



## DIETARY DIVERSITY WITHIN FARMING HOUSEHOLDS IN SOKOTO AND KEBBI STATES, NIGERIA



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**Abstract:** This study examined maternal and child dietary diversity within farming households in north western Nigeria; specifically in Sokoto and Kebbi States. Primary data on personal and socio demographic characteristics of subjects were collected in 1,500 households with the aid of a well pre-tested and structured questionnaire. Methods of analysis used were descriptive statistics and dietary diversity score. Maternal and child dietary diversity scores (DDS) were created based on mother's recall of her own consumption of 9 food groups and her child's consumption of 7 food groups, during the 24 h prior to the home survey. Specifically, children within the age range of 6- 23 months and women within the range of 15 – 49 years were considered based on the FAO recommendation. Results revealed that 46.52% of children received minimum dietary component. The mean household dietary diversity score (HDDS) was 5.42 while that of the women's dietary diversity score (WDDS) was 4.29. Overall, 60.4% of the households had HDDS  $\leq 5$  while 39.6% had HDDS  $>5$ . The values for WDDS were 65.8% ( $\leq 4$ ) and 34.2% ( $> 4$ ). The proportion of HDDS  $< 5$  and WDDS  $< 4$  for Kebbi State was greater at 69.02 and 75.74%, respectively. The study concludes that majority of the children and the women had low dietary diversity. The proportion of households and women with low dietary diversity was greater in Kebbi State than what was obtained in Sokoto State. The study therefore recommends that vigorous intervention through extension agents should be made to women in the study area and especially in Kebbi State to create awareness about consumption of food in the right quantity and quality to ensure maternal and child health in the farming households.

**Keywords:** Dietary diversity, household, maternal, child, nutritional status

### Introduction

The burden of maternal and child under nutrition remains unacceptably high in many developing countries and especially in Nigeria. The consequences of under nutrition are serious, such that approximately 45% of child deaths are attributable to maternal and child under nutrition globally (Black *et al.*, 2013).

Nigeria, in the past few years has experienced some worsening of maternal and child mortality. The infant mortality rate in Nigeria evaluated at 100 per 1000 live births in 2003 was measured at 87 in 1990. Currently the mortality rate of children under the age of five in Nigeria is 201 per 1000 live births (WHO, 2016). Hence, there is an increase in the trend of child mortality in Nigeria. Concurrently, maternal mortality has also increased from 1,350 deaths per 100,000 live births in 1990 to about 814 deaths per 100,000 live births in 2015 (World Fact Book, 2015). This situation is not only specific to Nigeria but a common scenario in most developing countries of the world.

In addition to prevalence of an elevating risk of mortality, under nutrition increases morbidity and impairs cognitive development, which can lead to poorer academic performance in school and reduced productivity during adulthood (McDonald *et al.*, 2014).

The poor nutritional status of women is also of great concern globally, both for the health and well-being of women and their offspring. Maternal under nutrition contributes to foetal growth restrictions, which in turn increases the risk of neonatal deaths and, for survivors, of stunting by 2 years of age (Black *et al.*, 2013). Regrettably, however, poor nutrition is highly prevalent among women in low and middle income countries, resulting in substantial increases in mortality and overall disease burden (Black *et al.*, 2008).

Nutritious foods and diverse diets in sufficient quality and quantity are essential for children to meet their nutrient needs and support growth. This is especially important during the first 1000 days of the child's life, a critical window for the promotion of optimal child growth, health and development

