

Analysis of food security and dietary diversity patterns among toddlers of female farmworkers in Lombok Tengah, Indonesia

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ABSTRACT

Background: Malnutrition and lack of access to food are ongoing problems in the world, and Lombok Tengah, West Nusa Tenggara, is not an exception. Inadequate dietary intake among children under five years of age in Central Lombok can have negative short- and long-term health effects, including stunted physical growth and impaired cognitive development in childhood. Female farmworkers have been among the most impacted populations in this socioeconomic transformation.

Methods: This is a cross sectional study and the subjects in the study was randomly selected, while the number of samples participating in this study was 359 farmer households. The research has a purpose to evaluate the dietary diversity and food security of female farmworkers in Lombok Tengah. We assessed dietary diversity and food security in female farmer workers using a direct interview and observation approach using WHO and FAO standards. We collected dietary intake using a 24h dietary recall among female farmworkers. The statistical tests used in this study were an independent t-test and chi-squared test to see the mean difference and see the relationship between continuous and categorical variables.

Results: Through statistical tests, it is proven that there is a relationship between dietary diversity score and food security status. Our study adds to the literature base by using the 10-food-group-based WDDS to quantify dietary diversity. The most diverse patterns had high consumption of cereals, dark green leafy vegetables, eggs, oil and fats, sweets,

spices, condiments and beverages. Meat, poultry, and similar goods were found to have statistically significant correlations with food security status in unadjusted studies. Despite variation for some women, dietary diversity was relatively low for women overall.

Conclusion: Additionally, a high correlation was seen between food security and household dietary diversity. The community's appalling nutrition status was made clear by the findings.

KEYWORDS

Agriculture, Eating habit, Malnutrition, Household Women Worker.

INTRODUCTION

Inadequate dietary intake among children under five years of age in Central Lombok can have negative short- and long-term health effects, including stunted physical growth and impaired cognitive development in childhood¹ and increased risk of cardio-metabolic disease in adulthood². Dietary diversity is a key indicator of dietary quality and is particularly important for children under five years of age, who have high nutrient requirements for growth. Low dietary diversity, characterized by inadequate amounts and unbalanced distribution of food groups, often leads to nutrient deficiencies, especially micronutrients³. Research on children in Central Lombok has traditionally focused on children under the age of five, as nutritional disease pathways associated with dietary intake in very young children are well established⁴. Internal factors such as sharecropping, family size, gender and lack of nutritional knowledge in Central Lombok highlight the importance of monitoring and interventions to improve dietary intake in children under five years of age. Targeting children under the age of five is an opportunity not only to improve growth and nutritional sta-

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tus, but also to eliminate the risk of long-term disease before adulthood. When there is a shortage of nutrient rich foods due to limited resources, it can be defined as food security⁵. The Sustainable Development Goals, which aim to eliminate poverty and hunger while promoting health and wellbeing, have an impact on food security and malnutrition⁶. However, in developing countries, the pace of development to achieve this goal is very slow⁷. In Central Lombok, health problems such as food security and malnutrition have become common health problems (stunting 37%, wasting 4.9% and underweight 21.5%). The main problem of malnutrition is stunting. People are faced with a situation where they cannot choose not to buy more carbohydrate sources in order to feel fuller when consuming food. Traditional foods in their diets give way to low nutrient poor processed foods⁸. This study aims to assess the condition of food security and food diversity in female farming households in Central Lombok.

METHODS

A quantitative approach, non-experimental, cross-sectional study design was adapted to describe the household food insecurity, dietary diversity and worker status of women workers in Lombok Tengah. Three researchers collected, analyzed and tabulated the obtained using demographic profile sheet, dietary diversity score and household food insecurity access scale (HFIAS). The research was done in seven location site such as government health care facilities within Lombok Tengah, West Nusa Tenggara, Indonesia. The subjects in the study were randomly selected, while the number of samples participating in this study was 359 farmer households. Ethical approval was carried out from the Institutional Ethics Committee of the Mataram Health Polytechnic (LB.01.03/6/115/2023).

