A Gendered Perspective on Household Dietary Diversity Status in Mbinga District, Tanzania

Abstract

Introduction: This study examines household dietary diversity in Mbinga District, Tanzania, focusing on under-fives, examining sources of household food, gender relations, and differences in dietary scores among female-headed and male-headed households.

Methodology: The study adopted a cross sectional research design where by a total of 150 heads of households whose children aged 0 - 59 months were assessed. A structured questionnaire and interview checklist were administered to collect data from heads of the households and key informants respectively. Data were coded and analysed by Statistical Package for Social Sciences (SPSS) programme and STATA. An Independent two-sample t-test was used to differentiate the sources of household food and status of dietary diversity between the female-headed and male-headed households.

Results: Out of 150 households, 74% secure food from farm harvests, 26% rely on purchase, and starchy staple foods are the most consumed, while poultry, milk, dairy, and flesh foods are least consumed. Cereals, roots, and tubers were the most common staple foods in the studied community, and they had the highest score of 98.7%, whereas poultry products scored 3.3%. The independent sample t-test revealed that, there was a significant difference in the consumption score of flesh foods in male-headed households ($M = 4.39$, $SD = 1.74$), and female-headed households ($M = 1.26$, $SD = 0.44$); $t = 5.28$, $p = 0.000$. Similarly, there was a significant difference in the consumption score of poultry products in female-headed households ($M = 2.65$, $SD = 0.44$), and male-headed households ($M = 5.26$, $SD = 1.71$); $t = 6.34$, $p = 0.000$. Moreover, a significant difference in the consumption of milk and dairy products such as chicken and eggs was found in female-headed households ($M = 1.54$, $SD = 0.30$) and male-headed households ($M = 4.54$, $SD = 1.80$) ($t = 2.014$, $p = 0.010$).

Conclusion and recommendations: The study comes to the conclusion that, in the Mbinga District, there are variations in the dietary diversity of households according to household headship. Female-headed households had low dietary diversity as compared to male-headed households. The primary food source for households was the harvest from farms, with male-headed households making up the majority of purchases due to their relative economic wellness compared to female-headed households. As a result, nutritional diversity in households varied according to family headship. The Tanzanian government should develop gender-responsive sensitization programs to ensure equal access to food, resources, education, and economic opportunities for both men and women. Addressing insufficient household dietary diversity requires collecting and integrating data on national food security and nutrition statistics, fostering collaboration, and empowering unprivileged women. Additionally, the Tanzania Social Action Fund should support female-headed households, particularly those with abandoned male heads.

KEYWORDS: Gender, *Gender disparity, Household dietary diversity, Under-five nutrition, household headship, male-headed households, female-headed households*

INTRODUCTION

Undernutrition affects people of all ages and is a global public health concern. It is a problem for public health as well as productivity and economic expansion(United Nations International Children's Emergency Fund and World Health Organization, 2019). Children under five are among the most vulnerable, with the majority suffering from underweight, wasting, and stunting. According to World Bank estimates from 2021, there were approximately 149 million children under five who were considered stunted or too short for their age; 45 million who were considered wasted or too thin for their height; and 38.9 million who were overweight or obese(Food and Agriculture Organization of the United Nations, 2010). Thus, undernutrition is thought to be a contributing factor in about 45% of fatalities in children under the age of five. These are primarily found in low- and middle-income nations, particularly in Asia and Africa. AS reported by (WHO and UNICEF, 2018) undernutrition in children can take many different forms, but the best way to treat it is through prevention, which includes maintaining a diverse diet in the home.

The regions with the largest differences in household dietary diversity between male- and female-headed households are Asia (4.4 percentage points in 2021 versus 2.7 percentage points a year earlier) and Latin America and the Caribbean (11.3 percentage points versus 9.4 percentage points in 2021). In the case of acute food insecurity, the margin widened similarly between 2020 and 2021. Women were 2.5 percentage points more likely than men to experience extreme food insecurity in 2021 (14.1%), up from 1.3 percentage points in 2020. Males were more likely to experience it (11.6%) (World Bank, 2021). According to the World Health Organization, a healthy diet consists of fruits, vegetables, legumes, nuts, and whole grains.Since different food items and groups are good sources of various macro- and micronutrients, a diverse diet is generally positively correlated with nutrient adequacy. Although diversity is a critical aspect of dietary quality, it does not guarantee a balanced diet since disproportionately low or high amounts of energy from a given macronutrient may be a sign of under consumption (disproportionately high amounts of total carbohydrates) or overconsumption (disproportionately high amounts of lipids and sometimes proteins).

In many poor countries, both production and consumption are heavily reliant on cereals, for which production is insufficient to meet domestic caloric requirements(Mbunda and Sewando, 2024). Although the nutritional makeup of these staples varies by variety, they typically lack important micronutrients like vitamins A and C, and some of the B vitamins and minerals (such as vitamin B6, iron, and zinc) may have reduced bioavailability. The Household Dietary Diversity Score (HDDS), which totals the number of different food groups ingested by the household over a given reference period, is one of the most often used measures of dietary diversity. Despite being simple to compute and understand, the HDDS assigns the same weight to various dietary groups regardless of their quantity or contribution to health (Headey *et al.*, 2019).

Gender disparity is a major issue that affects family access to and utilization of various food groups, especially for under-five children, despite the fact that household dietary diversity has an impact on the nutrition of children under five(Taruvinga *et al.*, 2013). The gender gap is primarily manifested in home headship, and it has a very negative effect on the likelihood that

members of the family would use and consume a variety of food categories for their health. The gender disparity in household diets widened further in 2021, with 31.9 percent of families headed by women experiencing moderate to severe food insecurity and a non-diversified diet globally, compared to 27.6 percent of households headed by men (Kolliesuah *et al.,* 2023). Poverty, food insecurity, and sociocultural taboos are all products of gender inequality and unfavorable gender norms that restrict women's access to resources, services, and inputs like food, land, knowledge, and social taboos. It is difficult for vulnerable women, particularly those living in households headed by women, to get the resources and nutrition information they need to increase food security. Female-headed households are worldwide more susceptible to underfive nutrition status and insufficient dietary diversity than households led by men.

