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RESEARCH ARTICLE

DIVERSIFICATIONOF FOOD IN MATAUE VILLAGE KULAWI SUB-DISTRICT SIGI DISTRICT

[1,*]Rosmala Nur, [2]Nikmah Utami Dewi, [2]Fadlun, [2]Diah Ayu Hartini and [3]Vidyanto

[1]Biostatistic, Family Planning and Demography Department, Public Health Faculty, Tadulako University, Central Sulawesi, Indonesia
[2]Nutrition Department, Public Health Faculty, Tadulako University, Central Sulawesi, Indonesia
[3]Administration and Health Policy Department, Public Health Faculty, Tadulako University, Central Sulawesi, Indonesia

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***Corresponding author:* Rosmala Nur**

ABSTRACT

Food dietary diversification is a necessary thing to do because the food consumption pattern of our community are not yet diverse, nutritionally balanced and safe, along with the domination by rice and flour. Diversification of food consumption is influenced by many factors and one of them is the agriculture and livestock sector. This study aims to find out the Factors Associated with food dietary diversification in Mataue Village Kulawi Sub-District Sigi District. The type of this research is an analytical survey with a Cross Sectional Study approach. With total sample 61 people and using *Simple Random Sampling* technique. The results of this study were statistically tested by *Chi-square* test at a 95%confidence interval. The results showed that there was no relationship between livestock ownership (p=0,929) and food dietary diversification, and there was a relationship between land use (p=0,023), and food crop diversification (p=0,007) with diversification in food consumption. The need for support and encouragement of the village government to expand the scope of land use utilization and increase the type of food crops by all households to increase diversification of food consumption.

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INTRODUCTION

The diversity of food types and nutritional balance in food consumption patterns is needed by the body to live healthy, active and productive lives. Food diversification is an effort to increase the availability and consumption of diverse, nutritiously balanced foods and based on the potential of local resources. Diversification of food consumption or diversity of food consumption must be carried out in order to create more qualified and competitive human resources (Food Security Agency, 2011-2015). Poor diversification of food consumption is characterized by reliance on starchy staples which is a red flag for malnutrition. Otherwise, a diet that includes various types of food groups is considered important for health. Diets that include nuts that are rich in nutrients and animal source foods and fruits rich in vitamins and vegetables are related to the adequacy of micronutrients and chronic nutrient reduction (Thompson**,** 2011). The Indonesia Desirable Dietary Pattern (DDP) Score over the period 2010-2014 tends to decline and does not reach the target. In 2010 the DDP score reached 85,7 but was still below the target of 86,4. In 2011 it decreased to 85,6 and did not reach the target of the DDP score of 88,1. In 2012 it declined to 83,5 and did not reach the national target of 89,5. In 2013 it also decreased to 81,4 while the target of the DDP score at that time was 91,5 while in 2014 it increased to 83,5 but it was still below the target of 95. To achieve better quality food consumption it was necessary to increase consumption of tubers, animal source foods, nuts, vegetables and fruits (Food Security Agency, 2014). Desirable Dietary Pattern (DDP) in Central Sulawesi Province in 2013-2015 tended to fluctuate, reaching 72,7 in 2013, increasing in 2014 to 85,7 and falling back in 2015 to 85,1. Excessive consumption occur in the grains group while consumption of animal source foods and nuts has not fulfilled the recommendations. In 2013, if we viewed by Regency/City the highest DDP score was found in Palu City, which is 81,6 and the lowest was found in Tojo Una-una District at 62,6 (Central Bureau of Statistics, 2013). In 2013 the Sigi Regency was a Regency with a DDP score with the third lowest which is 64,3 after Banggai (63,6) and Tojo Una-una (62,6). The Sigi Regency DDP score is lower than the Central Sulawesi Province average which is 72,6 and the national average whic is 81,4. The DDP score is not ideal because it is still far from the ideal DDP score, which is 100. The energy consumption of the population of Sigi Regency is 1.819,5 kcal/cap/day lower than the recommended Estimated Energy Requirements (EEF) of 2000 kcal/cap/day. Excessive energy consumption is in the food group of grains with consumption reaches 1.216,1 kcal/cap/day, which is higher than recommended, which is 1000 kcal/cap/day, fruits/oily seeds 79,1 kcal/cap/ day while