At baseline a researcher was collecting information on age, gender, marital status, occupation, educational level, household size. Food security among female farmers is assessed to identify food insecurity, using the Household Food Insecurity Access Scale (HFIAS). Each household is measured on a food insecurity scale. Food security status was determined using food and Nutritional Technical Assistance (FANTA) were developed a set of questions that entails predictable reactions to the experience of food insecurity that can be summarized and quantified on a scale. Respondents give subjective responses on their experiences of food insecurity^{9,10}. The HFIAS has nine questions that cover three broad themes: (1). Anxiety and uncertainty about food access; (2). Insufficient quality (variety, preferences and social acceptability) (3). Insufficient food intake and the physical consequences. HFIAS score and HFIAS prevalence were used to report the household food insecurity degree in the past four weeks (30 days). The household's score is the total score of each household based on frequency of occurrence of the household food insecurity conditions as reflected on the questions (3 = often, 2 = some-

times, 1 = rarely) with maximum score for a household is 27, while the minimum score is 0. The higher the score, the more food insecure and the lower the score the more food secure. The HFIAS prevalence categorizes the households into four levels of household food insecurity (access), namely food secure, and mildly, moderately and severe food insecure. Households were categorized as increasingly food insecure if they responded affirmatively to more severe conditions and/or experienced those conditions more frequently.

The Individual Dietary Diversity Score (IDDS) measures dietary diversity among populations, which measures how much food a particular target group consumes in the evening or the previous day. To calculate IDDS, we firstly aggregated foods into 10 mutually exclusive groups based on FAO's guideline, namely (1) Cereals, white roots and tubers and plantains; (2). Pulses (beans, peas and lentils); (3). Nuts and seeds; (4). Dairy; (5). Meat, poultry, and fish; (6). Eggs; (7). Dark green leafy vegetables; (8). Other vitamin A-rich fruits and vegetables; (9). Other vegetables; (10). Other fruits. The IDDS data that has been collected was taken by collecting 24-hour recall data of food consumed by each respondent. The 24-hour recall was administered individually for each meal per day, which consisted subjects were asked about food they eat, portion size, preparation method and the ingredients used. The maximum score of IDDS is 12 with each food group scoring 1. Minimum score by a household is 0. The higher the score, the more diverse the household diet, and the lesser the score, the less diverse their diet.

The statistical tests used in this study were independent t-test and chi-squared test to see the mean difference and see the relationship between continuous and categorical variables. The dependent variables were household food insecurity access scale (HFIAS) and individual dietary diversity score (IDDS). Variables that were significant at 5% were included in the final model. A statistical probability level of $p < 0.05$ (two-sides) is considered significant.

RESULT

We worked out a special number, called the HFIAS score, for each home. We did this by adding up the answers to a question about what food was available¹¹. The scores have been put into groups: food secure, mildly food insecure, moderately food insecure and severely food insecure. This score is a way of measuring how food insecure the household was 4 weeks (30 days) before the data was collected. The score ranges from 0 to 27, with 0 meaning the household said "no" to all the questions about what happened, and 27 meaning they said "yes" to all nine questions about how often things happened. So, if your score is high, it just means your household experienced more food insecurity. And if the score is lower, it just means the household didn't experience as much food insecurity¹². **Table 1.** Shows the subjects Out of the 359 respondents, most of the household (68.0%) were

Table 1. Distribution of sociodemographic and dietary pattern of farmer households in Lombok Tengah

Variable	Individual dietary diversity score (IDDS)						p-value
	High		Low		Total		
	n	%	n	%	n	%	
Age							
6-24 Months	99	84.6	18	15.4	117	100	0.000
25-59 Months	236	97.5	6	2.5	242	100	
Gender							
Male	169	90.4	18	9.6	187	100	0.019
Female	166	96.5	6	3.5	172	100	
Household Food Insecurity Access Scale							
Food secure	138	95.2	7	4.8	145	100	0.341
Mildly food insecurity	176	92.1	15	7.9	191	100	
Moderately food insecurity	20	90.9	2	9.1	22	100	
Severely food insecurity	1	100	0	0	1	100	

found to be food secure. Most of the of household (84.1%) with a higher level of food dietary diversity (consuming 5-8 food groups). The age of toddlers by 32.6% 6-24 months and 67.4% 25-59 months. 52.1% male and 47.9% of females were involved, with each nationality making up 15% of the subjects in this study.