Africa faces significant challenges related to food security and inadequate household dietary diversity. It is estimated that over 239 million people in sub-Saharan Africa and 37 million in North Africa are undernourished. Female-headed households are particularly affected by this situation, as they bear the dual burden of environmental degradation and gender inequality(ACET, 2017). In comparison to male-headed families, female-headed households in sub-Saharan Africa are two percentage points more likely to suffer from inadequate household dietary diversity and food insecurity(Ogbo *et al.,* 2019). Male-headed households are expected to provide the greatest food diversity because they are seen to be more productive and to have greater economic tightness and ownership of agricultural and financial resources. Because of their low economic standing and lack of access to resources for agriculture, households headed by women are typically expected to eat substandard food. Women do, however, make a substantial contribution to agricultural labor—far from being neglected. They comprise about all of the labor force in the agricultural sector. In Sub-Saharan Africa, women often constitute about 50% of the agricultural labor force(Coates *et al.,* 2007). Different percentages of this group are found in Africa. Argaw*et al.,* (2021) found that 51% and 32% of the population were in southern and northern Nigeria, respectively, 56% in Uganda, and 52% in Tanzania and Malawi.

Tanzania, like many other countries around the globe, is a sub-Saharan African nation that struggles with undernutrition, particularly in children under five years old, where a key obstacle is the lack of dietary diversity. The country has experienced steady economic growth in recent years. However, 27 percent of the population still lives below the poverty line, and an additional 8 percent lives in extreme poverty (URT, 2019). A significant share of the population remains malnourished, with high stunting (impaired growth due to undernutrition) and increasing rates of overweight, obesity, and vitamin and mineral deficiency. An estimated 20 percent of families are unable to afford a diet with sufficient calories, while 59 percent cannot afford a nutritious diet. Agriculture plays a key role in the national economy and provides a livelihood for 70 percent of the population, with women making up most of the sector's labor force(Legesse *et al.,* 2020). Despite their participation, women often have limited access to land, credit, and other resources, reducing their ability to produce and generate income and making them more susceptible to shocks. The country is ranked 146 out of 191 on the Gender Inequality Index of 2022, mainly due to high maternal mortality rates, high adolescent birth rates, and low levels of secondary education for girls due to early marriages and unplanned pregnancies (Kansiime *et al.,* 2017).

In rural areas, households experience inadequate post-harvest storage facilities, and some rely on seasonal crop outputs. The impact of undernutrition is higher. In Tanzania, 34% of children

under five suffer from stunting; 5% of wasted children and 14% of underweight children are affected, while 5.5% of women between the ages of 15 and 49 are underweight(Khamis *et al.*, 2019). The majority of household meals consist mostly of staple foods, with minimal dairy products, meats, fruits, vegetables, and poultry items like eggs.

The burden of chronic undernutrition in Tanzania ranks third in Sub-Saharan Africa, after Ethiopia and the Democratic Republic of the Congo. A varied diet is essential for children under five years old, as they require high-energy and nutrient-dense foods for optimal growth and development. Over 80% of Tanzanian households are dependent on agriculture, and by increasing fruit and vegetable production, dietary diversity can be achieved. Micronutrients, fiber, vitamins, and minerals can be found in abundance in vegetables, especially the traditional ones like amaranths, African eggplant (Solanumaethiopicum), African nightshade (Snigrum), okra (Abelmoschusesculentus), sweet potato leaves (Ipomoea batatas), pumpkin leaves (Cucurbita maxima), and jute mallow (Corchorusolitorius). Over 70% of the calories consumed by Tanzanian rural households come from starchy staples(Headey *et al.*, 2019).

Female-headed households are vulnerable to childhood undernutrition as they typically use lower levels of purchased inputs and have lower rates of adoption of new technologies (Ochieng *et al.*, 2017). Accessing services that support agricultural output and decision-making may potentially be a bigger challenge for them. In order to enhance the food security and nutrition of vulnerable populations, the World Food Programme (WFP) has been present in Tanzania since 1963. The organization collaborates with the government, donors, other UN agencies, NGOs, and the private sector. WFP's Country Strategic Plan 2022–2027 aims to achieve inclusive economic growth in accordance with its 2030 Agenda commitment. This is achieved through market-based interventions (e.g., digital solutions for commodity marketing and financial inclusion), enhanced human capital, greater accessibility to reasonably priced, nutrient-dense foods and healthy diets, and climate action (ACET, 2017).

The number of undernourished children in Tanzania continues to rise despite the government's efforts since household dietary diversity is still insufficient, particularly in families led by women(Marla and Padmaja, 2023). In this case, eradicating the issue is made more difficult since gender disparity stands in the way of attaining adequate nutrition and food security for households. Studies likeLegesse *et al.,* (2020), (Kissoly *et al.,* 2020) and Khamis *et al.,* (2019)have been carried out recently. However, they neglected the gender perspective on data collection and critical analysis of gender disaggregated data that would address the question of who is most affected by undernutrition in favor of focusing more on the nutrition status of children under five, childcare practices, adherence to breastfeeding practices, and household dietary diversity. It is with this fact that the study's conclusions can be used to make the best decisions and take the most effective action by carefully selecting targets and creating programs and policies.