(Dewey, 2003; PAHO, 2001; Amugsi *et al.*, 2015). Dietary diversity (DD), defined as the sum of food groups consumed over a period of 24 h, has been documented as a valid and reliable indicator of dietary adequacy of young children (FANTA, 2006; Moursi *et al.*, 2008; Kennedy *et al.*, 2007; Nti, 2011; Steyn *et al.*, 2005). Therefore, dietary diversity is a reasonably easy-to-measure proxy variable for measuring young children's nutrient intake and assessing child feeding practices (Arimond, 2004; Mishra *et al.*, 2009; WHO, 2009; Rah *et al.*, 2010; Ekesa *et al.*, 2011; Amugsi *et al.*, 2014; Gumbo, 2014). Different foods and food groups are good sources for various macro- and micronutrients, so a diverse diet best ensures nutrient adequacy. The principle of dietary diversity is embedded in evidence-based healthy diet patterns and is affirmed in all national food-based dietary guidelines. The World Health Organization (WHO) notes that a healthy diet contains fruits, vegetables, legumes, nuts and whole grains (WHO, 2009). In child health promotion, emphasizing dietary diversity helps focus families' attention on what is in the family pot, rather than on the complex details of dietetics. Thus, there is growing appreciation of the importance of dietary diversity for child health, and calls for research to illuminate the ways in which child dietary diversity can be promoted (Moursi *et al.*, 2008; Amugsi *et al.*, 2014 and Amugsi *et al.*, 2015).

Mothers usually play the most vital role in the healthcare of their children; research is needed to illuminate maternal factors that might promote child dietary diversity. One of the most proximal maternal factors may be maternal dietary diversity, following a logic that all family members eat from the same family pot. Maternal dietary diversity is important because compared with men, women – and particularly women of reproductive age - require diets that are higher in nutrient density (nutrients per 100 calories). This makes them vulnerable to micronutrient deficiencies. Micronutrient deficiencies impair women's health and the health of their children. In some settings, women may be disadvantaged in intra-household distribution of nutrient-dense foods (for

example, animal-source foods). Improved dietary diversity is one of several strategies for improving micronutrient intakes for women of reproductive age.

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Minimum Dietary Diversity-Women (MDD-W) is a dichotomous indicator of whether or not women who are 15–49 years of age have consumed at least five out of ten defined food groups the previous day or night. The proportion of women 15–49 years of age who reach this minimum in a population reflects one important dimension of diet quality. Even though the indicator is measured by asking questions of individual women, it is a population-level indicator, i.e. it is designed to tell us something about micronutrient adequacy of groups of women. Groups of women who achieve minimum

dietary diversity (i.e. meet the threshold of five or more groups) are more likely to have higher (more adequate) micronutrient intakes than groups of women who do not.

It is to this end that this study seeks to examine maternal and child dietary diversity among farming households in north-western Nigeria with the aim of ascertaining their nutrient intake which is a dimension of diet quality among women and children in the study area.

## Materials and Methods

### The study location

The study was conducted in north western Nigeria and specifically in Sokoto and Kebbi States. Generally, the study area is agrarian with a greater percentage of the land use devoted for agriculture. The land cover can also be described as grassland with an extensive flood plain and tortuous rivers. The coordinates of locations of the communities were collected using hand held GPS (Geographical positioning system) and the spatial distribution is as presented in Fig 1.