The prevalence of food insecurity among household in Lombok Tengah indicated 32.0% of households as food insecure and 68.0% of households as food secure in varying degrees demonstrating an overall high rate of household food secure.

The description of the household food insecurity was obtained from aggregate of the response score to each of the HFIAS occurrences questions. Approximately 24.8% of

households experienced anxiety an uncertainty over household food, while 75.2% were not worried or uncertain. Over half of the sampled population experienced insufficient food quality. They either eat unwanted food (58.9%), limited variety of food (55.3%), or un preferred food (57.6%) due to lack of resources and less than 45% of household experienced none of these conditions (41.1%, 44.7%, and 42.4% respectively).

The results of this study showed that 53.2%, 6.1% and 0.3% of households were mildly, moderately and severely food insecure respectively, with an overall food insecurity rate of 59.6%. Some household experienced insufficient food intake by going a whole day without food (0.84%), go to sleep hungry (1.95%) or have no food any kind (2.5%), fewer meals a day (27.6%) and smaller portions of meals (32.8%) due to food inadequacy. The reverse was the case with households who do not experience these conditions (99.16%, 98.05%, 97.5%, 72.4%, and 67.2% respectively). Using the chi-square test, the demographic factors age of the toddlers and gender significant association between household food security with age and gender.

The result data that has been collected from the dietary diversity score in households ranges from one to eight food groups, the average value of the food diversity score is 4.3 (SD = 1.29). It can be interpreted that food consumption at this research site is already at a high level of food diversity.

Table 2. Distribution of food insecurity status of farmer households in Lombok Tengah

Food Security Status	Range	n	%
Food Secure	0-1	145	40.4
Mildly food insecure	2-7	191	53.2
Moderate food insecure	8-14	22	6.1
Severe food insecure	15-27	1	0.3

Table 3. Distribution of household dietary diversity score of farmer households in Lombok Tengah

Household Dietary Diversity Score	Range	n	%	Mean	SD
Low	1-4	57	15.9	3.7	0.51
High	5-8	302	84.1	5.1	0.63
Total		359	100	4.3	1.29

Table 4. Food groups included in the dietary diversity score and the frequency by household food insecurity status

