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Determinants of Dietary Diversity Among Households In Central River Region South, The Gambia

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Abstract

Adequate dietary diversity of households in the rural areas of The Gambia remains a great public health concern. As diets of most households in the rural areas mainly composed of cereal-based grains foods with few animal food products (meat), vegetables and fresh fruits. Household dietary diversity and its determinants in the Central River Region South was not widely studied. This current study intended to determine the household dietary diversity status and its determinants in the study area. A cross-sectional study was conducted among households using dietary diversity questionnaire to assess the household's dietary diversity status, with 24 hours dietary recall period. A total of 334 households with women responsible for preparing meals for the households were selected through a multistage sampling method. SPSS Version 24 was used to analyse the data. Both univariate and multivariate analyses were conducted to determine the predictor factors of dietary diversity status of households. Mean dietary diversity score was 4.3 (SD2.28). Overall, 60.2%, 25.4% and 14.4% of households were low, medium and high dietary diversified respectively. Result revealed that household income ≤1387.50 Gambian Dalasis (*1 USD = GMD 49*) (AOR = 4.57, 95 % CI:1.05,6.83, P = 0.043), without home gardening (AOR = 1.43, 95 % CI: 0.72, 2.88, P = 0.031), farmland (AOR = 2.18, 95 % CI:1.68, 5.11, P = 0.013), women without education (AOR = 1.67, 95 % CI:0.53, 5.22, P = 0.005) and spouses without employment (AOR = 2.20, 95 % CI:1.17, 5.35, P = 0.018) were the predicted risk factors for household dietary diversity status. Household dietary diversity was low in the study area.

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Monthly income, home gardening, spouses' employment status, ownership of farmland and women's educational status were significantly associated with low dietary diversity. Major interventions that can improve household dietary diversity should be implemented in the study area.

Introduction

Adequate nutrition contributes to the health and development of an individual. Maternal and child health can improve through proper nutrition alongside a safe environment during pregnancy and delivery.[1,2] Adequate nutrition, either directly or indirectly, lessens the risk of chronic diseases and improve excellent academic attainment among children.[3] Dietary diversity (DD) and the number of animal source foods (ASF) consume by an individual are the two generally accepted measures for dietary quality.[4] A diverse diet determines nutrient adequacy because no one food item can meet the nutritional requirement of an individual.[5]

Twelve food groups determine adequate dietary diversity score. These food groups provide the nutrients essential for life and growth. Are also known as 'everyday foods.' Each of the food groups provides a range of nutrients, and all have a role in helping the body function. In particular, vegetables, legumes and fruit protect against illness and are essential to a healthy diet. A balanced diet includes a variety of foods from each food group. It offers a range of different tastes and textures. It is important to choose most of the foods we eat each day from these food groups. For example, nutrients and vitamins and other food groups such as fruits, animal source foods, grains and vegetables require in their right amount for proper growth and development.[5]

Dietary determinants could contribute to a heightened risk of diseases, particularly chronic ones. However, adequate advice on nutrition can improve dietary diversity, thereby reduced in excessive intake of salt, fat, and refined sugars which are considered unhealthy in a large quantity.[6] Households whose diets are monotonous on starchy foods that lack vital micronutrients are subscribing to malnutrition and its burden and deficiencies in micronutrients.[7] Besides, diets of most pre-school children in Sub-Saharan African countries are mainly concentrated on starchy foods, fewer vegetables, fresh fruits and limited or no animal source foods.[5]

Dietary diversity is measured either at the individual or household level. Usually, it is measured by summing the number of food groups, not individual food items consumed. It is also a measure of access to food at the household level (example ability of households to obtain expensive food groups). Besides, it reflects dietary quality at the individual level. Mainly the micronutrient adequacy of the diet. The reference period of dietary diversity varies, but 24 hours recall period mostly used.[8]

Inadequate diet quality or diversity is an essential determinant of malnutrition, precisely, micronutrient deficiencies.[9] Reduced dietary diversity is associated with food insecurity which affects the nutritional status of low-income households.[10] Household food insecurity leads to underweight, wasting and stunting among children.[11] Micronutrient malnutrition is considered as a global health threat, especially among underdeveloped and developing countries. Among these countries, intake of foods concentrated mainly on starchy based grains(monotonous diets) in most cases lacks in diversity.[12] Women, especially those pregnant and children deemed vulnerable to malnutrition because they have high nutrient demand.[3,13-15] Therefore, a diet composed of different foods groups recognised as necessary in assuring sufficient nutrient intake among these vulnerable groups. Dietary diversity is essential in promoting nutrient intake.[4] At the same time establishing its determinants factors is indispensable and can help in policy formulation, which would eventually improve nutrient intake.[3] Studies have shown that an increase in dietary diversity is associated with socioeconomic status and household food security.[16] In low-income countries, suboptimal dietary practices were due to either from limited access to the food supply or inadequate knowledge of the importance to obtain good diet quality.[17]

