



INVESTIGATING DIETARY DIVERSITY AMONG HOUSEHOLDS IN KANO, NIGERIA

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Abstract

The study aimed to investigate dietary diversity among households in Kano, using the 24-hours approach (24hrs recall). The sample size of 426 household heads was used to determine the dietary diversity using the Dietary Diversity Score (DDS). Finding reveals that Cereals with Roots and Tubers constituted the most consumed food groups among the households. Finding from the DDS further reveals that 10 percent of the households are classified as low dietary diversity, about 34 percent are under medium or moderate dietary diversity. In comparison, 56 percent of the households are classified under high dietary diversity. The average DDS among the households in Kano is 6.69 percent. The study recommends that for the households to have better and sufficient, safe, and nutritious food, rural farmers should be encouraged to diversify their productive capacity to produce high-quality products. Therefore, the government should invest in extension service agents that can cover the entire state to expose the rural farmers to high-quality products.

Keywords: 24Hrs recall, dietary diversity score, extension service, nutritious

1. Introduction

One of the menaces presently in the world is the issue of how best to combat the challenges posed by malnutrition in all its entirety – undernutrition, micronutrient deficiency, obesity and overweight (Food and Agricultural Organisation [FAO]; International Fund for Agricultural Development [IFAD]; United Nations Children Emergency Fund [UNICEF]; World Food Programme [WFP] and World Health Organisation [WHO], (2019). Consequently, there is a need for urgent and necessary actions to address these challenges before the fight get out of human control (FAO et al., 2019). These challenges have a root cause in the level of poverty. The United Nations Sustainable Development Goals (SDGs) identified poverty and food security as the first and second goals (SDG 1 and SDG 2), which need to be addressed by every nation before the end of 2030 (UN, 2017). FAO et al. (2019) projected that an estimated 822 million people worldwide are suffering from severe food security challenges. This translates into one (1) person in every nine (9) individuals classified as chronically hungry. In line with the recent definition of chronically hungry individuals in the world, which is in line with SDGs definition comprising both moderately and severely food insecure individuals in the world, projected the number of hungry people to be around two (2) billion (FAO et al., 2019).

Furthermore, the report stated that a large number of people from high-income countries lack access to adequate and nutritious food at their disposal. For example, an estimated 8 percent of the northern American population, as well as Europe, are classified as food insecure, drawn



from the moderate level of food insecurity (FAO et al., 2019). The figure is even severe in Africa and Asian continents. For instance, an estimated 676 million of the total African continent were food insecure by the end of 2018, while an over 1 billion individuals were found to be food insecure in Asian continent during the same period under review (FAO et al., 2019). Further breakdown of the African continent's figure revealed that an estimated 70 million of the total population of North Africa are food insecure; about 606 million out of the total population of Sub Saharan Africa are food insecure. This represents the highest figure of food insecure individuals in the African continent. About 184 million people out of the total population of West Africa are also food insecure, while an estimated 35 million of the total population of Southern Africa are food insecure.

The quality of food consumed is the primary determinant of dietary facet of food security (Swindale & Bilinsky, 2006). FAO (2007) discovered that there is a high correlation between dietary diversity of households with the accessibility of food and adequacy of food at both household and individual level. Consequently, dietary diversity is designed to serve as a proxy between accessibility in terms of food at the household level and adequacy of nutrition at an individual level. It is a proxy-based on the fact that a more diversified dietary consumption is essential in itself. Dietary diversity directly correlates with birth, weight, child anthropometric level, and high concentration in haemoglobin; household and individual food security can influence dietary diversity, and data collection is relatively easy compared to other methods. Therefore, dietary diversity captures the nutritional aspect of food security, considered to be straightforward and less time consuming (Hoddinott & Yohannas, 2002). According to Okwoche and Benjamin (2012), household dietary diversity can be divided into two categories, high dietary diversity, and low dietary diversity. These food items consist of cereals, dairy products, seafood, meat/poultry, vegetables, sugar/honey, fruits, tuber and roots, oil/fat, and others.

