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Dietary Diversity Among Poor Households

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ABSTRACT

Background: *Household food security encompasses not only the quantitative availability of food but also dietary diversity and quality, which are essential determinants of the nutritional adequacy of household members. The Household Dietary Diversity Score (HDDS) indicator was developed as a rapid measure to reflect a household's economic ability to access various food groups in the short term (the last 24 hours), thus serving as a proxy for the level of food access and household food security status.*

Research Methods: *This descriptive cross-sectional study was conducted to assess dietary diversity among poor households in Kupang City with a sample of 138 households. Measurement of household dietary diversity was carried out using the Household Dietary Diversity Score (HDDS) instrument developed by the FAO.*

Research Result: *The findings indicate that most households exhibited a high level of dietary diversity. When categorized according to FAO criteria, 71.74 percent of households have a dietary diversity score of more than 6, while 28.26 percent of households are in the medium category (score 4–5), and no households are included in the low category (<3). However, when using categories based on average values, the results are slightly different, with 61.59 percent of households having a dietary diversity score below average (<6), while 38.41 percent were above average (>6).*

Conclusion: *These findings suggest that household diets were dominated by staple carbohydrate foods and vegetable, whereas the consumption of fruits and animal source foods remained low.*

BACKGROUND

Household food security encompasses not only the quantitative availability of food, but also the diversity and quality of the diet, which determine the nutritional adequacy of family members. The Household Dietary Diversity Score (HDDS) indicator was developed as a rapid measure to reflect a household's economic ability to access various food groups in the short term (the last 24 hours), thus serving as a proxy for the level of food access and household food security status. The HDDS is designed to capture variations in consumption across food groups that are closely related to energy and micronutrient adequacy; therefore, the HDDS is widely used in food security surveys and nutrition assessments in various countries. (FAO, 2010; Kennedy et al., 2010; Maxwell et al., 2014).

Household dietary diversity is influenced by various socioeconomic factors, including income, food prices, market access, educational attainment of the household head, seasonal variations, local food availability, and nutrition related interventions (Awoke et al., 2022). Empirical evidence shows a positive correlation between household dietary diversity and calorie and protein adequacy, as well as animal protein sources, which in turn are associated with child nutritional outcomes (e.g., reduced risk of stunting). Therefore, HDDS analysis is relevant not only for assessing economic access to food but also for designing interventions targeting food groups that are less readily available to poor households.

Although the poverty rate in Kupang City is lower than the provincial average of East Nusa Tenggara, food insecurity and nutritional vulnerability remain important public health concerns. The proportion of poor households and food vulnerability remains significant in urban areas due to limited real income, dependence on markets for food supplies, and fluctuations in food prices that influence poor families' consumption choices. Methodologically, the HDDS study on poor households in Kupang City will provide important information for local policy planning, for example for food subsidy interventions, food diversification programs, improving market access, and nutrition counseling focused on increasing consumption of low-income food groups. The results of the study can also be used to identify priority food groups (e.g., animal protein sources, vegetables and fruits, and micronutrient-rich food sources) that need to be promoted in public health programs at the city level. This study aims to assess the level of dietary diversity and analyze the types of food consumed by poor households in Kupang City.

MATERIAL AND METHODS

This descriptive study aimed to describe the dietary diversity of poor households in Kupang City. It was conducted in Kupang City, East Nusa Tenggara, from February to June 2022.

The population in this study was all poor households with heads of households who were unemployed and had at least one child under five years old, residing in Kupang City. The study locations were selected using purposive sampling, considering areas where the majority of household heads work as farmers, fishermen, and laborers. The sample size was calculated using the Lameshow formula: n = (z2/e2) x p x (1-p). Using a 95% confidence level, a 5% margin of error, and a 10% probability of success, a sample size of 138 households was obtained.

This study used primary data obtained through direct interviews with mothers of toddlers, using a questionnaire as a data collection tool. Information collected included data on household dietary diversity, as well as family characteristics, such as parental education level and number of household members. Household dietary diversity was measured using the Household Dietary Diversity Score (HDDS) instrument developed by the FAO. The HDDS score was calculated by summing the number of food groups consumed during the previous 24 hours from a total of 12 standard food groups, namely cereals, tubers, vegetables, fruit, meat, eggs, fish, nuts, milk and dairy products, oil/fat, sugar/honey, spices, and beverages. Each group is given a score of 1 if consumed, and 0 if not, then added up to a total HDDS score (0–12), where a higher score indicates a more diverse food consumption pattern(Hoddinott & Yohannes, 2000). Data were analyzed using SPSS software version 18 and Microsoft Excel.