Although dietary diversity is imperative and is well recognised in The Gambia, however, limited studies conducted to determine the dietary diversity status of households and its related determinants, especially

in the rural areas of The Gambia. Therefore, this current study aimed to assess household dietary diversity status and its associated factors in Central River Region South, The Gambia. This study would unquestionably contribute to the information essential for an evidence-based intervention programme to improve the dietary diversity status of households in Central River Region South.

The Operational Study Definition

Dietary Diversity Score

The number of food groups consumed by households out of the twelve (12) food groups. These food groups included; cereals, fish and seafood, root and tubers, pulses/legumes/nuts, vegetables, milk and milk products, fruits, oil/fats, meat, poultry or offal, sugar/honey, eggs and different foods (tea).[3]

High Dietary Diversity

Consumption of seven or more food groups of the 12 food groups used in this study.[3]

Medium Dietary Diversity

Consumption of four to six food groups of the 12 food groups used in this study.[3]

Low Dietary Diversity

Consumption of three or fewer food groups of the 12 food groups used in this study.[3]

Methodology

Study location

This study was carried out in the Central River Region South, The Gambia. It is situated about 200 km from the south of the capital of The Gambia, Banjul. The region largely depends on agriculture chiefly on cereal grains crop production for a living. The principal varieties of crops produced in this area are groundnut, cassava, maize, bean, millet, sorghum, and rice. The region has two different seasons, dry and wet seasons. The data was collected during the lean season, where households might be experiencing food shortages.

Study Design, Duration and Participants

A cross-sectional study was conducted from August to November 2018 in Central River Region South, The Gambia. All households with women responsible for preparing meals for the households were selected as the study participants.

Calculation of Sample Size Sampling Method

The sample size of this study was calculated using a single population proportion formula based on the assumptions: Prevalence of food insecurity in the Gambia (11%) Comprehensive Food Security Vulnerability Analysis.[18] absolute precision (5%), confidence interval (95%), a design effect of 2 and with non- response rate of 10%. The final calculated sample size was 334 households. All households with women responsible for preparing meals for the households were selected randomly to participate in the study. Ten villages from 11 districts were selected by simple random sampling method. Lastly, the sample was allocated to each village proportionally and a systematic random sampling method was used to select households. The exclusion criteria were women who cannot speak (difficulty in speaking or deaf).

Dietary Assessment

This study used the Food and Nutrition Technical Assistance (FANTA) Household Dietary Diversity Score Questionnaire version 2006. The questionnaire was administered to women responsible for preparing meals in the households. Twelve (12) enumerators conduct the data collection under the supervision of supervisors. Dietary diversity status was measured at the household level. The questionnaire comprises 12 food groups, which cover almost every food consume in The Gambia. Also, the survey asks a single question regarding any food group household consumed. A simple count of each food group consumed by any of the household members during the previous 24 hours before the study was calculated to determine dietary diversity scores for each food group.

Ethical Approval

This study obtained approval from Universiti Sains Malaysia (USM) with protocol code JEPeM/18050260 and The Gambia Government/Jointly Medical Research Council(MRC) Ethics Committee with protocol code SCC1605V2.1. The participants were briefed about the objective of the study before they signed the written consent form. All the data collectors and principal investigator assured the participants the confidentiality of the information, and the households were coded by numbers rather than family names. Other possible ethical concerns were also discussed before the interview.

Data Quality Assurance

Before the start of the survey, all data collectors and two supervisors underwent two days of orientation training on ethics and standard of data collection procedures, validity, and reliability of the collected data. The first day of the training covered practical theories demonstration on different areas of data collection, which include assessment of sociodemographic and economic characteristics and dietary diversity status. About 5% (17 households) from two districts that were not part of the study were selected to pre-test the questionnaire. Strict supervision was conducted during the data collection. Data completeness was verified daily. Data were also cleaned and double-checked before entry into (SPSS) Statistical Package for Social Science version 24 for analysis.

Statistical Analyses

Dietary diversity categories were expressed using the 12 food groups in this study. Low dietary diversity category (less than three food groups), medium diversity category (four to six food groups) and high diversity category (seven than more food groups).[3] The dietary diversity scores were category dichotomised as "0" not attaining minimum dietary diversity and "1" for achieving minimum diversity.