MATERIALS AND METHODS

Study Area

This study was conducted in Mbinga district from January to March 2022. Mbinga is one of the six districts in the Ruvuma region, namely: Nyasa, Mbinga, Songea Urban, Tunduru, Songea

Rural, and Namtumbo districts (URT, 2023). Mbinga was strategically selected for this study for a number of reasons, among others: (i) it is found within the regions that are highly affected by undernutrition among the underfive, with a stunting rate of 41% in Tanzania (URT, 2019); and (ii) it is important and occupies the largest area for growing food crops such as maize, beans, cassava, millet, and potatoes in the Ruvuma region, although childhood undernutrition is not yet controlled (Wineman *et al.,* 2020). Additionally, feeding practices and dietary diversity are not well utilized in most households, despite intense mixed farming, including crop cultivation and animal rearing. Furthermore, a large proportion of the population lives in houses that are in good condition. Most houses are constructed of burned bricks, roofed by corrugated iron sheets, with floors made up of stone, gravel, sand, and cement. However, few households located in remote rural areas have houses in poor condition. Most houses (60–80%) have basic furniture, and the majority of households own a cell phone, which is expected of them to access basic health information regarding the essentials of household dietary diversity and underfive nutrition (ACET, 2017).

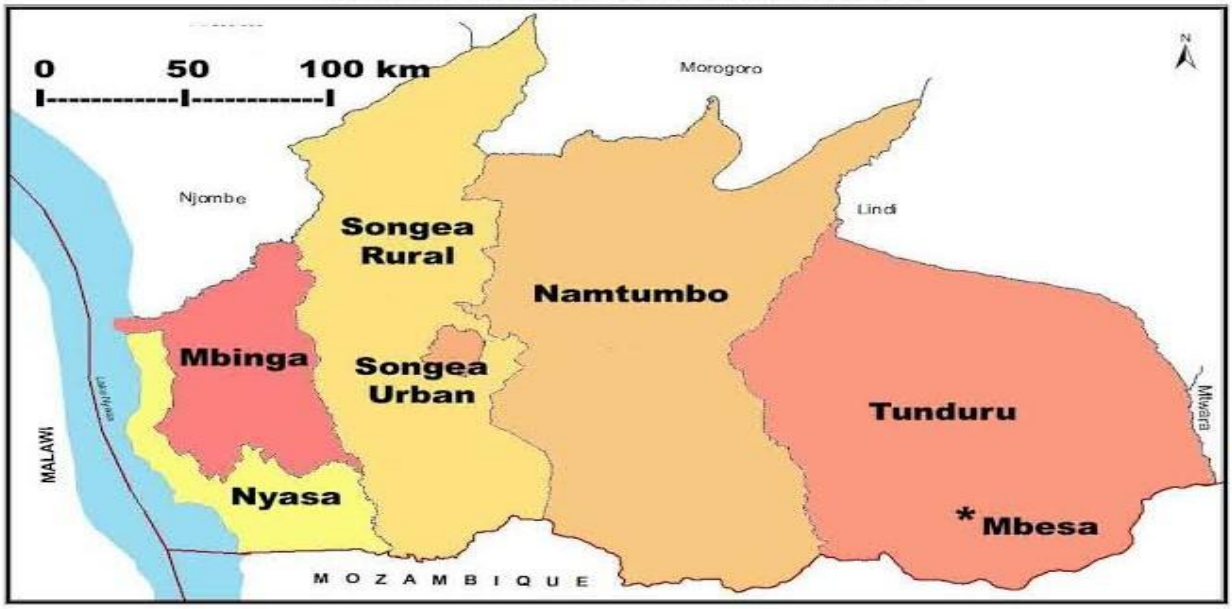

Figure 1: A map of Mbinga District

Research design

The author employed a cross-sectional research design to collect both qualitative and quantitative data, based on the fact that this design is suitable for inferring an existing relationship among household headship and household dietary diversity(Alwang *et al.,* 2019).Primary data were collected from household heads in the field using questionnaires structured with a couple of questions, and the key informants were interviewed using a checklist containing relevant questions. Potential secondary data was collected by reviewing relevant documents, including demographic and health surveys, strategic plans, journals, nutrition survey reports, and published papers. Furthermore, this study explored the relationship between independent variables and the dependent variable. The independent variable was sex of household heads (female/male) and the dependent variable was household dietary diversity as indicated by number of food groups consumed by household members in the past seven days before the interview day. Similarly, the testable hypothesis with respect to measuring the relationship between household heads and household dietary diversity was:

H_0: There is no relationship between household heads and household dietary diversity status in Mbinga District.

Sampling and sample size

Sampling techniques

Simple random sampling was used to select three wards: Mpapa, Maguu, and Nyoni, and one village from each ward, including Mitawa, Wanyu, and Likwera. At the village level, the study sampled 50 households, in which the number of households differed from one village to another depending on the population size as received from the village executive officers. Thereafter, households were selected by using the snowball sampling technique, whereby a few households with under five were purposefully selected and asked to recommend other households that meet the prescribed criteria.

Population sample

This study sampled 150 heads of households who were obtained by using Cochrane's (1977) sample determination formula for an unknown population based on the fact that the population size of the households with under-five children in the study area was not known.

$$n = \frac{z^2 qp}{e^2}$$

Where:

n = sample size when population is greater than 10,000

z = Standard normal deviation, set at 1.225 corresponding to 95% confidence level,

p = proportion in target population estimated to have a particular characteristic; if it is not known, 50% is used.

q = 1.0 – p = 0.5

d = degree of accuracy desired, set at 0.05

Thus, $n = 3.0^2 (0.5x1\text{-}0.5)/0.05^2$ = ***150***

Data collection, processing, analysis and presentation

A household survey was utilized to gather the quantitative data, in which the heads of households were given semi-structured questionnaires that included both closed-ended and open-ended questions. Factual information on background characteristics (age, sex, marital status, education, household size, occupation, and head of household) was obtained by the questionnaire. Moreover, data on household food sources and dietary diversity (food usage) were obtained through its use. The questionnaire was chosen because it was deemed suitable for gathering opinions on the relationship between household heads and dietary diversity at the household level from a significant number of household heads (150). To prevent respondents from being misled, the questions were posed in the most logical order feasible.