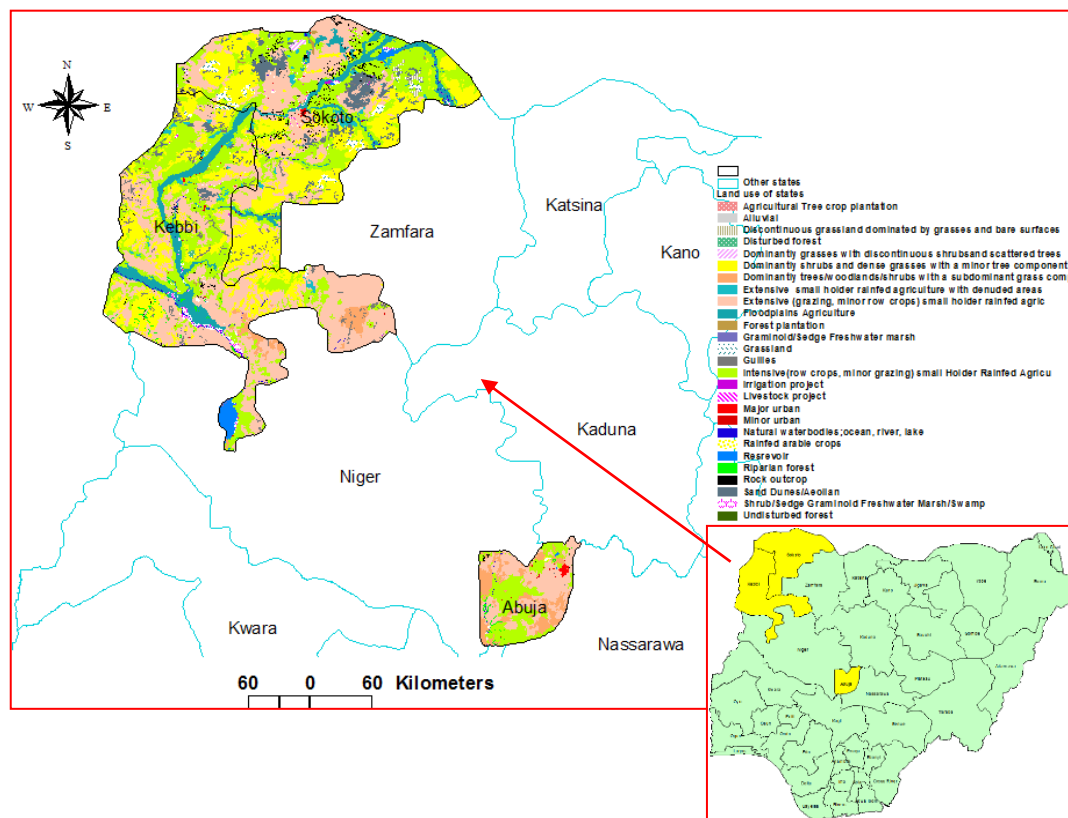


Fig. 1: Map of Nigeria showing study location

### Methods of data collection

Primary data were collected from farming households in the study location with the aid of a well structured questionnaire. The data was obtained from the Feed the future Nigeria Livelihood project annual survey carried out in 2017 under the sponsorship of Catholic relief services international (CRS) in which the authors of this paper were part of the team that conducted the study. The total population of the target beneficiaries for the project in Sokoto and Kebbi States was 42,000. A sample size determinant table was used to select the number of households to be enumerated based on this population. The target population of study for both Kebbi and Sokoto States was considered at 95% confidence level and 2.5% margin of error. With a population of 42,000, the sample

size selected at 2.5% margin of error translated to 1,500. This was then shared in equal proportion between the two States in the study area.

A total of 750 households were interviewed per state among six Local Government Areas (LGAs) which were purposively selected. The LGAs were Birin Kebbi and Dango Wasagu in Kebbi state; Dango - Shuni, Kebbe, Tangaza and Rabbah in Sokoto state. These Local Government areas are target beneficiaries under the project. Fourteen communities and 27 villages were surveyed in Sokoto and Kebbi States. About 56 households were interviewed per village. The total number of households which were then randomly interviewed was about 1,500. One woman was interviewed per household and this applies to all polygamous households in the study location.

**Method of data analysis**

Descriptive statistics such as frequency counts and percentages were used to describe information for the socio-economic characteristics of the farming households in the study area. The dietary diversity score was used to obtain the household, maternal and child diversity in the study area.

For dietary diversity, 12 food groups were used for the household dietary diversity score (HDDS), while ten food groups were used for the Women’s dietary diversity score (WDDS). On the other hand, 7 food groups were used to determine food intake of children as proposed by FAO (2011). The 12 food groups used to calculate the Household dietary diversity score (HDDS) were Cereals; Roots and tubers; Vegetables; Fruits; Meat, poultry and offal; Eggs; Fish and seafood; Pulses/legumes/nuts; Milk and milk products; Oil/fats; Sugar/honey and Miscellaneous. The 9 food groups that comprise the MDD-W indicator were Grains/white roots and tubers/and plantains; Pulses (beans, peas and lentils); Nuts and seeds; Dairy; Meat, poultry and fish; Eggs; Dark green leafy vegetables; Other vitamin A-rich fruits and vegetables; Other vegetables; Other fruits (Ruel, 2003). The 7 food groups used for children were Grains, roots and tubers; Legumes and nuts; Dairy products (milk, yogurt, cheese); Flesh foods (meat, fish, poultry and liver/organ meats); Eggs; Vitamin-A rich fruits and vegetables; Other fruits and vegetables.