RESULTS

The results of the study (Table 1) on 138 poor households in Kupang City show that most heads of families have a basic education level. As many as 42.02% of fathers had completed elementary school education, and 16.66% have a junior high school education, followed by 41.30% have a high school education. Meanwhile, mothers' education is relatively lower; 34.78% have an elementary school education, 25.36% have a junior high school education, and 39.85% have a high school education. In general, the level of parental education in poor households is still relatively low, which can affect family food consumption knowledge and behavior. Kara (2020) stated that the level of education of the head of the household is significantly related to the level of food security, where as the level of education of the head of the household increases, the level of household food security also increases (Kara & Kithu, 2020).

Table 1. Frequency Distribution of Respondent Characteristics

Variables	n (138)	%
Father's Education		
Elementary School	58	42,02
Middle School	23	16,66
High School	57	41,30
Mother's Education		
Elementary School	48	34.78
Middle School	35	25.36
High School	55	39.85
Father's Occupation		
Laborer	36	26.08
Trader	28	20.28
Motorcycle Driver	8	5.79
Fisherman	9	6.52
Farmer	45	32.60
Driver	12	8.69
Mother's Occupation		
Housewife	138	100
Employed	0	0
Number of Family Members		
≤5	110	79.72
>5	28	20.28

In terms of employment, fathers predominantly work in the informal sector. The largest proportion are farmers (32.60%), followed by laborers (26.08%), traders (20.28%), drivers (8.69%), fishermen (6.52%), and motorcycle taxi drivers (5.79%). This dominance of informal employment reflects the household's economic dependence on sectors with unstable incomes and high risk of price and weather instability, which can impact the household's ability to meet diverse food needs. All mothers were full time homemakers and did not engage in income generating activities, indicating women's low direct economic contribution to household income. This condition can exacerbate economic vulnerability and limited access to nutritious food, especially when the family income depends on a single breadwinner.

In terms of family structure, the majority of households (79.72%) have fewer than five members, while 20.28% have more than five members. This pattern reflects relatively small family sizes, but for poor households, the number of dependents remains an important factor in determining per capita food sufficiency and consumption diversity. Overall, these socioeconomic characteristics indicate that poor households in Kupang City are dominated by heads of families with low education, working in the informal sector, and having moderate to large family members, all of which have the potential to influence the level of household dietary diversity (HDDS).

Table 2. Respondents' Household Dietary Diversity

HDDS	n	%
FAO Category		
≤3	0	
4-5	39	28.26
≥6	99	71.74
Average Category		
≤6	85	61.59
> 6	53	38.41

Based on Table 2 regarding the dietary diversity of respondents' households, it can be seen that most households have a high level of dietary diversity. When categorized according to FAO criteria, 71.74 percent of households have a dietary diversity score of more than 6, indicating a fairly diverse food consumption in the past week. Meanwhile, 28.26 percent of households are in the medium category (score 4–5), and no households are included in the low category (<3). However, when using categories based on average values, the results are slightly different, where 61.59 percent of households have a dietary diversity score below the average (<6), while 38.41 percent are above the average (>6). These findings suggest that although most households met the FAO criterion for dietary diversity, considerable variation in food consumption patterns remained across

hoeseholds, relatively many households still have a lower level of dietary diversity than the average of the study population.

This condition reflects the persistence of disparities in consumption patterns between households, which can be influenced by economic factors, local food availability, and family nutritional knowledge. The HDDS score established by the FAO is too low for use in Indonesia, with only 22.03% sensitivity for identifying household food security. Therefore, modifications to the food insecurity threshold are necessary if the HDDS score is <8 (Baliwati et al., 2015). Other research also indicates that the HDDS score in Eastern Indonesia is 8.75, and that the HDDS in Indonesia is influenced by various factors, including economic status and food production diversity (Mamahit et al., 2024). A HDDS score of 10 is the minimum threshold for the HDDS to increase the average household nutritional adequacy in Ethiopia (Mekonnen et al., 2020). Research by Maretalinia (2024) shows that the lowest HDDS score of 12 districts across eastern Indonesia was found in East Nusa Tenggara Province, namely Kupang District (Maretalinia et al., 2024). The Household Dietary Diversity Score is a crucial measure of food security and nutritional status, reflecting household access to a variety of foods. The Household Dietary Diversity Score (HDDS) in farming households in South Africa shows that of the entire sample population, 50% of smallholder farmers have a highly diverse diet. Only 50% of smallholder farmers have high dietary diversity in each province. Irrigation systems and involvement in food crop production have a positive effect on smallholder crop productivity (Hlatshwayo et al., 2023).

