Original Research Article

Determination of Household Food Security and Its Impact on Nutritional Status of Mother and Children Under Five Years in Simalungun District North Sumatra-Indonesia

Sadar Ginting

Efarina University, Department of Public Health, Faculty of Health, Simalungun, Indonesia 21162

ABSTRACT

Background: Simalungun district is the second largest granary in North Sumatera province after Deli Serdang district, however the percentage of undernutrition in Simalungun district is higher.

Objective: The objective of this study was to analyze the determination of household food security and its impact on the nutrition status of mother and children under five years in Simalungun district.

Methods: Research design was cross-sectional study. The chosen research areas were determined by purposive sampling based on the status of the village as an undeveloped village. The samples were taken by stratified random sampling with the number of each category proportionately, and therefore it obtained the samples 125 households. The data were collected by structured interview using the questionnaires to one of the household members (i.e. mother). The nutritional status of the mother was measured by body mass index (BMI) and the nutritional status of children measured based on a child's weight-for-age (W/A), and then compared to the WHO standard 2007. The collected data were processed and analyzed by descriptive and statistic method.

Results: The results of the analysis indicated that the age of household head, household size and educational level have no a significant correlation to the household food security. Whereas the expenditure (p-value= 0,006) has a significant correlation to the household food security. There was relationship between the household food security with nutrition status of mother (p-value= 0.008) and children under five years (p-value= 0.031).

Conclusions: Based on the analysis, it indicated that the inadequate or insecure access to adequate food due to financial constraints. The household food security has a significant correlation to the nutritional status of mother and children under five years of age.

Keywords: Household Food Security, Nutritional Status

INTRODUCTION

In Indonesia that famous with fertile soil has various natural resources, but the famine was found anywhere and anytime. Anyone is classified in famine, if in the two last month live without food caused by the inadequate or insecure access to adequate food. In the western side, in the area of National Park of Bukit Dua Belas Jambi, there was a tragic event where 11 children of Anak Dalam ethnic were dead from famine. In the eastern side, in Timur Tengah Selatan and Nusa Tenggara Timur district, six people were dead caused by famine. In the most eastern side of Indonesia, in 2009, the famine covers the district of Yakuhimo Papua, 92 persons were dead caused by the lack of food and nutrition. [1] The result of the last study, FAO reported that in 2015 there were 19.4 million people in Indonesia in famine condition. [2]

North Sumatera is one of the provinces in Indonesia in the self-sufficiency emergency status. The seriousness of the local government in food security as formulated in vision and mission

did not separate this province from the food susceptibility and poverty. This is indicated by the data of food security and susceptibility map issued by World Food Program in mutual cooperation of National Food Security Board in 2009. There were 100 districts that classified into food susceptibility. North Sumatera is in 13th position as a district with the first priority of food susceptibility and the 98th rank with the district in third priority food susceptibility. [3]

Simalungun is one of the districts in North Sumatera province that has the agricultural center with the area of agricultural and plantation land 346.195 Ha or 78.92% of total area of Simalungun district. [4] Although Simalungun is the second largest granary in North Sumatera after Deli Serdang district, however the percentage of undernutrition is higher. Based on the results of the local health survey in 2016, the nutritional status of women of reproductive age is still poor (30%). Of thirty sub-districts in three district as an undeveloped area in Simalungun district with women of reproductive age, the area with risk of chronic energy deficiency is higher in sub-district of Tapian Dolok (73%), Batu Nanggar (73%) and Jorlang Hataran (57%). Based on the data in Health Office of Simalungun district, there was undernutrition problem in the children under five years (15,6%). [5]

Hardinsyah said that three of ten childrens under five in Indonesia have the protein-energy deficiency, three of ten pregnant women are in chronic energy deficiency, and six of ten of households have the potency of food secure. The nutrition status is an indicator whether the household in food secure, or in food insecure (had insufficient access to adequate food). In addition, there are some factors that could influence the household food security such as the social economic factor, household size, the age of household head, educational level, and expenditure per capita per month. [6]

The objective of this research is to analyze the determination of household food security and its impact on the nutrition status of mother and child under five at the district of Simalungun district North Sumatra, Indonesia.