Infant and young child feeding indicators were measured by minimum meal frequency, minimum dietary diversity and minimum acceptable diet. The caregivers were guided to recall food and liquid consumption the day prior to visit. A child was assumed to have taken ‘adequate number of meals’ if he/she received the minimum frequency for appropriate complementary feeding (that is, 2 times for 6–8 months and 3 times for 9–11 months, 3 times for children aged 12–23 months) in last 24 h. For non- breastfed children, the minimum meal frequency was 4 times in the last 24 h. Breastfed children who meet both the minimum diversity and the minimum meal frequency were considered to have met the WHO recommended minimum acceptable diet. Children 6-23 months who took at least four out of seven food groups a day prior to the interview date were assumed to have taken minimum acceptable diet.

Minimum Dietary Diversity-Women (MDD-W) is a dichotomous indicator of whether or not women 15-49 years of age have consumed at least five out of ten defined food groups the previous day or night. The proportion of women 15–49 years of age who reach this minimum in a population reflects one important dimension of diet quality. Even though the indicator is measured by asking questions of individual women, it is a population-level indicator, i.e. it is designed to tell us something about micronutrient adequacy of groups of women.

Groups of women who achieve minimum dietary diversity (i.e. meet the threshold of four or more food groups) are more likely to have higher (more adequate) micronutrient intakes than groups of women who do not. While households who had achieved a minimum dietary diversity were those who meet the threshold of five or more food groups; households which had five and below five food groups were categorized as having low dietary diversity while households which had above five food groups were categorized as having high dietary diversity. On the other hand, women who had four and below four food groups were categorized as having low dietary diversity while those above four food groups as having high dietary diversity.

**Results and Discussion**

The general characteristics of the sampled farming households in the study area are presented in Table 1, showing the sex of

the household head, age of the household head, marital status, household size, and level of educational attainment. All these variables are indicators of the present socio economic condition of the farming households. The result revealed that male household heads were the majority at 76.65 percent while female headed households were 24.35 percent. The results also revealed that majority (87.45%) of the respondents in the study area were married while less than 6 percent were single. About 7 percent were widowed while less than 1 percent were separated from their spouses.

In terms of age the result revealed that more than 75 percent of the respondents were less than 50 years of age. This result indicates that a large portion of the respondents were young able-bodied individuals who were still within their economically active age. Results also revealed that majority (75.64 percent) of the household heads in the study area were educated, ranging from primary school leaving certificate to Qur’an education and secondary school leaving certificate. However 24.36 percent had no form of education at all. A large proportion of the respondents (84.71percent) had a mean household size of 4 to 5 individuals per household. Majority of the respondents were also married (87.45 percent), about 5.28 percent were single while 6.86 percent were widowed.

**Table 1: Socio-economic characteristic of the respondents in the study area**

Variables	Frequency	Percentages
<b>1. Sex</b>		
Male	1103.0	76.65
Female	355.0	24.35
<b>2. Marital Status</b>		
Married	1275	87.45
Single	77	5.28
Divorced	1	0.069
Separated	5	0.34
Widowed	100	6.86
<b>3. Age (years)</b>		
< 20	34	2.39
21 -30	272	19.09
31 -40	430	30.18
41 – 50	342	24.00
51 -60	202	14.18
Above 60	145	10.18
<b>4. Mean Household size</b>		
4 – 5	1235	84.71
6 – 7	223	15.29
<b>5. Highest Educational level attained</b>		
No Educational qualification	349	24.25
Ordinary National Diploma / National Certificate in Education	35	2.43
Primary School leaving Certificate	249	17.30
Quranic Education	568	39.47
Senior Secondary Certificate	237	16.45