Data was entered into (SPSS) version 24, cleaned before the analysis. A descriptive statistic was used to describe the study participants. Crude Odds Ratios (COR) were estimated using binary logistic regression at a 95% confidence level to assess the strength of association between dietary diversity (dependent variable) and the independent variables. All the variables with a P-value of <0.25 in the univariate logistic were considered and fitted in the multivariable logistic regression (Adjusted Odds Ratio: AOR). Results with a P-value < 0.05 were considered statistically significant as a predictor of low dietary diversity status.

Result

Sociodemographic and socioeconomic characteristics of households

The overall sample size was 334 households that participated in this study. The mean age of the respondents 28.04 (SD5.88) years. About 92.0% of the households headed by males and 8.1% headed by females. A large number of respondents, 97.3%, were married, and about 42.8% of households have seven and above family members and the mean household size was 7.96 (SD5.05).

Table 1: Characteristics participants in Central River Region South, The Gambia (n=334)

Variables	Mean (SD)	Frequency (n)	Percentage (%)
Mothers age(years)	28.04 (5.88)		
<20		23	6.9
20-29		182	54.5
30-39		114	34.1
40-49		15	4.5
Household head			
Male		307	91.9
Female		27	8.1
Household size	7.96 (5.05)		
1-3		59	17.7
4-7		132	39.5
>7		143	42.8
Women educational status			
Formal		103	30.8
Non-formal		231	69.2
Spouse educational status			
Formal		106	31.7

Non-formal	228	68.3
Women employment status		
Employed (salaried)	15	4.5
Not employed	319	95.5
Spouse employment status		
Employed (salaried)	50	15
Not employed	284	85
n = Number, SD = Standard deviation		
Household income(GMD) 1587.28 (1209.84)		
≤ 1387.50	255	76.3
≥1387.51	79	23.7
Availability of household facilities (n=333)		
Radio	263	79.0
Telephone	258	77.5
Bicycle	235	70.6
Electricity	65	19.5
TV	60	18.0
Fringe	34	10.2
Farmland		
Yes	176	52.7
No	158	47.3
Livestock		
Yes	258	77.2
No	76	22.8
Market access		
Yes	88	26.3
No	246	73.7
Financial assistance		
Yes	59	17.7
No	275	82.3
Food assistance		
Yes	45	13.5
No	289	86.5

n = Number, SD = Standard deviation. 1 USD = GMD 49. The poverty line is less than Dalasis is 1,837.50 =(1.25 USD),GMD= Gambia Dalasis

The women who attended formal education were 30.8%. Regarding the livelihood, among women, 4.5 % were employed, and 76.3% of households had a monthly income of 1837.50 Gambian Dalasis (GMD) / USD59, while 23.7% gain monthly income of GMD ≥1837.51 /USD59. For the spouse, 31.7% had a formal education, and 15% of them were employed. For households reporting ownership of assets ranged from mobile phone 77.5%, TV 18%, Radio 79%, bicycle 70.6%, refrigerator 10.2%, electricity 19.5%, farmland 52.7% and livestock 77.2% (Table 1).

Table 2 presents the consumption of each food group in the households. More than 90% of households consumed cereals-based grains 24 hours before the survey. About 53.6% of households consumed peas, beans, lentils, or nuts; 47.9 % of households consumed sugar or honey, and 46.7% consumed dried fish or fresh or shellfish.

Besides, 47.0% of households consumed food made with oil, fat, or butter. In comparison, 45.8% of households consumed roots or tubers, 38.0% of households consumed milk or other milk products, cheese, yoghurt, 24.6% of households consumed vegetables, 12.3% of households consumed fruits, 11.7% of households consumed meat or poultry or offal, whereas 15.0% of households consumed miscellaneous foods (tea and coffee) and 6.0% of households consumed eggs.

Table 2: Consumption of individual food group by households recorded in the previous 24 hours

Number	Consumption of	Frequency(n)	Percentage (%)
1	Cereals (foods made from grain)	327	97.9
2	Roots or tubers	153	45.8
3	Vegetables	82	24.6
4	Fruits	41	12.3
5	Meat or poultry or offal	39	11.7
6	Egg	20	6.0
7	Fresh or dried fish or shellfish	156	46.7
8	Foods made from beans, peas, lentils, or nuts	179	53.6
9	Cheese, yoghurt, milk or other milk products	127	38.0
10	Food made with oil, fat, or butter	157	47.0
11	Sugar or honey	160	47.9
12	Other foods	50	15.0

*Responses of more than one option of food groups

Households Dietary Diversity Status

Table 3 presents households dietary diversity score. The mean dietary diversity score was 4.36 (SD 2.28). Averagely, households consumed four (4) food groups before 24-hours recall period. The vast majority of households 201(60.2%) were found in low diversified state (consumed ≤three food groups), 85 (25.4.%) of households are in the medium dietary category (consumed 4–6 food groups), and 48 (14.4%) of households are in the high dietary category (consumed 7-12 food groups).