METHODS
Study design, area, and sampling techniques

The research design is cross-sectional study. The location of research is in Sub-district of Tapian Dolok (1 village), sub-district of Batu Naggar (1 village), and Jorlang Hataran (1 village). The chosen research areas were determined by purposive sampling, based on the status of the village as the undeveloped village. The choosing of the village is based on the poverty level in chosen sub-district.

Population in this research is all of the households in the area of food susceptibility in Simalungun district. The samples were taken by stratified random sampling with the number of each category is proportional, it obtained the samples 125 households, that consist of pre-prosperous family and prosperous family.

Data collection and Analysis

The collected data is the data of household characteristics, i.e. the number of family members, the age of household head, education level of household head, expenditure either for food or for non-food, and the data of food consumption in a year. The data were collected by structured interview using the questionnaires to one of the household members (e.i mother). The nutritional status of the mother is measured by body mass index and the nutrition status of the children is measured by the body weight according to the age (weight-for-age) and compared to the WHO standard in 2007. [7]

The collected data were processed and analyzed by descriptive and statistic method. The data processing is consist of editing, coding, entry and analysis. The data of age of household head is classified into 3, i.e. young adults (18-39 yrs), middle-aged (40-59 yrs) and older adults (≥60 yrs). The

data of the size of household according to the national population and family planning of Indonesia is classified into 2 criteria, i.e.: small-scale household if ≤4 people and large-scale household if >4 people. [8] The data of educational level of head of household is categorized into elementary school if duration of education is 6 years, junior high school if the duration of education ≥7-9 years, senior high school if the duration of education >10-12 years and higher education or university if the duration of education is >12 years. The data of household expenditures is categorized based on expenditure per capita per month according to the Central Bureau of Statistics, i.e. below the poverty line < IDR 302.735 and above the poverty line ≥ IDR 302.735. [9] The data analyzed by the descriptive method is the data of the age of head of household, the size of household, educational level, expenditure per capita per month of household and the nutrition consumption of household.

In order to measure a correlation between the variables, it analyzed by chi-square test. The data of food consumption is obtained from SQDD (Semi-Quantitative Food Frequency) that conversed into energy (kcal) and protein (gram) using the List of Composition of Food Ingredient. The rate of nutrition sufficiency is obtain from the list of nutrition sufficiency of the population that suggested from National

Food and Nutrition Summit 2012. The rate of nutrition sufficiency of household is the calculation of the rate of

nutrition sufficiency (energy and protein) of each the household member. The rate of nutrition sufficiency (energy and protein) is calculated by comparing the average of nutrition consumption of household and the rate of the sufficiency of nutrition of household in percentage. [10] The data was categorized based on the cut of point into 4 categories, i.e. good if ≥ 90.0% dietary allowances, medium if 80.0 – 89.0% dietary allowances, less if 70.0-79.0% and deficit if < 70.0%. Furthermore, the determining of food security level by categorizing the energy sufficiency level into 2 categories, i.e. is food insecure if energy sufficiency level < 90.0% and food secure if energy sufficiency level ≥ 90.0%. [2]

RESULTS
Determination Factors of Household Food Security

Based on the results of study it indicated that majority of the age of household head is 40-59 years (63 persons) and 44 persons (69.8%) are classified in food secure. The higher of age of household head, the higher of household food susceptibility in which the higher percentage (78.6%) of household in the category of food insecure with the age of household head is ≥ 60 years. The result of chi-square test indicate that there's no a significant correlation between the age of head of household and the household food security p-value = 0.476 (p>0.05). This condition is shown in Table 1.