Additionally, as to triangulation, the in-depth information was gathered from the ward executive officer (3) and health officials (3) through an interview. Data on compliance with the study area's minimal dietary diversity score and gender-specific obstacles linked to household dietary diversity were gathered using a checklist. The rationale behind employing interviews as a data collection approach is its capacity to facilitate the acquisition of comprehensive insights from the selected key informants regarding the correlation between home headship and household dietary diversity. According to Ruel (2013), no other method of data collection can match the rich information that interviews provide, which is especially helpful in generating insights for the description of social reality.

Data processing, analysis and presentation

The collected data were cleaned up, organized, categorized, and condensed. In order to carry out this procedure, the author used both inferential and descriptive statistics with IBM-SPSS version 20. Additionally, the analysis was carried out in accordance with the goals stated below; anthropometric data was analyzed using Emergency Nutrition Assessment (ENA) for SMART version 11. Based on Z-scores for a child's height-for-age, weight-for-height, and weight-for-age, three indices of undernutrition were created. Similarly, cross-tabulation descriptive statistics were used to assess the sources of household foods. Response scores of standardized food sources, like own farm production and purchase, were cross-tabulated against the headship of the household (male and female heads). In order to distinguish the level of dietary variety, the independent two-sample t-test was employed to examine the household dietary diversity status (HDDs) for children under five.

Data validity and reliability

The instruments for this study (questionnaire and interview checklist) were pre-tested. The pre-test was aimed at determining whether the questions were clear and unambiguous to the study respondents. Some adjustments to the questions in terms of language used, content, and flow were made in response to the observed weaknesses of the tools. A pilot test was done on 20 respondents randomly selected in Luhangarasi Ward, which was not sampled for the study. Therefore, the respondents who were involved in the pilot test were not included in the actual household surveys. To ensure the reliability of the responses, the questionnaire was made simple and straight-forward. In this study, the researcher was careful in collecting, analyzing, and processing data from respondents. He maintained ambiguity, fewer complications, and relevance when formulating a questionnaire. Similarly, the use of both primary and secondary sources of data by using different types of data collection instruments, such as questionnaires, interviews, and documentary sources, was designed to measure the same thing in order to check reliability. Furthermore, the use of non-probability sampling techniques such as purposive and snowball sampling allowed the researcher to select the respondents based on their knowledge of the population, its elements, and research objectives.

Ethical Considerations

Adherence to ethics is a crucial element in the research process. Thus, with this knowledge, the researcher followed various rules throughout the entire process. In this study, the researcher secured a letter of introduction from TICD, which enabled the acquisition of permission from all possible authorities in Mbinga District Council, allowing him to conduct this research. Further, the study promoted voluntary participation, where respondents and informants were subjected to choosing to participate in the research project at their will and consent (Nnko, 2017). Similarly, in this study, ethics included maintaining dignity, privacy, confidentiality, informed consent, being honest and transparent, and adherence to human rights. This is very important as it enhanced the maximum cooperation, willingness, and freedom of respondents in expressing their thoughts regarding the research topic.

RESULTS AND DISCUSSION

Characteristics of respondents

The study involved 150 heads of households from three wards of Mbinga District. The study was conducted in such a manner that both men and women of different ages, sexes, education, occupations, and economic status were involved;

Sex of respondents

The research involved households of different categories in terms of family size, age, sex, years of schooling, marital status, and occupation of the household head. Moreover, the sex of respondents was taken into account in order to avoid bias in responses. However, female respondents were more numerous than male respondents because the latter are demographically fewer than the former. Table 2 indicates that about 64.7% of the respondents were female household heads and 35.3% were male household heads in the surveyed area. Similarly, in Tanzania, the female and male populations were 51.3% and 48.7%, respectively (Taruvinga et al., 2013). The sex of heads of households in the surveyed area of the study was considered to be one of the determinants of household dietary diversity status.

Age of respondents

Generally, age is a fundamental measure of population structure (Agwanda and Amani, 2014). Demographers and other social scientists have a special interest in the age structure of a population because several social relationships within the community depend on age. The significance of the age of the heads of households was also assessed with regard to household dietary diversity status. Mdimu *et al.,* (2020) found the influence of the age of the mother or father on under-five nutrition status to be very diverse. Some studies have found that age has a positive effect on food productivity, livelihood improvement strategies, household food storage, size of household, knowledge on nutrition issues, as well as food availability and dietary diversity for the under-five and household members at large (Carletto *et al.,* 2016).Table 1 indicates that the age distribution of the household heads ranged from 18 to 55 years, with concentrations between 19 and 45 years and an average age of 32 years. The concentration of the age cohort of the heads of household implies that members of their age group had strong command in food production, managing under-five feeding practices, and ensuring household dietary diversity, hence a higher possibility of improved under-five nutrition status.

Household size

Likewise, household size is an important determinant of food requirements and availability per household based on dietary energy consumption *per capita* per day and per under-five equivalent per day (Gassara and Chen, 2021). The significance of household size in household dietary diversity hinges on the fact that the availability of labor for farm production, the total area cultivated for different crops, the amount of food crops retained for domestic consumption, and the marketable surplus are all determined by household size. It also affects a mother's ability to take care of under-five children in terms of breastfeeding while also being available to other family members for food and other domestic services. Likewise, Table 1 indicates that about

30% of the households had a family size of 3 members, 19.3% of households had 4 members, 14.7% of households had 5 members, 14.7% of households had 6 members, 7.3% had 7 members, 6% of respondents had 8 members, 3.3% of households had 9 members, 2% of households had 10 members, and 2.7% of respondents had 11 members. In addition, the minimum household size was 3 members, while the maximum size was 11 members in extended families. The mean household size was 5.1, which was above the national average of 4.7 (URT, 2013b). Ajao *et al.* (2010) pointed out that large families are not food secure, not dietary diversified, and are not nutrition friendly; this is because people with more household members can devote less time and resources to each individual member. This shows that under-five children from large households are likely to be more susceptible to undernutrition than members living in smaller households.