Source: Field Survey, 2017

**Table 2: Prevalence of children 6-23 months receiving a minimum acceptable diet**

Sex	Frequency	Percentage
Male	332	22.8
Female	304	20.9
Total no of children with MAD	636	43.7
Total number of children	1455	100.00

MAD = minimum adequate diet

Source: Field survey, 2017

**Prevalence of children 6-23 months receiving a minimum acceptable diet in the study area**

Table 2 shows the prevalence of children 6-23 months receiving a minimum acceptable diet. The result revealed that 43.7% of children aged 6-23 months received minimum acceptable diet. It was observed that more male children had

higher prevalence of receiving minimum acceptable diet than female children in the study area. This could be as a result of the preference for male children than female children in the study area. This situation is true for many African societies. Table 3 reveals the indicators on children 6-23 months receiving a minimum acceptable diet About 450 (30.92%) and 301 (21.30%) children, respectively had the minimum dietary diversity and minimum meal frequency. In all, 677 (46.52%) children were recorded to have minimum dietary component. The result further revealed that the number of non – breast fed children 6 -23 months of age in the sample with minimum acceptable diet MAD component data were about 94 (6.46 %).

**Prevalence of exclusive breastfeeding of children under 6 months of age**

There was a high prevalence of exclusive breastfeeding of children under 6 months of age in the study area (Table 4). This observation may be attributed to increased knowledge, awareness and practice of exclusive breastfeeding among mothers. This is expected to improve the health of children as well as the three domains of children’s development; cognitive, affective and psychomotor. The observed prevalence (98.9 %) of exclusive breastfeeding of children under 6 months of age in the study area was higher than the World Health Organization infant and young child feeding observed in most communities (90 %) (WHO, 1995).

**Table 3: Indicators on children 6-23 months receiving a minimum acceptable diet**

Description	Male	Female	Total	%
Number of breastfed children 6-23 months of age who had at least the minimum dietary diversity during the previous day	234	216	450	30.92
Number of breastfed children 6-23 months of age who had at least the minimum meal frequency during the previous day	157	144	301	21.30
Number of breastfed children 6-23 months of age in the sample with MAD** component data	338	245	583*	40.01
Number of non-breastfed children 6-23 months of age who received at least 2 milk feedings and had at least the minimum dietary diversity not including milk feeds during the previous day	0	0	0	0
Number of non-breastfed children 6-23 months of age who received at least 2 milk feedings and at least the minimum meal frequency during the previous day	0	0	0	0
Number of non-breastfed children 6-23 months of age in the sample with MAD** component data	49	45	94*	6.46

\*Total number of children with MAD component data = 677 (Both breastfed and non-breastfed) Total number of children sampled was 1455; \*\*MAD = minimum adequate diet

**Table 4: Prevalence of exclusive breastfeeding of children below 6 months of age**

Description	Male	Female	Total
Number of children 0-5 months in the sample exclusively breastfed during the day and night preceding the survey/Total number of children 0-5 months in the sample with exclusive breastfeeding data.	(291/294)	(266/269)	(557/563)
Percent of children 0-5 months of age in the sample who are exclusively breastfed	51.7	47.2	98.9

Source: Computed from Field Survey, 2017

**Dietary diversity survey (household dietary diversity score & women dietary diversity score)**

Table 5 shows the mean dietary diversity scores (DDS) for the study area. The mean value of household dietary diversity score (HDDS) was 5.42 while that of women’s dietary diversity score (WDDS) was 4.29. Overall, 57.5% of the households had HDDS ≤ 5, while 42.5% had HDDS > 5. Thus, indicating that majority of the households had poor dietary diversity. The values for WDDS were 62.4% (≤ 4) and 37.6% (>4). This also show that majority of the women had low dietary diversity.