the recommended is 60 kcal/cap/day (Central Bureau of Statistics, 2013). Food group consumption which is still low in Sigi Regency In 2013, are the food group of nuts whith consumption was only 27,1 kcal/cap/day while the recommended is 100 kcal/cap/day, tubers food group 62,9 kcal/cap/day is lower than recommended, which is 120 kcal/cap/day, animal source food group 91,1 kcal/cap/day lower than recommended which is 240 kcal/cap/day, vegetables and fruits 75,1 kcal/cap/day is lower than recommended which is 120 kcal/cap/day and others 20,7 kcal/cap/day lower than recommended which is 60 kcal/cap/day (Central Bureau of Statistics, 2013). At the household level FAO (2011) use the *Household Dietary Diversity Score* (HDDS) to determine household economic capacity to access various foods (Food and Agriculture Organization, 2011). Mataue village is one of the villages that received a land use program in Sigi Regency. Based on the Mataue Village profile it is known that most of the people work as farmers and most of the food they consume comes from their own agricultural products. This study investigates the factors that related to food consumption diversification in Mataue Village Kulawi Sub-District Sigi District.

RESEARCH METHODS

The type of this research is a quantitative with a Cross Sectional Study approach, conducted from April to June 2016. Research location in Mataue Village, Kulawi Sub-District, Sigi District. The study population was all households in the Mataue Village, Kulawi Sub-district, Sigi District, which were 136 households with *Simple Random Sampling sampling* techniques which amounted to 61respondents.

Operational Definition and Objective Criteria

- Diversification of food consumption, is the diversity of food consumption that can be known through the consumption of various food groups. Low if the mean (μ) is less than the average HDDS value of the respondent (6,25).
- Diversification of food crops, is the diversity of food crops cultivated in yards, fields and gardens. Low if the mean (μ) is less than the average diversification value of the respondent food crop (4).
- The use of land, is utilized yards as the cultivation of food crops. Utilizing it when people cultivating food crops in the yard.
- Livestock ownership is the household that have farmed livestock. Categorized as having if you have farmed animals.

Data collection

- The primary data in this study are data on land use utilization, food crop diversification and livestock ownership by the community as well diversification of food consumption. Data on land use, diversification of food crops and ownership of animals were collected using a questionnaire. Data on diversification of household food consumption was collected using 24 *hour recall* of food intake. Information collected on food consumption is used to calculate *Household Dietary Diversity Score* (HDDS).
- Secondary data in this study were score data on DDP in Central Sulawesi Province and Sigi Regency and data on residents of Mataue Village. Central Sulawesi Province and Sigi Regency DDP score data were obtained from the Central Sulawesi Provincial Food Security Agency while data on residents of Mataue Village was obtained from the Mataue Village government.

RESULTS

Relationship between Land Courtyard Useand Food Diversification Consumption: The relationship between land courtyard use with food diversification consumption was analyzed using cross tabulation on *Chi-Square test.* Results of relationship analysis shown in the following table. *Chi Square* test results obtained ρ=0.023 or X^2 is count (3.97)> X^2 table (3.841) with the result Ho on this research is rejected, it means that there is a relationship between land courtyard useand food diversification consumption. Responden who are utilizing their land courtyard are more having thefood diversification consumption which is 29 people (76. 3%) while respondents who did not use their landcourtyardis having lower food diversification consumption which is12 people (52.2%).

Relationship between Food Crop Diversification and Food Diversification Consumption: The relationship between diversification of food crops and diversification of food consumption was analyzed using cross tabulation in the *Chi-Square* test. Relationship analysis results shown in the following table. *Chi Square* test results obtained value of ρ=0.007 or the value of X^2 (5.87)> X^2 table (3.841) with the result Ho on this research is rejected, meaning that there is a relationship between diversification of food crops and diversification of food consumption. Respondent which has diversified food is higher and have food diversification consumption which is 31 people (77.5%), while respondents with a low crop diversification is lower and have lower food diversification consumption which is at 12 people (57.1%).