Empirical evidence reveals that there exist various studies on household dietary diversity both in Nigeria and other parts of the world, for instance, Mbwana, Kinabo, Lambert, and Biesalski (2016) in Tanzania; Mukhtar (2019c) in Nigeria; Omotayo (2018) in Nigeria. Even though there are few such studies in Nigeria, especially in recent times, this study will reveal if there is divergence with previous dietary diversity researches in Kano State. The only known study on dietary diversity in Kano focuses on households in a rural location. In contrast, this study will cover both the rural and the urban areas of the state and come up with a comprehensive finding regarding dietary diversity in the State

2. Literature Reviews

Mukhtar (2019a) investigated the determinants of dietary diversity and coping strategies among the rural households in Kano using a sample size of 256 household heads and Dietary Diversity Score (DDS). Finding reveals that an estimated 53% of the rural household heads are classified as high dietary diversity consuming food items between 6-above. The average mean dietary diversity among households is 8. Mbwana et al. (2016) investigated the determinants of households' dietary diversity in Tanzania using a Multinomial model to find the link between food security and dietary diversity. Finding reveals that majority of the households consumed cereal in the location and the average dietary diversity in Tanzania is estimated to be five food items.



Nabuuma *et al.* (2018) researched on dietary diversity among small holder households in the Bukoba district and Kiboga district in Tanzania and Uganda, respectively, to launch the dietary diversity and consumption pattern among the smallholder farming households. Finding from the 24hrs recall indicates that toot, tubers, and flour were the most consumed food group in both the two districts; however, Kiboga district has the highest consumption of the food group. The findings also revealed that 52 percent of the households are within moderate dietary consumption. Omotayo (2018) researched the economics of food intake, nutrition, and farming households' health in Southwest Nigeria. Findings revealed that 41 percent of the households consumed an average of two (2) times daily, while 42 percent consumed less than or equal to three food groups (3). Mean scores of household dietary diversity across the three states were 5 for both Oyo and Ogun States, while Osun state has 4. Finding further revealed that all the States are lower than the recommended FAO recommendation of 6 cut-off points.

3. Methodology

Primary data was adopted and gathered through a well-structured questionnaire administered to the 426 sample size. A multi-stage stratified non-probabilistic sampling purposive in nature was used. Firstly, Kano is stratified into Kano urban and Kano rural. Secondly, stratification was carried out to stratify rural into Kano north and south, while Kano metropolitan was classified as Kano urban. The third stage involves the selection of ten (10) local government areas out of forty-four (44) local government areas in the state. Lastly, depending on the number of wards in the local government area, a total of 426 household heads were drawn randomly from the ten (10) local government areas.

4. Results

Descriptive Statistics

Socio-demographic analysis reveals that in terms of gender status, 88 percent of the household heads are male, while only 12 percent are female-headed households. About 89 percent of the household heads are married, while 3 percent and 8 percent of the household heads are divorced and widowed, respectively. The average household head age is 41 years, indicating that majority of the household heads are within their active age. Average household size is estimated at 10 individuals in a household comprising 6 people under the age of 18 years old, while about two 2 people are children attending school; at least each household has a minimum of 4 adults above the age of 18 years old. In terms of household classification, 60 percent are farming households, while 40 percent are non-farming households. Under farming household heads, labour contribution in the farming system is classified as family labour and hired labour. About 67 percent is hired labour, while family labour accounts for 33 percent. Average farming experience among the farming household head is 31 years, while average cultivable land is about 4 ha. Land ownership reveals that about 25 percent are privately owned, about 64 percent and 2 percent are family and community-owned land, respectively, while about 9 percent is rented land.

Descriptive analysis in terms of economic profiling of household heads shows that the average monthly expenditure of household head is estimated at N115,000 (US\$377). About 29 percent of these expenses are related to food expenditure, while 71 percent account for non-food expenditure. The average monthly income is estimated at N132,000 (US\$432). About 13



percent of household heads are primary school leavers, about 18 percent achieved SSCE/GCE grade, 32 percent of the household heads had NCE/OND, and Bsc/HND, respectively. About 8 percent have MSc/Ph.D, in the study area. In terms of occupation, about 11 percent are private-sector workers, about 50 percent and 39 percent are public sector and farming respectively.

