influence can be seen in the value of Exp(B). The Socio-Economic Status variables obtained was Exp(B) = 3,916, which means respondents from lower socio-economic status are at risk of 3.916 times to cause insufficient intake of children under five. The purchasing power variable values obtained was Exp(B)=3,044, which means that respondents who had low purchasing power are at risk of 3,044 times to cause insufficient intake of Children under five.

The correlation among variables of socio-economic status, purchasing power and the intake of the nutritional status of children under five is presented in the following table:

Table 9: Influence together variables socio-economic status, purchasing power and intake to nutritional status of children under five.

| | Variables | Sig. | Exp (B) |
|---|---|---|---|
| Step 1 | Socio-Economic Status | 0.640 | 1,263 |
| | Purchasing power | 0,001 | 7.558 |
| | Intake | 0,014 | 3,089 |
| Step 2 | Purchasing power | 0,001 | 8.291 |
| | Intake | 0,008 | 3,273 |

Table 9 shows thatin step 1, the socio-economic status ($p$=0.640) did not affect the nutritional status of children under five so socio-economic status variables that at step 2 should be excluded. After socio-economic status variable is issued, the obtained variabel purchasing power ($p$=0.001) and Intake ($p$=0,008) affect the nutritional status of children under five. Strong influence can be seen in the value of Exp(B), the purchasing power of variable values obtained Exp(B)=8,291, which means that respondents who had low purchasing power were 8,291 times at risk of suffering from malnutrition. At the intake, values Exp(B)= 3,273 means that respondents who had insufficient intake were 3,273 times at risk of suffering from malnutrition.

# 4 DISCUSSION

We present the determinant of malnutrition suffered by children under five in Pekalongan Regency. In our research, we have three variables such as sosio-economic status, purchasing power and intake. Respondents' characteristics found were that mean of age was 33,67 month. Respondents were dominated by women as many as 54 % or 73 children under five. The mean of height was 82,9 cm and mean of weight was 10,24 kg. Of 135 children under five, we found the nutritional status such as 57 or (42.2%) were children under five with malnutrition, 26 or (19.3%) with less nutrition and 52 (38,5%) with good nutritional status. In theanalysis, we found that nutritional status of Children under five was dominated by malnutrition.

The analysis shows that the correlation of socio-economic status was$p$ value 0,000, OR= 4,593. Itmean that there was a significant correlation between sosio-economic status and nutritional status of children under five. Malnutrition was dominated by family with low income. This is similiar to the studies conducted by Galgamuwa, Lahiri Sandaruwan, Devika Iddawela 2017 that stated malnutrition suffered by Children under five was dominated in low income groups. This is also in accordance with research done in Sub-Saharan African preschool children. Malnutrition is suffered much by group of people with the lowest socio-economic status (Silveira et al. 2017). High income offers the opportunity to provide good quality food and more health services. Another study shows that the links paternal education is a strong determinant for enhancing the household income in developing countries(Yohannes 2003).

In this study, it sosio-economic status was not the only issue to be discussed but also purchasing power and intake. In analysis of Purcashing power the result of $p$ valuewas 0,000, OR= 5,004. It means that there was significant correlation between purchasing power and nutritional status of children under five. Malnutrition was dominated by respondents with low purchasing power. The result is almost in line with family's income. Purchasing power here is defined as the ability of a family to buy nutritious food to meet food intake. Not only to

buy ingredients other than food,the purchasing power of nutritious food is also expected to support the nutritional status of children under five as a source of growth and development. Nutrition is an important determinant of immunological status. Under-nutrition can make immune competence poorer and increase chances of susceptibility and vulnerability to infections (Tulsi Ram Bhandari and Muniraj Chhetri 2013). Therefore, the fulfilment of nutritious foods is very important. If the families have some lists foodstuffs to purchase for at least 3 days, it can minimize the occurrence of malnutrition suffered by children under five.

At least, another factors correlating with nutrional status of children under five is intake. In this study, intake had *p* value=0,000, OR=5,586.It means that there is a significant correlation between intake and nutritional status of children under five. The result of this study shows that malnutrition was dominated by insufficient intake. Mean of the calories was lower if compared with AKG Indonesia. Inadequate intake may cause trends of malnutrition among children under five.

In conclusion, severe malnutrition can occur because it is offset by a history of infection. The history of infection mechanisms results in undisturbed nutritional status and affects the intake that increased infections that will in-turn worsen under-nutrition by increasing nutritional needs and nutrient loss, and reducing nutrient intake (C. Garza & Onts 2005)**.**The primary determinants of malnutrition as conceptualised by several researchers related to unsatisfactory food intake and/or severe and repeated (UNICEF 1998).

# 5 CONCLUSIONS

The results obtained from 135 children under fiveshowthat the number of malnutrition amongchildren under fivewas 57 (42.2%), and children under fivelacking of nutrition were 26 (19.3%). While, the number of children under five with good nutritional status was52 (38,5%). There was a significant correlation among socio-economic status, purchasing power intake and nutritional status of children under five in Pekalongan Regency. With *p* valuesof socio-economic status (p=0,000), purchasing power (p=0,000) and intake (p=0,000). Triangulation results in Health Office of Pekalongan District shows that the distribution of malnutrition cases spreads evenly in each region.In addition, the screening cases and intervention efforts were good enough, but the evaluation and monitoring of the effectiveness of the program was not optimal.

Suggestions that can be proposed is the intervention of malnutrition should be made directly with the PMT (Pemberian Makanan Tambahan). Moreover, the provision of Information Education and Communication, while intervening indirectly should also be done through the empowerment and strengthening of family economy considering the findings of the variable of socio-economic status of the family, purchasing power, and the intake correlated with the nutritional status of Children under five.

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