Food Groups included in dietary diversity score	N	Food Security Status				P
		Food secure	Mildly food insecure	Moderate food insecure	Severely food insecure	
Cereals	359 (100)	244 (100)	70 (100)	38 (100)	7 (100)	-
White roots and tubers	73 (39.8)	26 (32.3)	16 (21.5)	29 (35.7)	2 (31.6)	0.681
Vitamin A Rich vegetables and tubers	213 (67.9)	149 (59.4)	36 (48.2)	21 (57.1)	7 (60.4)	0.824
Dark green leafy vegetables	359 (89.6)	250 (73.2)	64 (59.1)	38 (83.9)	7 (100)	0.213
Other vegetables	321 (81.5)	216 (77.8)	70 (80.0)	30 (72.6)	5 (74.1)	0.419
Vitamin A rich fruits	54 (21.9)	32 (17.1)	11 (13.8)	8 (19.3)	3 (8.9)	0.119
Other fruits	139 (65.9)	81 (60.2)	58 (56.4)	0	0	0.415
Organ meat	75 (49.7)	42 (45.2)	29 (36.7)	3 (12.2)	1 (5.4)	0.890
Flesh meat	29 (39.2)	23 (37.2)	6 (29.1)	0	0	0.002**
Eggs	159 (82.5)	113 (79.2)	40 (78.3)	6 (44.7)	0	0.129
Fish and seafood	161 (68.1)	132 (66.9)	21 (67.5)	5 (48.4)	3 (49.3)	0.045**
Legumes, nuts and seeds	288 (69.3)	179 (67.1)	70 (68.9)	32 (59.3)	7 (60.6)	0.392
Milk and milk products	42 (49.2)	37 (48.2)	5 (49.1)	0	0	0.006**
Oils and fats	316 (97.9)	201 (95.4)	70 (100)	38 (100)	7 (27.0)	0.981
Sweets	359 (99.6)	244 (87.9)	70 (98.9)	38 (100)	7 (100)	0.837
Spices, condiments and beverages	359 (100)	245 (100)	69 (100)	38 (100)	7 (100)	0.491
Dietary diversity scores						
Low dietary diversity (≤ 4 food groups)	57 (15.9)	8 (3.3)	17 (24.3)	25 (65.8)	7 (100)	0.009**
High dietary diversity (> 4 food groups)	302 (84.1)	236 (96.7)	53 (75.7)	13 (34.2)	0	

** Value is statistically significant at $p < 0.05$.

In this study, it was reported that the sample consumed various food groups, including cereals (100%), oils and fats (97.9%), and sweets (99.6%). Through statistical tests, it is proven that there is a relationship between the dietary diversity score and food security status. There was relationship between the group flesh meats, fish and seafood, milk and milk products, and food security status, these food group were the least consumed food group among female farmer.

DISCUSSION

Our research investigated household food security and dietary diversity in Lombok Tengah, West Nusa Tenggara Indonesia. Finding revealed high level of food insecurity at 59.6% corresponding with several household food security studies in some areas in Indonesia⁹⁻¹¹. Lack of food is a consequence of the unavailability of food or household inability to access the available food. The results of a study in Ethiopia showed that 16.9%, 34.1% and 15.4% of households were mildly, moderately and severely food insecure, respectively¹², and the overall household food insecurity was 66.4%.

This difference may be due to the fact that the aforementioned study used a larger sample size and the samples were selected from different regions of the country, which have different geographies, annual rainfall and arable land, and therefore different amounts and types of food production, and therefore different levels of food insecurity. This means that area-specific surveys are better for understanding the real situation of an area, as average results from different areas may not be the same as the actual figures of a particular area, as problems in one area may be masked by other areas¹³. Our study adds to the literature base by using the 10-food group based IDDS to measure dietary diversity. This method has also been proposed by the FAO as an indicator of micronutrient adequacy at the population level¹⁴.

We look at household dietary diversity, which accounts for the different food groups consumed by the sampled population. Less than a quarter of household consumed flesh meat, fish and seafood, and milk and milk product food groups and more than half (62.7%) were at or below the average dietary diversity score for the group, with more female headed or single parents household. The most commonly consumed food groups in descending groups were cereals, vegetables, eggs, oil/fats, sweets and condiments. They are also affordable and have a high energy density, enough to satisfy hunger for a longer period of time and protect against hunger. But do not overlook the importance of getting the recommended amounts of protein, vitamins and minerals into a diet. Henjum et al. (2015) found that low dietary diversity explains low micronutrient intake¹⁵. Protein rich foods such as milk and dairy products and fish and seafood were the least consumed food groups. Household food security has six dimensions: availability, access, utilization or consumption of food, stability, agency and sustainability¹⁶. Existing dietary diversity scores

vary according to the number of food groups used for calculation, including 7, 8, 9, 10 or 12 food groups. The score based on 10 food groups used in our study showed better performance in measuring micronutrient adequacy than scores based on 7 or 9 food groups in individuals of reproductive age and in children of both sexes aged 4 years^{17,18}.