Farming household production patterns reveal that 6 percent of the farming production is consumed, about 90 percent of the farming production is sold, while about 2 percent each is seeded and donation. The average monetary value of the total farm production consumed is estimated at N236,000 (US\$720); sales are N3,545,000 (US\$1,081,000); seeds N96,000 (US\$290) while donation accounts for N71,000 (US\$220). Table 4.1 further buttresses.

Table 4.1: Socio-economic Profiling of Households Structure

Detail	Percentage	Detail	Percentage	Average
<i>Gender Status</i>		<i>Age (Years)</i>		41
Male	88	<i>Family Size</i>		10
Female	12	Children (18 yrs Below)	60	
<i>Marital Status</i>		Children in School	20	
Married	89	Adult above 18 yrs	40	
Divorced	3	<i>Farming Experience (Yr)</i>		31
Widowed	8	<i>Cultivable Land (ha)</i>		4
<i>Land Ownership</i>		<i>Household Type</i>		
Individuals	25	Farming	60	
Family	64	Non-Farming	40	
Community	2	<i>Expenditure (Monthly)</i>		
Rented	9	Naira		115,000
<i>Education</i>		Dollar		377
Primary	13	<i>Income (Monthly)</i>		
SSCE/GCE	18	Naira		132,000
NCE/OND	32	Dollar		432
Bsc/HND	32	<i>Farming Production (Yr)</i>		
M.Sc./PhD	5	<i>Consumed</i>		
<i>Occupation</i>		Naira		236,000
Private Sector	11	Dollar		773
Public Sector	50	<i>Sales</i>		
Farming	39	Naira		3,545,000
<i>Labour Contribution</i>		Dollar		11,623
Family	33	<i>Seeds</i>		



Detail	Percentage	Detail	Percentage	Average
Hired	67	Naira		96,000
<i>Farming Production (Yr)</i>		Dollar		314
Consumed	6	<i>Donation</i>		
Sales	96	Naira		71,000
Seeds	2	Dollar		233
Donation	2			

Source: Research Survey, 2019

Note: Exchange @ CBN official rate of N305/US\$

Dietary Diversity Score

Dietary Diversity Score (DDS) is an easy and straightforward method introduced by the International Food Policy Research Institution (IFPRI). The method produces a rundown of locally consumed food items based on group classification, reducing the food items into 12 food groups. From these lists of food groups, each household was asked whether they have consumed everything in the previous seven days (Swindale & Bilinsky, 2006). The method identified the quality of food expended by households, which is then used to determine the dietary aspect of food security. The quantity of the different food consumed was not assigned any weight in any way. Therefore, the greater the number of food items eaten, the higher the differing eating regime; thus, the greater the food secure a household will be (Hoddinott & Yohannes, 2002).

The main objective of DDS is to determine whether the improvement is achieved in a household's access to food. The DDS measures the frequency of food groups taken by a given household for a given period, sometimes referred to as "reference" (Swindale & Bilinsky, 2006). To calculate the DDS, 12 conventional food is used and mostly, captured during the peak period of hunger (February-March) based on 24-hour recall (reference period). The aim is to avoid less accurate data since it is assumed that household can easily recall what they consumed in 24-hour time. The method also observed the regular eating pattern of a household. The questionnaire was directed to the person responsible for cooking the meals in households or adults that fed on the same household in the last 24 hours. The respondents from the households were asked to include all food groups consumed by the household member in-house or cooked in the house meant for household members' consumption outside the home (Swindale & Bilinsky, 2006).

According to Swindale and Bilinsky (2006), based on the outcome of DDS, dietary diversity can be categorised into; low dietary diversity scores (household consuming 1-3 food group). Medium dietary diversity score (household consuming 4-5 food group) and high dietary diversity score (household consuming 6-12 food group).

Table 4.2 shows the percentage of household respondents and the 12-food group consumed using the last 24-hr approach as recommended by FAO. The table reveals that cereal and roots/tubers constitute the most consumed food group in the study area, with 14 percent and 12 percent. According to Arimond and Ruel (2004), inadequate dietary diversity is a significant challenge in developing countries like Nigeria where their primary source of diet is from staples



food items like cereals and roots/tubers, with little or no fruits, animal products, and vegetables. This is then followed by vegetables with 9 percent, while fruits and meats/poultry/offal all accounted for 8 percent each. The rest of the food group accounted for 7 percent, each of which is the least eaten food group in the study area. Table 4.2 further reveals the percentage of dietary diversity consumed by households in Kano.