**Table 5: Estimates of households’ dietary diversity scores in the study area**

Variable	Total (%)	Mean	Standard deviation	P-value
HDDS		5.417	2.618	
5 and Below	838 (57.5)			0.291
Above 5	620 (42.5)			
WDDS		4.287	2.108	
4 and Below	910 (62.4)			0.004
Above 4	548 (37.6)			

HDDS= Household Dietary Diversity Score; WDDS= Women’s Dietary Diversity Score

Source: Computed from Field Survey, 2017

The lower proportion of households and women having high HDDS and WDDS may be due to the economic recession in the country since HDDS is a proxy measure of the socio-economic level of households. It could also be inferred that there was a reduction in intake of essential nutrients consumed by the households. This assertion is corroborated by the fact that cooking of foods was done twice a day by most of the households (Table 6). Furthermore, most of the households (46.4%) consumed meat once a week, with just 10.5% of them

consuming meat daily (Table 7). It has been reported by FAO, (2011) that financial and economic crisis negatively affect the quantity of foods consumed for maintaining energy balance as well as for the quality of foods consumed for maintaining sufficient intakes of proteins, fats and micronutrients such as vitamins, minerals and trace elements.

**Table 6: Frequency of cooking in a day by the households**

Variable	Frequency	Percentage
<b>Frequency of cooking by households</b>		
Once a day	231	15.8
Twice a day	837	57.4
Thrice a day	390	26.7
<b>Total</b>	<b>1458</b>	<b>100.0</b>

Source: Computed from Field Survey, 2017.

**Table 7: Frequency of meat consumption on a day and week**

Variable	Frequency	Percentage
<b>Frequency of meat consumption</b>		
Daily	153	10.5
Once a week	677	46.4
Seldom	628	43.1
<b>Total</b>	<b>1458</b>	<b>100.0</b>

Source: Field Survey, 2017

**Table 8: Distribution of HDDS based on State**

Variable	Kebbi (N (%))	Sokoto (N (%))	Pooled	P-value
<b>HDDS</b>				
<b>5 &amp; Below</b>	518 (69.02)	388 (51.79)	906 (60.4)	0.000
<b>Above 5</b>	232 (30.98)	362 (48.21)	594 (39.6)	
<b>WDDS</b>				
<b>4 &amp; Below</b>	568(75.74)	419 (55.87)	987 (65.8)	0.000
<b>Above 4</b>	182 (24.26)	331 (44.13)	513 (34.2)	

HDDS= Household Dietary Diversity Score; WDDS= Women’s Dietary Diversity Score; Values in parentheses are percentages

Source: Field Survey, 2017



Table 8 shows the distribution of household dietary diversity based on state. The result reveals that Sokoto state had the highest percentage (48.21%) of households with HDDS > 5, and women with WDDS > 4 at (44.13%), while Kebbi state recorded a lower proportion of HDDS >5 at 30.98% and WDDS >4 at 24.22%. Generally, majority of households had low HDDS and WDDS, portraying a likely situation of food insecurity in the households. Furthermore, the low WDDS may also mean that the economic well-being of households will be reduced as these women will be less productive in labour force. This therefore calls for intervention through extension agents to enable women give the right quantity and quality of foods to their households.

The influence of gender of household head on DDS is presented in Table 9. Male-headed households had higher HDDS and WDDS. This could be due to the fact that males have more control over resources and output than women and therefore could utilize the output without any restraint. It could also be that male household heads have more strength to work for longer hours on larger size of farm land than females. Cultural discrimination may not also allow females to own farm land. Recent studies reveal that male-headed households showed greater food security than female-headed household in Nigeria. The result also revealed that the gender of household head had influence on HDDS at ( $P < 0.01$ ) and WDDS at ( $P < 0.10$ ).

### Conclusion and Recommendations

The study concludes that majority of the women and children have low dietary diversity. Among the children, more male children had higher prevalence of receiving minimum acceptable diet than female children in the study area. Male-headed households had higher HDDS and WDDS than female headed households. However, the gender of household head had a greater influence on household dietary diversity than the women dietary diversity in the study area. The study therefore recommends that vigorous intervention through extension agents should be made to women in the study area and especially in Kebbi State to create awareness about consumption of food in the right quantity and quality to ensure maternal and child health in the farming households.

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