Chi-square test for factors associated with household food security showed that dietary diversity were associated with household food security. Households cannot consume foods such as meat, milk and fish possibly due to the inability to access these foodstuffs economically. The use of cooking oil and sugar is high among respondents (mildly and moderately food secure) who experience food insecurity as part of a form of coping strategy to survive. This result is aligned with previous research that stated there was association between household food security and female farmers¹⁹.

Our study provides the first evidence that children under five years of age in Lombok Tengah have low dietary diversity and poor micronutrient adequacy, as reflected by low IDDS calculated for 10 food groups. Other studies aimed at assessing dietary diversity in children in Kenya focused on children under 5 years of age and used dietary diversity scores based on seven or nine food groups²⁰⁻²². We also observed differences in diet according to gender. We found that men tended to have a less varied diet than women. A recent study examined the dietary intake of more than 7000 children aged 10-19 years from 6 countries in sub-Saharan Africa, including Burkina Faso, Ethiopia, Ghana, Nigeria, Uganda and Tanzania²³. They found that girls were more likely to consume meat, eggs and fish, but not cereals, white roots and tubers, vegetables, fruits, legumes, nuts and seeds, or dairy products²⁴.

CONCLUSIONS

High levels of anxiety and uncertainty about food and low intake of protein rich foods raise concern about the physical and nutritional status of household members. Partnership in the area while equipping local people for improved productivity to achieve sustainable development goals.

REFERENCES

1. Patton GC, Sawyer SM, Santelli JS, Ross DA, Afifi R, Allen NB, et al. Commission on adolescent health and wellbeing. *Lancet* 2016, 387, 2423–2478.
2. Victora CG, Adair L, Fall C, Hallal PC, Martorell R, Richter L, Sachdev HS. Maternal and child undernutrition: Consequences for adult health and human capital. *Lancet* 2008, 371, 340–357.
3. Verger EO, Le Port A, Borderon A, Bourbon G, Moursi M, Savy M, Mariotti F, Martin Prevel Y. Dietary Diversity Indicators and Their Associations with Dietary Adequacy and Health Outcomes: A Systematic Scoping Review. *Adv. Nutr.* 2021;12:1659–1672.
4. Popkin BM, Corvalan C, Grummer Strawn LM. Dynamics of the double burden of malnutrition and the changing nutrition reality. *Lancet* 2020, 395, 65–74.