Table 3: Dietary Diversity status of households in Central River Region South, Gambia

Variables	Frequency(n)	Percentage (%)
Diversified		
Medium HDDS	85	25.4
High HDDS	48	14.4
Non-diversified		
Low HDDS	201	60.2

n= Number

Predictors of Household Dietary Diversity

Table 4 displays univariate and multiple logistic analysis of associated factors of dietary diversity of households. During univariate analysis, no education among women, lack of unemployment and education among spouses, monthly income of less than 1,387.50 Gambian Dalasis (GMD), ownership of farmland and livestock, lack of financial assistance, not practising home gardening and lack of market access were the predictors of low dietary diversity. During multiple logistic analyses, monthly household income below 1,387.50 GMD, not practising home gardening, lack of ownership of farmland, lack of education among women and lack of employment among spouses were the significant associated factors of low household dietary diversity.

Table 4: Univariate and multivariable logistic regression analyses of factors associated with household dietary diversity

		Dietary diversity status				
Predictors		**High**	**Low**	**COR[a] (95% CI)**	**AOR[b] (95% CI)**	**P-value**
Mother educational status	Formal	10	38	1	1	
	Not formal	93	193	12.56(0.87,7.49)	1.67(0.53,5.22)	0.005*
Mother age(years)	≤20	10	35	1	1	
	25-35	26	174	1.91(0.85,4.32)	1.73(0.76,3.97)	0.194
	≥36	12	77	1.83(0.72,4.64)	1.70(0.66,4.37)	0.270
Home Gardening	Yes	15	33	1	1	
	No	118	168	1.55(0.80,2.97)	1.43(0.72,2.88)	0.031*
Market access	Yes	7	81	1	1	
	No	41	205	2.31(0.99,5.37)	2.18(0.93,5.12)	0.074
Ownership of farmland	Yes	27	149	1	1	
	No	21	137	1.18(0.64,2.19)	2.18(1.68,5.11)	0.013*
Ownership of livestock	Yes	39	219	1	1	
	No	9	67	1.33(0.61,2.88)	1.15(0.50,2.62)	0.748
Financial assistance	Yes	5	54	1	1	
	No	43	232	2.00(0.76,5.29)	1.87(0.68,5.12)	0.223
Spouse educational status	Formal	3	47	1	1	
	Not formal	45	239	2.52(1.25,3.09)	4.32(1.36,5.37)	0.145
Spouse employment status	Employed (salaried)	35	13	1	1	
	Not employed	243	43	1.55(0.80,2.97)	2.50(1.17,5.35)	0.018*
Household income	≥1387.51	8	40	1	1	
	≤1387.50	71	215	4.09(0.33,2.16)	4.57(1.05,6.83)	0.043*

AOR[a] = Adjusted Odds Ratio, COR[b] = Crude Odds Ratio, CI= Confidence Interval, * Statistically significant at P<0.25, [b]Statistically significant at P <0.05.

Discussion

This study evaluated the household dietary diversity status and its determinants in Central River Region South, The Gambia. The mean score of dietary diversity was 4.36(SD2.28). On average, four (4) food groups were consumed by households 24-hours before the study was conducted. There were 60.2 %, 25.4% and 14.4% of households in low, medium and high, dietary diversity status respectively. The finding from this study agreed with similar studies conducted in Bangladesh, Vietnam and Ethiopia, by Nguyen *et al.,*[19] Low dietary diversity among breastfeeding mothers was also reported in Ethiopia.[13] Similar findings also reported in six Nigerian states.[20]

The similarities among these studies were the same tool used to assess the dietary diversity status of households. The high rate of low dietary diversity could be related to the food insecurity situation of households in the study area. Since dietary diversity is a surrogate measure of food security and food-insecure households ate a diet less diverse than food-secure households.[21] The study also showed more than 90.0% and 53.6 % of households had consumed cereals, seeds and nuts, respectively. This finding could be explained that, in The Gambia, agriculture is the primary source of cereals, which are often available in the local communities where households can have access to it, such as rice and sorghum. This finding supported by other studies in Africa.[22,23] whereas both rice and sorghum are stapled foods for most African countries which are readily available at the local markets. Conversely, households were low diversified in fruits, eggs, milk and milk products, vegetables and meat or poultry or offal (12.3%, 6.0%, 38.0, 24.6 %, 11.7%), respectively. This finding supported by similar findings reported in Bangladesh, Vietnam, Ethiopia by Nguyen *et al.,*[24] and in Kenya.[25]