Table-1:-Determination Factors of household food security

Determinant Factors	Household Food Security				Total		p- value
	Food Insecure		Food Secure				
	n	%	n	%	n	%	
Age of household head							
≥ 60 years old	11	78,6	3	21,4	14	100,0	0,476
40-59 years old	44	69,8	19	30,2	63	100,0	
18-39 years old	30	62,5	18	37,5	48	100,0	
Household size							
> 4 persons (small scale)	70	70,7	29	29,3	99	100,0	0,205
≤ 4 persons (bigger scale)	15	57,7	11	42,3	26	100,0	
Education of household head							
Elementary school	40	76,9	12	23,1	52	100,0	0,263
Junior High School	20	66,7	10	33,3	30	100,0	
Senior High School	23	59,0	16	41,0	39	100,0	
Higher education or University	2	50,0	2	50,0	4	100,0	
Expenditure per capita per month							
Below the poverty line	56	77,8	16	22,2	72	100,0	0,006
Above the poverty line	29	54,7	24	45,3	53	100,0	

The larger and smaller household sizes have a food security category in food insecure for 70.7% and 57.7%, respectively. In a large household, especially the lower economic level, the distribution and sufficiency of food are lower. Based on the result of chi-square test indicates that there is no a significant correlation between the household size and the household food security (p>0.05). This condition dose not corresponds to Hildawati, that the numbers of household members influence the sufficiency of household food consumption directly. The difference is caused by the categorization of the household in large-scale of household did not consider the household composition (age and sex of household members). [11] For the variety of the household composition also manifest the variation of food preference and consumer unit in the household. This will influence the consumption level of household and influence the food susceptibility of household. [6]

Education is an important thing in determining the nutrition status because the educational level will help the distribution of information about the health and nutrition, education of parents especially the household head is the causal factor of nutrition problem of the children. The education level of the household hold is an important factor in influence the household consumption. Table 1 shows that the educational level of the household head is an elementary school. The most percentage in food insecure is the elementary school education. The data indicate that the education level of head of household is lower. The result of chi-square test indicates that there's no a significant correlation between the educational level and the household food security (p>0.05). This caused by the preference of food of the

household head that didn't base on the educational level but based on the derivative culture of the household head such as the consumption habit. In addition, the other causal factors are the lower of knowledge about nutrition and capability in applying the information on the daily living. [12]

Knowledge is one of indicator applied in determining the household food security. The results of research indicate that more of household in food secure (45.3%) has the expenditure per capita per month on above poverty line (>IDR 302.735) while the household is in food insecure (77.8%) has the lower expenditure per capita per month (<IDR 302.735) or below the poverty line. The results of the data show that there is the difference of expenditure per capita per month of household in food insecure and the household with food secure.

The result of chi-square test between the expenditure per capita per month and the food security of household indicate that there is a significant correlation between the expenditure per capita per month of household and the food security of household, $p < 0.05$. This indicates that the higher of expenditure per capita per month of household (the lower of food security). This is still relevant with Herdiana, that there is a correlation between food security and the income in which the food insecurity is 12 times higher than income and famine is 9 times higher to the household below the poverty line than household with the income 1.85 times of the poverty line. [13]

Household Food Security and Nutrition Status of Mother

Based on the measurement of nutrition status it indicates that the number of mother with undernutrition status is higher for 44.8%.

Table-2:-Correlation household food security and nutrition status of mother

Food Security of Household	Nutrition Status of mother				Total		p-value
	Undernutrition		Normal				
	n	%	n	%	n	%	
Food Insecure	45	52,9	40	47,1	85	100,0	0,008
Food Secure	11	27,5	29	72,5	40	100,0	

As we know that the thin mother is found on the household in food insecure (52.9%), while the percentage of mother with normal nutrition status was found in the household with food secure (72.5%). The result of chi-square test indicates that the food security of household has a significant correlation on the nutrition status of mother and child, p = 0.008 (p<0.05).

Household Food Security and Nutrition Status of Child Under Five Years

Based on the result of research indicates that the number of the child under five with undernutrition is higher (30.4%).

Table-3:-Correlation household food security and nutrition status of children under five

Household Food Security	Nutrition Status of Child under five				Total		p-value
	Undernutrition		Normal				
	n	%	n	%	n	%	
Food Insecure	31	36,5	54	63,5	85	100,0	0,031
Food Secure	7	17,5	33	82,5	40	100,0	

As we know that of 85 households in food secure, 36.5% of the child under five has a undernutrition and 63.5% of child under five as a normal nutrition status. And the household in food secure has a child under five with the undernutrition is 17.5% and the normal nutrition is 82.5%. Based on the results of analysis of chi-square indicates that the food security of household is correlated significantly on the nutrition status of the children under five, p-value = 0.031 (p < 0.05).