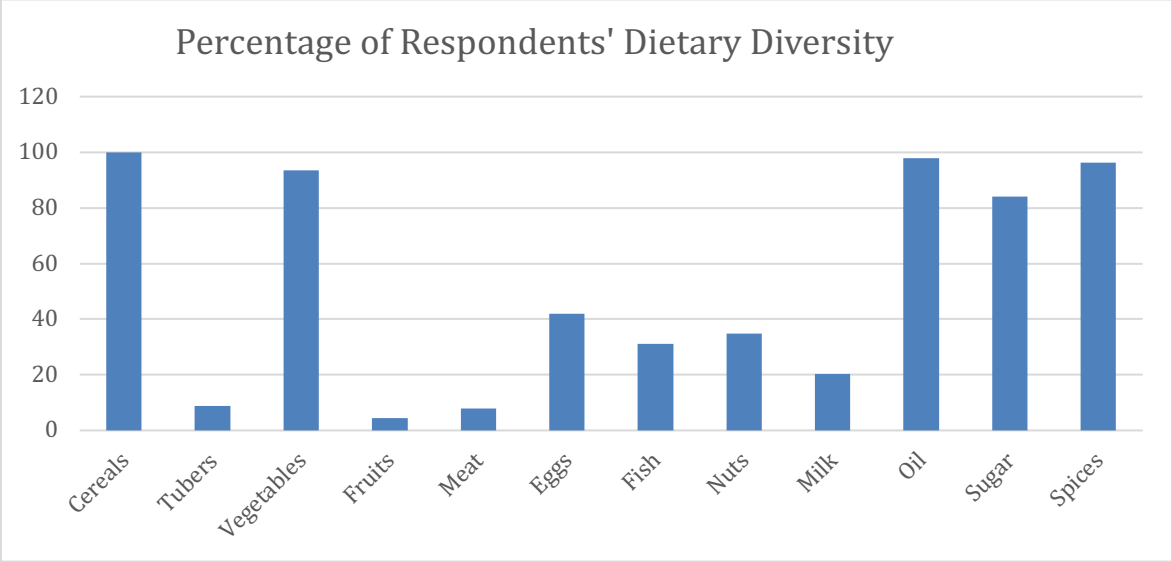


Figure 1. Percentage of respondents' dietary diversity

Based on the results in Graph 1, it can be seen that the majority of respondents consumed staple food groups such as cereals, oils, and spices, with a percentage approaching 100 percent. This indicates that energy-rich foods and cooking ingredients are a major part of household consumption patterns. In contrast, the consumption of fruits, meat, milk and other nutrient dense foods remained relatively low. Eggs and fish were consumed by about a third of respondents, while consumption of meat, nuts, and especially milk remained very limited. This condition indicates that household consumption patterns are still oriented towards energy supply rather than nutritional quality. Low consumption of vegetables, fruit, and protein sources can impact the imbalance of macro and micronutrient intake, which in the long term has the potential to reduce household nutritional security. Therefore, although most households have achieved food security in terms of staple food availability and access, nutritional diversity and quality still need to be improved through nutrition education and increased access to balanced, nutritious food.

DISCUSSION

The research results show that food consumption patterns in poor households in Kupang City are still dominated by staple foods and basic cooking ingredients. Almost all households consume cereals (100%), oil (95–99%), and spices (95–98%). This indicates that poor households in Kupang City are highly dependent on staple foods as the foundation of their daily consumption. Because staple carbohydrates tend to be cheaper and easier to obtain, this aligns with the logic of households with limited economic resources. This finding indicates a strong dependence on carbohydrate rich foods as the primary source of dietary energy. The same thing also

occurs in North Uganda, where cereals and tubers are staple foods in both urban and rural areas.(Kolliesuah et al., 2023).