5. [FAO, Ifad, UNICEF, WFP, WHO]. The State of Food Security and Nutrition in the World 2021: transforming food systems for food security, improved nutrition and affordable healthy diets for all. Rome:FAO;2021.p. 240.
6. Bahn RA, Hwalla N, El Labban S. Leveraging nutrition for food security: the integration of nutrition in four pillars of food security. *Food Secur Nutr*. 2021. doi.org/10.1016/B978-0-12-820521-1.00001-0.
7. [FAO, Ifad, UNICEF, WFP, WHO]. The state of food security and nutrition in the world: repirposing food and agricultural policies to make healthy diets more affordable. Rome:FAO;2022.
8. Popkin BM. Relationship between shifts in food system dynamics and acceleration of the global nutrition transition. *Nutr Rev*.2017; 75(2):73-82
9. World Health Organization. Physical Status: The Use And Interpretation Of Anthropometry. Report Of A Who Expert Committee. World Health Organ. Tech. Rep. Ser.. 1995;854:1-452.
10. Coates J, Swindale A, Bilinsky P. HFIAS for Measurement of Food Access Indicator Guide. 2007 Vol. 53
11. Dewi P, Khomsan A, Dwiriani CM, Sukandar D. Household food security and children's food consumption diversity in the different agroecological regions in West Java, Indonesia. *Nutr Clín Diet Hosp*. 2024; 44(4): 353-359. DOI: <https://doi.org/10.12873/444khomsan>
12. Utoro PAR, Pujokaroni AS, Aini Q, Saragih B. Factors and comparative analysis of COVID-19's impact on household food security in rural and urban regions. *Nutr Clín Diet Hosp*.2025; 45(1): 61-68. DOI: <https://doi.org/10.12873/451utoro>.
13. Utama LJ, Abdi LK, Yunita L, Saudia BEP, Kristiandi K, Nur A. Food security of farmer households in Central Lombok Regency. *Nutr Clín Diet Hosp [Internet]*. 2024;44(3): 268-276. DOI: <https://doi.org/10.12873/443utama>
14. Coates J, Swindale A, Bilinsky P. Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide Version 3. 2007. Food and Nutrition Technical Assistance Project Academy for Educational Development, Washington DC.
15. Castell GS, Rodrigo CP, de la Cruz JN, Bartrina JA. Escalas de evaluación de la inseguridad alimentaria en el hogar. *Nutr Hosp*. 2018;2015(31):272-8.
16. Ali D, Saha KK, Nguyen PH, Diressie MT, Ruel MT, Menon P, Rawat R. Household food insecurity is associated with higher child under-nutrition in Bangladesh, Ethiopia, and Vietnam, but the effect is not mediated by child dietary diversity, *The Journal of Nutrition*. (2013) 143, no. 12, 2015-2021, <https://doi.org/10.3945/jn.113.175182>.
17. Henjum S, Torheim LI, Thorne-Lyman AL, Chandyo R, Fwazi, WW, Shrestha PS, Strand AA. Low dietary diversity and micronutrient adequacy among lactating women in a peri-urban area of Nepal. *Public Health Nutrition*. 2015; 18(17), 3201-3210.
18. FAO. The State of Food Security and Nutrition in The World: Repurposing Food and Agricultural Policies to Make Health Diets More Affordable. 2025. <https://openknowledge.fao.org/items/445c9d27-b396-4126-96c9-50b335364d01>
19. FAO. FHI 360. Minimum Dietary Diversity for Women: A Guide for Measurement; FAO: Rome, Italy, 2016.
20. Martin-Prével Y, Allemand P, Wiesmann D, Arimond M, Ballard T, Deitchler M, Dop MC, Kennedy G, Lee WT, Moursi M. Moving forward on Choosing a Standard Operational Indicator of Women's Dietary Diversity; FAO: Rome, Italy, 2015.
21. Caswell BL, Talegawkar SA, Siamusantu W, West KP, Palmer AC. A 10-Food Group Dietary Diversity Score Outperforms a 7-Food Group Score in Characterizing Seasonal Variability and Micronutrient Adequacy in Rural Zambian Children. *J. Nutr*. 2018, 148, 131-139
22. Sambo TA, Oguttu JW, Mbombo-Dweba TP. Analysis of dietary diversity status of agricultural household in the Nkomazi Local Municipality, South Africa. *Agric Food Secur*. 2022;11 (1):1-12. doi.org/10.1186/s40066-022-00387-0.
23. Amugsi DA, Dimbuene ZT, Kimani-Murage EW, Mberu B, Ezech AC. Differential effects of dietary diversity and maternal characteristics on linear growth of children aged 6-59 months in sub-Saharan Africa: A multi-country analysis. *Public Health Nutr*. 2017, 20, 1029-1045.
24. M'Kaibi FK, Steyn NP, Ochola SA, Du Plessis L. The relationship between agricultural biodiversity, dietary diversity, household food security, and stunting of children in rural Kenya. *Food Sci. Nutr*. 2017, 5, 243-254
25. Muthini D, Nzuma J, Nyikal R. Farm production diversity and its association with dietary diversity in Kenya. *Food Secur*. 2020, 12, 1107-1120
26. Darling AM, Sunguya B, Ismail A, Manu A, Canavan C, Assefa N, Sie A, Fawzi W, Sudfeld C, Guwattude, D. Gender differences in nutritional status, diet and physical activity among adolescents in eight countries in sub-Saharan Africa. *Trop. Med. Int. Health* 2020, 25, 33-43.