Table 1: Descriptive statistics of the household size and age of respondents (n=150)

Statistics	Max	Min	Mean	Mode	Median	Std. Deviation
Household size	11	3	5.1	5	5	2.1
Age of respondents	55	18	35.3	33	34.5	3.3

It can be observed from the table that the mean age of respondents was 35 years, with a median age of 34 years, showing that the two measures of relationship are closely linked, as the standard deviation was 3.3. Likewise, the mean household size was 5 members, and the median indicated almost the same number, indicating the concretization of the variable in the sense that it is effective that the family size of households in the study area is higher than the national average of 4.8 (URT, 2022).

Marital status of respondents

The influence of marital status on household dietary diversity and under-five nutrition status can be explained in terms of food availability, feeding practices, and household size. It is expected that family labor would be more available where the households are married; however, the probability of a large household size is high in a household whose head is married. In addition, nutrition status in monogamous and polygamous households is significant due to the reality that the latter tends to have a large family size, and sometimes the heads may encounter some difficulties in providing appropriate care and feeding services, especially for the under-five children. Generally, the percentage of polygamous households was high as compared to monogamous households in the surveyed area. This implies that the surveyed households were culturally male-dominated (Gibore*et al.,* 2019). Table 2 shows that 10.7% of the respondents in the surveyed area were not married, 40% of respondents were in a monogamous marriage, 41.3% of respondents were in a polygamous marriage, and 8% of respondents were widowed.

Education level of respondents

The education level of respondents was one of the social characteristics that were assessed in terms of the number of years of schooling. Many studies have revealed that the level of education helps household members acquire and use information efficiently in food production and the appropriate feeding of under-five children. So a more educated person acquires more information, is, to a large extent, a better producer, and adheres to ensuring minimum dietary

diversity for the under-five at the household level (Aloyce, 2018). Similarly, the level of education of household heads determines the level of opportunities available to improve livelihood strategies, enhance food security, and reduce poverty. It affects the level of exposure to new ideas on their involvement in enhancing under-five nutrition and the importance of appropriate care and feeding practices for under-five children. Educated heads of households are expected to participate effectively in ensuring household food security and adherence to appropriate under-five feeding practices. Table 2 indicates that about 82% of respondents had attained primary education, 8.7% had secondary education, and 9.3% had never gone to school in their lifetime. In view of these results, the majority of heads of households have primary education, and some have never gone to school, so this affects their knowledge and participation in ensuring dietary diversity at the household level and feeding practices for under-five children at the household level (Kejo *et al.*, 2018b; Mtoi and Nyaruhucha, 2019).

Table 2:Characteristicsof respondents andtheirhouseholds (n=150)

Characteristics	Categories	f	%
Sex of respondents	Female	53	35.3
	Male	97	64.7
Marital status	Not married	16	10.7
	Married (monogamy)	60	40
	Married (polygamy)	62	41.3
	Widowed	12	8
Education	Never gone to school	14	9.3
	Primary education	123	82
	Secondary education	13	87
Head of household	Male	85	56.7
	Female	65	43.3
Occupation	Peasant	139	92.7
	Government employee	7	4.7
	Business	4	2.7

Head of household

Household headship was taken into account by including female-headed households (FHHs) and male-headed households (MHHs) in order to avoid gender bias in responses. It is with this notion that this study aims at assessing the relationship between household headship and household dietary diversity. In this study, the MHHs were more numerous than the FHHs because the patriarchal system is dominant among the Matengo; women are married and are supposed to be under their husbands unless the latter is dead or has disserted the family (Larson *et al.*, 2019). Table 2 shows that 56.7% of the households were male-headed and 43.3% were female-headed in the surveyed area. However, in Tanzania, FHHs and MHHs are 24.4% and 75.6%, respectively (World Bank, 2018). Household headship in rural areas of Mbinga district was considered to be one of the determinants of household dietary diversity, food security, and under-five feeding practices since FHHs are believed to be less endowed with land entitlement compared to MHHs. The situation of MHHs being much more numerous than FHHs is a common cultural reality in most African families, whereby the community entrusts a man with

the responsibility of bringing food for the family, protecting them against social injustice, clothing them, and making shelter for them (Peneza and Maluka, 2018).

Occupation

The main occupation of the heads of households influences education and knowledge of under-five nutrition status. Significantly, it affects the household's livelihood strategies, which directly influence food production, availability, dietary diversity, and adherence to appropriate under-five feeding practices since occupation determines income level and entitlement to materials such as food and land, which are very essential for under-five nutrition(Alwang *et al.*, 2019). Results in Table 2 indicate that 92.7% of respondents were peasants, 4.7% were government employees, and only 2.7% were business persons. In view of these results, it can be concluded that the majority of households in the study area were engaged in the production of food and cash crops such as maize, millet, cassava, and coffee, so the expectation was that their households were food secure with recommended dietary diversity and meal frequency, but this is not well reflected in under-five children's nutrition status.

Sources of household foods for the under-five in the study area

One of the predictors of household food availability and dietary diversity is the source of food for the particular household. Some sources make household members assured of enough food and a diverse diet, among others, as opposed to other sources. Table 3 shows that out of the 150 households studied, 74% secure household food from their own farm harvest, and 26% depend on purchases to secure food materials for the under-five and other members of the household.

Table 3: Source of household food*Head of household Cross tabulation (n=150)

		Head of household		Total	%
		Father	Mother		
Source of household food	Family farm harvests	67	44	111	74
	Purchase	24	15	39	26
Total		85	65	150	100

This implies that more than 70% of the households in Mbinga District are food producers, which is equivalent to the same percentage at the national level (Omotilewa *et al.*, 2021). It is with this evidence that the peasant households were expected to produce enough food and enhance meal diversity. However, this has not been well achieved so far due to various reasons, including inadequate agricultural diversification, a low level of nutritional knowledge, and cultural issues that affect feeding practices, especially for under-five children. Likewise, the observed percentage of households that obtained food materials through purchase denotes that there is inadequate agricultural commercialization in the study area. It is expected that intensive commercialization in the agricultural sector will lead to easier distribution of varieties of food materials for households, especially those who do not cultivate particular crop types *(Khamis et al.*, 2020).