DISCUSSION

About 68.0% of household were in food insecure. The condition of household food security is manifested by incapability of household to satisfy their food either quantitatively or qualitatively for all of family members that indicate the food susceptibility and insufficiency. This condition is exacerbated by the occupation as farm labor with the lower income, the lower education that causes the consumption of food does not meet the needs, and causes the food susceptibility with the higher number of the child under five with undernutrition.

Although statistically indicates that there is a significant correlation between the household size and the household food security (p>0.05). However the result of the table indicates that there is tendency of household with the member of > 4 persons influence the food security of household. This is suitable for any results of study in any area in Asia, Africa and America Latin that indicates that the child in the household with the large size will have a higher risk for malnutrition. [14] Study of Latief et. al., also indicated that the food distribution is severe in the household with the big number of members. The number of household members that did not suitable to the increase of income will cause uneven food distribution. This condition cannot prevent the nutrition problem of the larger household. [15] As well as Berg who said that the number of child with famine in the bigger household, four times than the household in small size. The child in malnutrition in the large household is five times than household with the few household members. [16]

In this research indicates that there is the trend of the higher of education of household head, the higher of knowledge of nutrition is good. The lower education level of the household in food susceptibility is related to their poverty. In the poverty condition, it means the limited of income, they have difficult in satisfying their primary need such as food, so the education is not their first priority. While, if the people have easiness in access the higher education it will improve their prosperous level. The educational level will be measured based on the duration of education or the type of education either in the formal or informal sector. Hardinsyah said that the formal educational level indicate the capability of anyone to understand any aspect of

knowledge include the knowledge of nutrition. Generally, the educational level of anyone will influence their behavior and attitude in daily living and this indicated by attitude and behavior when eat. [6]

The educational level will determine the capability of the household to access their need. The higher of education of head of household is the easiness of household to satisfy their need. [17] The information about nutrition will determine the number and type of consumed food. The people with the higher education choose the food with the higher nutrition according to the available food and eat habit since child, so the requirement of nutrition can be satisfied. [18]

The result of chi-square test between the expenditure per capita per month and food security of household p-value < 0.05 indicates that there is a significant correlation between the expenditure per capita per month of household with the food secure. According to Azwar, the food expenditure is one of the indicators of food security, the higher of expenditure for food it means the few if food security. The higher of society prosperous of a nation, the lower of expenditure of product, and vise verse. [19] Engels theory said that "The higher of expenditure of household the lower of the percentage of expenditure for consumed food". [20] This indicates that a household is in prosperous if the allocation of expenditure for food is lower than allocation of expenditure for non food.

The expenditure for food will be a measure to know the prosperous level of household. According to Hildawati, the data of expenditure was manifested by the household consumption pattern in allocation of their income. In addition, the household expenditure with the lower income is higher than their income. Therefore, the data of expenditure manifest the actual income. [11]

CONCLUSION

Majority of the age of household head in this research was medium adult for 50.4%. The household size was the large household (> 4 people) with the percentage is 81.75%. Majority of the household head has graduated elementary school (41.6%). Majority of the household (57.6%) has a lower expenditure (<IDR 302.735). The age of household head, the household size and educational level of mother have no a significant correlation on the household food security. While the expenditure has a significant correlation on the household food security.

The thin mother comes from the household in food insecure. As well as the children under five in malnutrition that comes from the household in food insecure category. Based on the analysis, it indicated that the household food security has a significant correlation on the nutrition status of mother and child under five years.

SUGGESTIONS

The credit for build a household business could be implemented in order to increase the household income. The program of famine problem/malnutrition of the local government must be integrated to the multi-sectoral such as social institution, human resources, and social network because the famine problem is a factor determining the food security. In order to increase the household food security, in addition to physic and economic access, it also requires information about nutrition.

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