Households with a low monthly income of ≤1387.50 GMD were 4.57 times higher odds to be low diversified as compared to households with a higher income of ≥1837.51 GMD per month. This finding agreed with a study done by Thorne-Lyman *et al.,*[26] In Bangladesh, the economic status of the households was associated with low dietary diversity status.[26] This finding could be explained that households with low income adversely affected their food preference, in terms of quantity and quality of different food groups consumed. Household food insecurity could affect the dietary diversity of households. A household may lack adequate income to access food to improve their dietary diversity status. Low household dietary diversity in this study could also be associated with food insecurity. If households depend highly on cereals without other food groups such as animal source food, fruits and vegetables might lead to micronutrient deficits.[27]

Literature has shown that better socioeconomic status linked to a higher diet diversity score of households in developing countries.[28] An increase in household income would also increase household dietary diversity status by consuming different food groups.[29] Households that reported not engaging home gardening were found low dietary diversified. Households not practising home gardening were 1.43 more likely to experience low diversified when compared to households with home gardening. Finding from this study concurred with a study carried out in Ethiopia.[25] This finding demonstrated that home gardening could adequately improve the intake of vegetables. Home gardening offers a way of consuming a range of foods that may not be available in the market by growing fruit, vegetables and other crops. Home gardens also provide convenient access to fresh plants and animals source foods in rural as well as urban areas.[30] This finding could be explained that households with gardens could use food produce from the gardens to diversify daily food intake of vegetables. Besides, households can also sell parts of the vegetables and get additional income to purchase other food items for the household.[25]

Our study also showed that spouses that were not employed were 2.50 times expected to experience low dietary diversity status as compared to spouses employed. This study finding agreed with a finding reported in South Africa.[31] This finding could be explained that spouses that were not employed might have experienced inadequate income in households, which could decrease their odds of accessing adequate foods to improve their dietary diversity status. Besides, it could also be associated with the low purchasing power of spouses. Either employed or not spouses depend on employment as a source of household income. Women that were not educated were 1.67 times a higher chance of attaining low dietary diversity. Comparable conclusions on the influence of women's educational status on low dietary diversity were reported in Bangladesh, South Africa and Kenya.[14,26,31] This finding could be explained that women without education might not get the necessary information on appropriate food preparation, feeding practices, nutrient content in foods and nutritious food choices. Higher education among women could be served as a source of employment opportunities for income generation. Women are known to play an essential role in the household economy. They are more likely to prioritise

the household budget on food, health services and childcare as compare to their male counterpart. Therefore, women's incomes or income managed by women can lead to increased dietary diversity in the household.

Moreover, households without access to farmland were 2.18 times high odds to achieve low dietary status as opposed to households with ownership of farmland. A similar finding reported elsewhere example, Bangladesh, where households with farmland said to have improved dietary diversity status of women positively.[32] The finding could be explained that households with farmland could grow more foods to supplement other food items obtained through purchases.

Strength and Limitation

The household dietary diversity questionnaire was able to identify households with low and high dietary diversity status. The study provided baseline data on household dietary diversity status, which has not been available in the study area. Seasonal variation affects the availability of food that could lead to low dietary diversity status of households. The data were collected during the rainy season when households usually experience food shortages. Household dietary diversity data were collected only at one recall period, which could be subjected to under-reporting. Only women in the household answered the questionnaire on behalf of all household members, which determine the household dietary diversity status for the entire household. However, since all the respondents were women, they had a good knowledge of the situation in the household.

Conclusion

The dietary diversity status of households in the study area was very poor. Factors such as monthly income less than 1387.500 GMD, not having home gardening, spouses' employment status, ownership of farmland and women's educational status were significantly associated with low household dietary diversity status.

Recommendation

The government should improve job opportunities and strengthening education, particularly among women, to improve household dietary diversity. Home-gardening practices should be encouraging at the community level to enhance household food security, especially dietary diversity in their food consumption. Land should be accessible to farmers to grow more foods, which may increase dietary diversity. More studies are recommended on dietary diversity in different seasons of the year to better understand the actual dietary diversity status of households in the study area.

Author's contributions

D. Wuyeh conducted the data collection, performed the statistical analysis, and drafted the manuscript. AJ Rohana and NA. Hamid supervised and designed the study, performed the statistical analysis and proofread the manuscript. All authors read and approved the manuscript

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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