During an interview with one of the household heads, the following was revealed:

Since the death of my husband, it has not been simple to secure food varieties for my children; I have sold some of our small plots of arable land to pay school fees for my children. Even if I happen to purchase food, I cannot afford enough variety. (KII, 19th March, 2022).

Further, the results of the independent sample test show a significant relationship between household headship and sources of household food (p = 0.000), and the influence between variables was significant (Table 4). Meaning that out of 111 households that secured food materials from their own farm harvests, 60% were male-headed households and 40% were female-headed households. This implies that male-headed households are endowed with relatively adequate arable land, financial resources, and capacity for crop cultivation as compared to female-headed households. This is also supported by Larson *et al.* (2019), who found a significant relationship between household headship, household dietary diversity, and under-five nutrition status. Moreover, the test indicated that, out of 39 households that depended on purchasing food, 61% were male-headed households and 39% were female-headed households. This variation might imply that the existing gender inequality and poor women's empowerment have continued to make them economically dependent. The inadequate engagement of female-headed households in commercialization indicates that they have financial challenges as compared to male-headed households. These findings concur with (Legesse *et al.*, 2020)who found a significant implication of gender inequality in resource access and control on household food security, dietary diversity, and under-five nutrition status.

Table 4: Independent samples test for Source of household food*Head of household

		Levene's Test for Equality of Variances						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**
Source of household food	EVA	274.34	0.000	5.023	148	0.000	0.282	0.056
	EVNA			5.749	84	0.000	0.282	0.049

EVA=Equal Variance Assumed, EVNA=Equal Variance not Assumed

Household dietary diversity status for under-five children

The study was intended to assess the household dietary diversity for under-five children in Mbinga District using food utilization as a major indicator. The respondents were asked to recall the frequency of consuming six groups of food so as to measure if the households' dietary diversity was adequate or inadequate. The findings are clearly presented and discussed in this section. The heads of households were asked to comment on food groups consumed by their children within seven days before the inquiry. Table 5 indicates the most and least consumed food groups by the children. Starchy staple foods were the most consumed food group, while poultry products, milk and diary products, and flesh foods were the least consumed food groups. Cereals, roots, and tubers were the most common staple foods in the studied community, and they had the highest score of 98.7%, whereas eggs scored 3.3%.

Table 3: Food groups consumed by under-five in the past seven days (n=150)

Frequency/times per week	**6-7**	**3-5**	**1-2**	Never
Food groups	**f (%)**	**f (%)**	**f (%)**	**f (%)**
Staple food	148 (98.7)	0	0	2 (1.3)
Fruits and vegetables	112 (74.7)	30 (20)	8 (5.3)	0
Poultry products eg; Eggs	5 (3.3)	8 (5.3)	11 (7.3)	126 (4.7)
Milk and Dairy products	21 (14)	15 (10)	38 (25.3)	76 (50.7)
Flesh foods	2 (1.3)	2 (1.3)	11 (7.3)	135 (90)
Legumes, nuts and seeds	130 (86.7)	9 (6)	9 (6)	2 (1.3)

It was further reported during the interview with the Ward Executive Officer from one of the surveyed wards that:

"Historically, ugali with beans and vegetables and some food types like cassava and potatoes are mostly consumed by the majority of people in our district. Unfortunately, even the under-five children are mostly fed with these food types rather than other groups such as eggs and meat, which is sometimes costly for ordinary households to afford."(KII, 15th March, 2022).

This implies that under-five children eat the same food groups as adults and share the same food plate with them. Although they lack important nutrients from other food groups such as eggs, fruits, fish, and meat, the frequently consumed food type has less dietary diversity, thus hampering their nutrition status. These findings were similar to those of Price *et al.,* (2018), who found that there was high consumption of cereal staple foods (88.3%), low consumption of eggs (16%), and more than 50% of the respondents had low dietary diversity (59%) in Uganda.

The relationship between household dietary diversity status and household headship

An independent-samples t-test was conducted to compare consumption of various food groups within seven days before the day of interview among female-headed and male-headed households in the study area.There was a significant difference in the consumption score of flesh foods in male-headed households (M = 4.39, SD = 1.74), and female-headed households (M = 1.26, SD = 0.44); t = 5.28, p = 0.000. Similarly, there was a significant difference in the consumption score of poultry products in female-headed households (M = 2.65, SD = 0.44), and male-headed households (M = 5.26, SD = 1.71); t = 6.34, p = 0.000. Moreover, a significant difference in the consumption of milk and dairy products such as chicken and eggs was found in female-headed households (M = 1.54, SD = 0.30) and male-headed households (M = 4.54, SD = 1.80) (t = 2.014, p = 0.010).These results suggest that household headship does have an effect on household food access and consumption. Specifically, our results suggest that female-headed households struggle to afford milk and other dietary products as the heads of the households are believed to be less educated, rarely employed, have a relatively high burden of children, and normally possess little or nothing with regard to land and financial resources as compared to male-headed households. Female-headed households have large number of dependents and often these women have their husbands dead or deserted for a long time thus making them poor and less productive. Additionally, the results signifies that the Matengo patriarchy system is also a big hurdle to empowerment of women, the female-headed households are rarely granted rights of ownership and control of productive resources such as land and financial capital thus making them even more dependent.