Relationship between Livestock Ownership and Diversification of Food Consumption: The relationship between ownership of livestock and food diversification consumption was analyzed using cross tabulation in the *Chi-Square* test. Relationship analysis results shown in the following table. *Chi Square* test results obtained value of ρ=0,929 or the value of X^2 (0.43) < X^2 table (3.841) with the result Ho on this research is accepted, meaning that there is no relationship between livestock ownership and food diversification consumption. The majority of those who have more livestock have a high diversification of food consumption as many as 29 people (65,9%). The same thing happened to respondents who do not have farm animals are also more likely to have a high food diversification consumption which is 15 people (34.1%).

DISCUSSION

Relationship between Land Courtyard Use with Food Consumption Diversification: Based on the results of the research conducted, it was shown that there was a relationship between land courtyard use and food diversification consumption with a value of ρ = 0.023.

Table 1. Analysis The Relationship between Land Courtyard Useand Food Diversification Consumption in Metaue Village, Kulawi Sub-District, Sigi District

Utilization of Yard	Diversification of Food Consumption				Total		X^2 (ρ)
	Low		High				
	n	%	N	%	n	%	
Not using	12	52.2	11	47.8	23	100	3.97 (0.023)
Using	9	23.7	29	76.3	38	100	
Total	21	34.4	40	65.6	61	100	

Table 2. **Analysis Relationship between Food Crop Diversification and Diversification of Food Consumption in Metaue Village, Kulawi Sub-District, Sigi District**

Food Crop Diversification	Diversification of Food Consumption				Total		X^2 (ρ)
	Low		High				
	n	%	n	%	n	%	
Low	12	57 .1	9	42. 9	21	100	5.87 (0.007)
High	9	22 .5	31	77 . 5	40	100	
Total	2 1	34 .4	40	65 . 6	61	100	

Table 3. Analysis Relationship between Ownership of Livestock and Diversification of Food Consumption in Metaue Village, Kulawi SUB-District, Sigi District

Ownership of Livestock	Diversification of Food Consumption				Total		X^2 (ρ)
	Low		High				
	n	%	n	%	n	%	
Does not have	6	35. 3	1 1	64 . 7	17	100	0.43 (0.929)
Have	1 5	34 . 1	2 9	65 . 9	4 4	100	
Total	21	3 4 . 4	4 0	65 . 6	61	100	

This shows that the use of land can increase the diversification of food consumption. This research is in line with research (Selepe, 2014) with the result that the use of land courtyard as a very significant impact (ρ = 0.000) on the diversification of food consumption. Increasing the diversification of food consumption in children has increased after the land use program was marked by increased consumption of weekly vegetables. This shows the direct positive impact of the use of land courtyard on nutrition and food diversity in children. In study (Cabalda, 2011) it is also in line with this study where children from households with home gardens are significantly more likely to eat vegetables more often (ρ = 0. 029). Having land utilized is positively related to the diversity of children's food and the frequency of vegetable consumption. The study (8) using a *cross-sectional study* in HIV-positive and HIV-negative patients stated that food crops in gardens in the courtyard contributed to the food diversity score. Land use has a significant contribution to food diversity in the HIV-positive rural population. In low-income communities, they prioritizing purchase basic food items which are the cheapest energy sources to keep from starvation. When income levels increase, they buy plant foods (for example, lentils, fruits, vegetables) and animal products (including fish) because they have the preferred taste (Bouis, 2011).

Relationship between Food Crop Diversification and Food Diversification Consumption: Based on the results of research conducted, it shows that there is a relationship between crop diversification with the food diversification consumption with a value of ρ = 0.007. This shows that by increasing the diversification of food crops in the yard, rice fields and gardens can increase the diversification of food consumption. This study is in line with Herforth's (2010) study which found that the number of food groups consumed increased by 0.1% in Arusha after increasing 1 number of food crops (ρ < 0.001); association was a little significant in Kiambu (ρ = 0.076).