This finding is in line with the finding of Joosten, Dijkxhoorn, Sertse, and Rueben (2015); Mukhtar, Kamaruddin, and Applanaidu (2019b), which noted that the availability and consumption of fruits and vegetables are mostly influenced by the income source in the urban, while it depends solely on vegetation in a rural location. Ruel (2002) also noted that inadequate pulses, legumes, nuts, and animal products, which are the primary source of protein and micronutrients, are lacking in developing countries like Nigeria.

Table 4.2: Percentage of Dietary Diversity Consumed in Kano

Food Items	Percentage
Cereals	14
Roots/Tubers	12
Vegetables	9
Fruits	8
Meats/Poultry/Offal	8
Eggs	7
Fish	7
Pulse/Legumes/Nuts	7
Milks	7
Oil & Fat (groundnut/Palm Oil)	7
Sugar & Honey	7
Species & Condiments	7

Source: Research Survey, 2019.

Furthermore, Table 4.3 reveals the percentage of food group sources by households in Kano. The table shows that majority of the households in Kano source their dietary mostly from purchase through the market and local stores. Purchase source accounted for about 63 percent and primarily associated with households residing in an urban centers like Kano Municipal and Gwale. This is then closely followed by farmers' own production, which accounts for about 32 percent, which is also associated with farming households and usually residing in a rural location where farming activities are predominant. About 4 percent of food source is through gifts normally from relatives and friends, while only 1 percent account for borrowing sources. Table 4.3 indicates the percentage of food group sourced in the study area.

Table 4.3: Percentage source of Food Items by Households in Kano

Source of Food Group	Percentage
Own Production	32%
Borrowing	1%
Purchasing	63%
Gifts (Relatives & Friends)	4%

Source: Research Survey, 2019.



Table 4.4 further reveals the DDS scores in terms of total and percentage achieved by households in Kano, Nigeria. The table furthermore indicates the consumption of various food groups by households and the outcome of the scores. Table 4.4 shows that the minimum food group consumed by the households is 1-3 food groups, with a total score of 120 points representing 10 percent achievement. The score is obtained by taking the product of 40 households, which achieved food group consumption ranging from (1-3 food group) multiply by the three (3), which is the highest food consumed. Furthermore, Table 4.4 revealed that 3-5 food groups expended by the households account for the highest score of 430 points achieving the highest percentage of 20 percent.

It should be noted that the higher the score, the higher the number of households in such a group and does not mean the highest dietary diversity by the household. For instance, 12 food groups even though it shows households eating the whole food group which can be considered as the highest diet diversity has a total score of 396 points which also indicate that only 8 percent of the households achieve that, according to Magrini and Vigani (2014). Table 4.4 shows the DDS by households indicating the number of food groups.

Table 4.4: DDS indication Number of Food Group and Percentage Achieved

Food Group	Households	Scores	Percentage
1-3 Food Group	40	120	9
4-Food Group	57	228	14
5-Food Group	86	430	20
6-Food Group	53	318	12
7-Food Group	43	301	10
8-Food Group	37	296	9
9-Food Group	31	279	7
10-Food Group	26	260	6
11-Food Group	20	220	5
12-Food Group	33	396	8
Total	426	2,848	

Source: Research Survey, 2019

Figure 4.1 reveals the percentage of dietary diversity classification achieved among households in Kano, Nigeria. The figure reveals that 10 percent of the households are classified as achieving low dietary diversity expending 1-3 food group. This group of households is considered as facing severe food security challenges (Mukhtar, Kamaruddin & Applanaidu, 2018c; Mukhtar *et al.*, 2018b). About 34 percent of the households are classified as moderate or medium dietary diversity consuming food groups of 4-5 food groups. About 56 percent of the households are classified as high dietary diversity consuming above six (6) food group. This finding indicates that majority of the households in Kano consumed above six (6) food groups. However, the level of consumption differs with more food groups consumed by households. For instance, household consuming 12 food groups can be considered as having the highest food security than household consuming 8 or 9 food groups; this is in line with the finding of Mukhtar *et al.* (2019a). Figure 4.1 shows the classification of dietary diversity.