Table 6: Group statistics for distribution of HDD status and HH headship (*n*=150)

	Head of household	N	%	Mean	Std. Deviation	Std. Error Mean
staple food	Male	73	49	2.16	1.567	.175
	Female	77	51	2.63	1.610	.185
Legumes, lentils, nuts	Male	71	47	2.33	1.611	.185
	Female	79	53	2.98	1.754	.218
Milk and dairy products	Male	85	57	4.54	1.803	0.149
	Female	65	43	1.54	0.306	0.102
Flesh foods	Male	88	59	4.39	1.742	0.166
	Female	62	41	1.26	0.443	0.055
Poultry products	Male	89	59	5.26	1.716	0.186
	Female	61	41	2.65	0.443	0.055
Fruits and vegetables	Male	72	48	2.33	1.708	.185
	Female	78	52	2.98	1.754	.218

HDD=Household Dietary Diversity, HH=Household

These findings concur with Tayyem*et al.,* (2022) who also found a significant association between household headship and income poverty in Ethiopia. Previous evidence also shows that a larger proportion of female-headed households experience food insecurity and undernutrition compared to male-headed households. However, previous analyses have focused on food insecurity determinants. More recently, the COVID-19 pandemic has increased food insecurity disparities by gender. In this sense, it is clear that food insecurity negatively affects household dietary diversity at the household level. Consequently, underfive children are the most vulnerable and prone to undernutrition.

As in other studies, Marla and Padmaja (2023)analyzed the dietary diversity status of agricultural households in the Nkomazi Local Municipality, South Africa, and their results revealed that the majority of households consumed cereals (100%) and vegetable (78.31%) food types. Households headed by respondents with no formal education had lower odds (OR = 0.20; 95% CI = 0.06–0.61) of having a higher dietary diversity compared to those headed by heads who had attained tertiary education. Households with income ≤ R3000.00 had lower odds (OR = 0.51; 95% CI 0.31–0.85) of having a higher dietary diversity as compared to those with income > R3000.00. Households headed by female parents were found to be more prone to inadequate dietary diversity than male-headed households due to differences in household income capacities.

Table 7: Independent samples test

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Staple food	Equal variances assumed	11.983	0.241	10.429	148	0.248	2.466	0.236
	Equal variances not assumed			10.874	147.618	0.340	2.466	0.227
Legumes, lentils, nuts	Equal variances assumed	8.836	0.253	3.654	148	0.248	1.008	0.276
	Equal variances not assumed			3.613	131.481	0.267	1.008	0.279
Milk and dairy products	Equal variances assumed	10.322	0.002	2.014	148	0.010	0.457	0.197
	Equal variances not assumed			1.015	144.906	0.022	0.113	0.187
Flesh foods	Equal variances assumed	135.647	0.000	5.284	148	0.000	1.771	0.195
	Equal variances not assumed			5.92	101.899	0.000	1.022	0.174
Poultry products	Equal variances assumed	67.18	0.000	6.345	148	0.000	1.543	0.218
	Equal variances not assumed			7.139	98.29	0.000	1.386	0.194
Fruits and vegetables	Equal variances assumed	0.1	0.752	-4.653	148	0.456	0.756	0.162
	Equal variances not assumed			-4.584	129.361	0.741	0.756	0.165

The findings of this study are also supported by Kolliesuah *et al.,* (2023), who found that high-income households are less likely than low-income households to face inadequate household dietary diversity in Northern Uganda, according to earlier studies. It is anticipated that households with higher incomes will be less impacted by changes in the economy, shifts in food prices, and shortages of any kind. In a similar vein, households with higher levels of education have lower rates of food insecurity than households with lower levels of education.

When it comes to the makeup of the household, families with more children often face greater levels of food insecurity than do households without children, and these are often available in female-headed households in developing countries like Tanzania.Likewise, Kihiu and Amuakwa-Mensah (2021) suggested that if women are empowered, they can contribute to household dietary diversity through (i) home food procurement, (ii) improving economic access, additional household income, and (iii) time and cooking skills to prepare food. Regarding home food procurement, such as gardening, fishing, foraging, backyard livestock, and canning, It is with this fact that interventions focused on increasing agricultural diversity, gender sensitization, and nutrition are amicably important.

CONCLUSION AND RESCOMMENDATIONS

Conclusion

The study comes to the conclusion that, in the Mbinga District, there were variations in the dietary diversity of households according to household headship. Female-headed households had low dietary diversity as compared to male-headed households. The former had little productive and economic resources, such as land and income, as precipitated by a strong patriarchal system in resource access and control, thus amicably making it difficult to produce and purchase important food types such as dairy and flesh foods. Further, due to the prevalence of starchy grains, roots, and tubers in both male- and female-headed families' diets, children did not receive the minimum amount of nutritional diversity. Male-headed homes had a high level of dietary diversity. The primary food source for households was the harvest from farms, with male-headed households making up the majority of purchases due to their relative economic wellness compared to female-headed households. As a result, nutritional diversity in households varied according to family headship.

Recommendations

The Tanzanian government is advised to develop gender-responsive sensitization programs aimed at granting equal access to food, productive resources, education, decision-making authority, and economic possibilities throughout food value chains for both men and women. In order to address the issue of insufficient household dietary diversity, policymakers should collect and integrate sex-disaggregated data on national food security and nutrition statistics and foster collaboration among stakeholders to initiate community-based programs to enhance nutrition and knowledge of the importance of adequate dietary diversity and appropriate feeding practices while empowering unprivileged women. Further, the community should disregard the Matengo culture, which rarely allows women to get full ownership rights to resources such as land, cattle, and other means of production, for this brings most women into a vicious cycle of poverty, food insecurity, and low dietary diversity. Moreover, the Tanzania Social Action Fund should support and consider with care the female-headed households, as they are mostly poor and suffer from undernutrition, especially those whose recent male heads have abandoned and deserted the homesteads.

References

ACET. (2017). *African Center for Economic Transformation (ACET). Agriculture Powering Africa's Economic Transformation: African Transformation Report (2017)*. www.acetforafrica.org.