Vegetable consumption in this study was high (90%), but fruit consumption remained extremely low, accounting for only 3–5% of households. This imbalance indicates that although poor households still have access to local vegetables, fruit consumption is not a priority. Low fruit consumption may be due to relatively high prices, limited availability of fresh fruit in local markets, and a lack of awareness of the importance of fruit for health. These results align with Rachman's (2017) findings in urban areas of Indonesia, which showed that low-income groups have the lowest fruit consumption compared to middle- to upper-income groups (Rachman et al., 2017).

Meanwhile, consumption of animal protein sources such as meat (7–10%) and milk (20%) remains very low, while consumption of eggs (40%) and fish (30%) is relatively higher. Rahayu also found that the characteristics of animal protein foods in East Nusa Tenggara Province are dominated by chicken eggs at 79%, while the lowest percentage is beef at 2%. The high egg consumption in East Nusa Tenggara households is due to chicken eggs being the most affordable and practical source of animal protein (Rahayu et al., 2024). This pattern suggests that household attempt to meet their protein requirements through relatively affordable animal source foods such as eggs and fish. Ariani's research also reported a similar trend, where low-income households consume more eggs and fish than red meat due to price factors (Ariani et al., 2018). However, low meat and milk consumption has implications for potential micronutrient deficiencies such as heme iron, calcium, and vitamin B12, which impact the nutritional status of families, especially children and pregnant women. This pattern is likely influenced by economic factors (the price of meat and fruit is relatively expensive compared to carbohydrates), market access (fruit may be less available or expensive in Kupang City), nutritional knowledge, and the priorities of poor households (prioritizing satiety over nutritional quality). Similar research also indicates that the diversity of animal food consumption among the majority of East Javanese people in the upper, middle, and lower classes is fresh fish. The second highest consumption rank is for livestock commodities, namely eggs and free-range chicken. The lowest animal protein consumption in East Java is from beef, at 0.14 g/capita/day (Ridjal et al., 2023). Studies in Yogyakarta and Nusa Tenggara (NTT is one of the regions) found that in NTT (as a relatively poor region), consumption patterns tend to meet carbohydrate needs without considering whether the food is nutritious or not. Meanwhile, in NTT, consumption behavior patterns are still oriented towards staple foods (Ermawati & Sarana, 2017; Firdaus & Dwitya Cahyono, 2017). A similar finding was found in a study in East Java province, where the Household Dietary Diversity Score (HDDS) was moderate and consumption of dairy products and meat/poultry was low. The dietary diversity score was classified as moderate, with the lowest consumption of dairy products and meat/poultry among the 12 food groups.(Mahmudiono et al., 2017).

High consumption of oil, sugar, and spices indicates a preference for high-energy, strong-flavored foods with low micronutrient content. This condition aligns with the nutritional transition phenomenon described by Popkin (2021), in which urban households in developing countries experience a shift in dietary patterns from nutritious traditional foods to high-energy, low-micronutrient foods. (Popkin, 2021).

Overall, these results indicate that the level of dietary diversity of poor households in Kupang City is still limited. Although energy intake is relatively well met, dietary quality is not optimal due to the low variety of micronutrient-rich food groups such as fruit, meat, and milk. This finding aligns with the FAO (2023) report, which emphasized that in Southeast Asia, including Indonesia, economic constraints and high food prices are major barriers to achieving a healthy and diverse diet (FAO, 2023). This is in line with literature that states that the education of the household head, income, and family size are determinants of dietary diversity. (Prachee et al., 2025)

Therefore, increasing dietary diversity in poor households needs to focus on community-based interventions and local policies, such as providing affordable food markets, nutrition education programs, and developing home gardens. These efforts are expected to increase access to nutritious food, expand consumption diversity, and ultimately improve the nutritional quality of poor communities in Kupang City.

CONCLUSIONS

Poor households in Kupang City exhibited moderate dietary diversity, characterized by high consumption of staple foods and vegetables but low consumption of fruits and animal-source foods. Although most households met the FAO dietary diversity threshold, the limited intake of micronutrient-rich foods

suggests a potential risk of nutrient inadequacy. Economic constraints, food prices, market availability, and limited nutrition knowledge appear to be important factors influencing household food choices.

RECOMMENDATION

Food and nutrition interventions targeting poor households in Kupang City should prioritize not only food availability but also dietary quality. Policies aimed at improving access to affordable fruits and animal-source foods, strengthening local food systems, promoting household food production, and enhancing nutrition education are needed to improve dietary diversity and nutritional adequacy. In addition, economic empowerment programs should be integrated into food security strategies to ensure sustainable access to nutritious foods.

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