In both countries, plant diversity is strongly associated with fruits and vegetables in various home-made products for consumption (ρ<0.001). Diversification of food crops related to self-sufficiency in food production shows evidence for the impact on household consumption (Herforth, 2011). In the study of Sibhatu (2015), which used a *cross sectional study* in four countries, it was concluded that between crop diversification related to food consumption diversification and producing 1 type of crop increased the amount of food group consumption by 0.9% (Sibhatu, 2015). In general, diversification of food crops is not the only factor causing a low level of diversification of a person food consumption such as the income (12). The simple principle that underlies is that poor households get extra income, they are better able to regularly access the food needed for healthy living, thereby increasing food security. Poor households often use additional income to buy additional non-*staple* food , thus increasing the diversity of household food (13-15) .

The Relationship between Livestock Ownership of and Food Diversification Consumption: Livestock ownership and food diversification consumption show a non-significant relationship with the value of ρ=0.929. This shows that having livestock will not increase the diversification of food consumption. The results of this study are in line with Kariuki *et al* (2013) which showed no significant difference in the *Months of Adequate Household Food Provisioning* (MAHFP) between households that have livestock and households that do not have livestock. Livestock ownership is not related to the diversification of food consumption because in times of food shortages, households will sell their livestock and their valuable products to buy food and (Smith *et al*., 2013) that livestock ownership does not increase food consumption because livestock are sold to meet other needs such as schooling children and other non-food financing item. There is no relationship between livestock ownership because diversification of food consumption is not only influenced by

livestock ownership which is an aspect of livestock but also influenced by socio-economic factors such as income, education, age of the family head, number of family members and assets owned (Marasinghe *et al*., 2015; Sarkar, 2014; Amaza *et al*., 2008). The income of each household head can increases their household food security status. Income is an important factor for access to food, especially in the metropolis where food production is limited and food which depends on the prevailing market price (Marasinghe *et al*., 2015). Education positively correlated to the diversity of food due to its more educated families more likely they are to achieve the diversity of foods high than low food diversity. Similar findings were found by some researchers who noted that educated women set a significantly greater proportion of their household food budget for nutritious and micronutrient-rich food groups, mainly due to greater awareness and understanding of health and nutritional benefits (Nicholas Minot, 2004).

Heads of families with a higher age can improve household food security. This is estimated because of income from these households tend to be higher as a result of working longer at the company or their personal business (Ahmed, 2014). The number of family members affects food diversity because if the number of household members increases , the intensity of food security decreases. Increased number of family members requires an increase in household expenditure, especially in situations where there are many household members do not generate any income but only the head of the household is held (Ahmed, 2014). Family-owned assets are one step in household food security. Some assets can be sold and used as bearings effects of conditions that adversely affect household food security, such as crop failure or drought (Amaza, 2008). This study is not in line with Rawlin (2014) which has the result that cattle ownership has a positive impact and is statistically related to the level of 1%, indicating that cattle ownership is associated with an average increase of 1.17 food group consumption on the previous two days. In his research an assessment of the diversification of food consumption at the individual level was carried out and calculating the impact on daily meat consumption using *Propensity Score Matching* (PSM) (Rawlins, 2014).

Conclusions and Suggestions

The conclusion of this study is that there is a relationship between land use and diversification of food crops with diversification of food consumption in Mataue Village, Kulawi Sub-District, Sigi District. Whereas in the variable of livestock ownership there is no relationship between ownership of livestock and diversification of food consumption in Mataue Village, Kulawi Sub-District, Sigi District. It is hoped that village officials can socialize the importance of utilizing courtyard and diversification of food crops at the household level so that people can easyly have access to various kinds of food and it can be felt by all households in Mataue Village and the community is expected to be able to use the court land to diversity food crops, thereby increasing diversification food consumption.

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