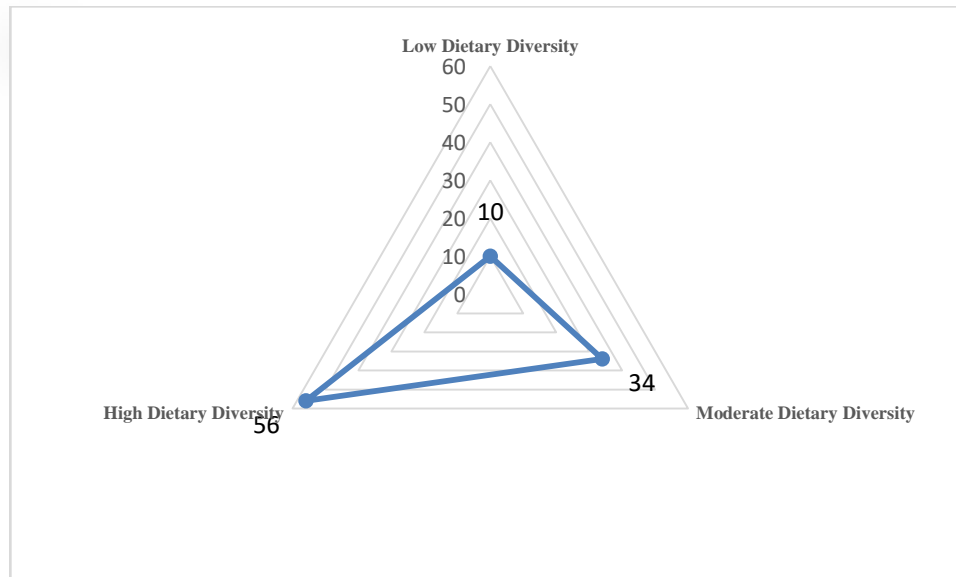


Figure 4.1: Percentage Classification of Dietary Diversity among Households in Kano
Source: Research Survey, 2019

Average dietary diversity among households in Kano is 6.69, indicating that each household consumed a minimum of 7 food groups, which is adequate in line with the FAO recommendation of 6 food groups. According to Arimond and Ruel (2004), with an increase in household dietary diversity comes an improvement in individual ability to meet up with daily dietary requirements as a result of numerous essential nutrients requires by the body. Consequently, encouraging local farmers to invest in various diverse products is highly recommended, especially with high-quality products that meet daily energy requirements. This strategy will also be effective even in a conflict-related area (Mukhtar *et al.*, 2019d; Mukhtar, 2019).

5. Conclusions and Recommendations

The research was set to assess the dietary diversity among households in Kano, using 426 sample household heads. Descriptive analysis revealed that 88 percent of the household heads are male, while 89 percent of which are married. The average household size among households is ten (10) individuals. Household classification further revealed that 60 percent are farming households; land ownership revealed that the majority of the land ownership is through family ownership. The average age and farming experience among households is 41 years and 31 years, respectively. The average monthly household expenditure and income are estimated to be N115,000 (US\$377) and N132,00 (US\$432). In terms of educational qualification, 32 percent of the household heads achieved NCE/OND and Bsc/HND respective.

Findings from the DDS revealed that the majority of the households are food secure in terms of dietary diversity consuming seven (7) food groups and above; average dietary diversity is



estimated to be 6.69. An estimated 56 percent of the households are classified as high dietary diversity. Furthermore, the finding revealed that predominant food groups consumed by the households are cereals and roots/tubers, while the majority of the food groups apart from these two are consumed in a less quantity, especially among households in a rural area.

The paper, therefore, recommends that extension service agents need to be engaged by the government and deployed to the rural locations in the state where farming activities are taking place. At the same time, these agents should involve the local farmers in producing various products with high quality of nutrients and safe for the local consumption. Numerous researches have also revealed that rural farmers in Nigeria are poor and sometimes find it difficult to diversify; therefore, government needs to step in and provide assistance in the form of subsidised fertilizer and credit facilities to the farmer at a subsidised interest rate.

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