Alwang, J., Gotor, E., Thiele, G., Hareau, G., Jaleta, M., & Chamberlin, J. (2019). Pathways from research on improved staple crop germplasm to poverty reduction for smallholder farmers. *Agricultural Systems*, *172*(October), 16–27. https://doi.org/10.1016/j.agsy.2017.10.005

Carletto, C., Corral, P., & Guelfi, A. (2016). Agricultural commercialization and nutrition revisited : Empirical evidence from three African countries. *Food Policy*. https://doi.org/10.1016/j.foodpol.2016.09.020

Coates, J., Swindale, a, & Bilinsky, P. (2007). Household Food Insecurity Access Scale (HFIAS) for measurement of food access: indicator guide. *Washington, DC: Food and Nutrition Technical …*, *August*, Version 3.

Food and Agriculture Organization of the United Nations. (2010). The State of Food Insecurity in the World Addressing food insecurity in protracted crises 2010 Key messages. In *Notes*. http://www.fao.org/docrep/013/i1683e/i1683e.pdf

Headey, D., Hirvonen, K., Hoddinott, J., & Stifel, D. (2019). Rural Food Markets and Child Nutrition. *American Journal of Agricultural Economics*, *101*(5), 1311–1327. https://doi.org/10.1093/ajae/aaz032

Kansiime, N., Atwine, D., Nuwamanya, S., & Bagenda, F. (2017). *Effect of Male Involvement on the Nutritional Status of Children Less Than 5 Years : A Cross Sectional Study in a Rural Southwestern District of Uganda*. *2017*.

Khamis, A. G., Mwanri, A. W., Kreppel, K., & Kwesigabo, G. (2020). The burden and correlates of childhood undernutrition in Tanzania according to composite index of anthropometric failure. *BMC Nutrition*, *6*(1), 1–13. https://doi.org/10.1186/s40795-020-00366-3

Khamis, A. G., Mwanri, A. W., Ntwenya, J. E., & Kreppel, K. (2019). *The influence of dietary diversity on the nutritional status of children between 6 and 23 months of age in Tanzania*. 1–9.

Kissoly, L. D., Karki, S. K., & Grote, U. (2020). Diversity in Farm Production and Household Diets: Comparing Evidence From Smallholders in Kenya and Tanzania. *Frontiers in Sustainable Food Systems*, *4*(June), 1–13. https://doi.org/10.3389/fsufs.2020.00077

Kolliesuah, N. P., Olum, S., & Ongeng, D. (2023). Status of household dietary diversity and associated factors among rural and urban households of Northern Uganda. *BMC Nutrition*, *9*(1), 1–16. https://doi.org/10.1186/s40795-023-00739-4

Legesse, B. D., Gehrke, E., & Qaim, M. (2020). Links Between Maternal Employment and Child Nutrition in Rural Tanzania. *American Journal of Agricultural Economics*, *41*(4), 1–19. https://doi.org/10.1111/ajae.12113

Marla, K. S., & Padmaja, R. (2023). Analyzing gender differentials in dietary diversity across urban and peri-urban areas of Hyderabad, India. *BMC Nutrition*, *9*(1), 1–10. https://doi.org/10.1186/s40795-023-00692-2

Mbunda, K. A., & Sewando, P. T. (2024). The influence of feeding practices on under-five nutrition status in Mbinga District , Tanzania. *International Journal of Science and Research Archieve*, *11*(1), 124–139. https://doi.org/Article DOI: https://doi.org/10.30574/ijsra.2024.11.1.1123

Mdimu, E. L., Massaga, J. J., Sembuche, S. L., Abade, A. M., Leyna, G. H., Sembuche, L., & Abade, A. M. (2020). *Risk factors associated with under nutrition among children aged 6-59 months in Ngorongoro , Arusha region , Tanzania : a case-control study , 2017*. *37*(315).

Ogbo, F. A., Dhami, M. V., Awosemo, A. O., Olusanya, B. O., Olusanya, J., Osuagwu, U. L., Ghimire, P. R., Page, A., & Agho, K. E. (2019). Regional prevalence and determinants of exclusive breastfeeding in India. *International Breastfeeding Journal*, *14*(1), 1–12. https://doi.org/10.1186/s13006-019-0214-0

Omotilewa, O. J., Jayne, T. S., Muyanga, M., Aromolaran, A. B., Liverpool-Tasie, L. S. O., & Awokuse, T. (2021). A revisit of farm size and productivity: Empirical evidence from a wide range of farm sizes in Nigeria. *World Development*, *146*, 105592. https://doi.org/10.1016/j.worlddev.2021.105592

Price, M., Galie, A., Marshall, J., & Agu, N. (2018). Elucidating linkages between women's empowerment in livestock and nutrition: a qualitative study. *Development in Practice*, *28*(4), 510–524. https://doi.org/10.1080/09614524.2018.1451491

Taruvinga, A., Muchenje, V., & Mushunje, A. (2013). Determinants of rural household dietary diversity: The case of Amatole and Nyandeni districts, South Africa \n. *International Journal of Development and Sustainability*, *2*(4), 2233–2247. http://isdsnet.com/ijds-v2n4-4.pdf

UNICEF & WHO. (2019). Global Breastfeeding Scorecard, 2019. *Global Breastfeeding Collective*, *3*, 1–4. https://apps.who.int/iris/bitstream/handle/10665/326049/WHO-NMH-NHD-19.22-eng.pdf?sequence=1&isAllowed=y

URT. (2019). *Tanzania National Nutrition Survey 2018* (Issue June). Dar es Salaam Printing Press.

WB. (2021). Food Prices, Nutrition and the Millenium Development Goals. In *Angewandte Chemie International Edition, 6(11), 951–952.*

World Health Organization, & UNICEF. (2018). *Nurturing care for early childhood development A global framework for action and results*. *May*, 26. https://www.who.int/maternal_child_adolescent/child/nurturing-care-framework-first-draft.pdf%0Afile:///V:/HALO/HALO Staff/Longmuir/New Literature B/Nurturing Care Framework for First Consultation.pdf