



EFFECTS OF HOUSEHOLD HOME GARDEN, SOCIO-ECONOMIC CHARACTERISTICS AND HEALTH STATUS PERCEPTION ON FOOD CONSUMPTION DIVERSITY IN OYO STATE, NIGERIA



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Abstract: The study examined the effects of home garden, socio-economic characteristics and health status perception on dietary diversity among households in Oyo State, Nigeria. Some households were studied by means of multistage sampling procedure using questionnaire as interview guide for data collection and descriptive statistics and truncated Poisson regression as analytical tools. The majority (72.5%) of the households are headed by males with 35% of the households owning home gardens. An average household has food diversity score of approximately 9 out of 12 food groups, indicating consumption of foods of moderately high variety. Income ($p < 0.05$), presence of children ($p < 0.01$) and adolescents ($p < 0.01$), possession of home garden ($p < 0.05$), and poor health status perception ($p < 0.05$) are factors with strong positive influence on dietary diversity. Although the effect may be minuscule, subjective assessment of health status as being excellent diminishes food consumption variety. Whereas efforts to promote home gardening for foods and boost household income are recommended for improved diet, we stress that idiosyncratic perception of household members' health can be a subtle pathway impeding consumption of more variety foods. Hence, the need to call closer attention to the potential danger subjective health evaluation could portend for food and nutrition security at household level.

Keywords: Dietary quality, food security, health perception, home garden, households

Introduction

Diets recognized as monotonous, cereal-based, and lacking diversity are characteristics of most developing countries, especially in Africa, where food consumption is inadequate especially in terms of animal products, fruits, and vegetables. Inadequate quantities and unbalanced distribution of the types of foods consumed by the household often result in nutritional deficiencies (Bukania *et al.*, 2014). Nutritional problems are common in poor populations, Nigeria inclusive, since their diets are predominantly starchy staples (Styenet *et al.*, 2006). The preponderance of malnutrition and risks of related diseases in developing countries have been linked to consumption of poor quality foods which also results from less varied diets (Ruel, 2002). Dietary diversity can be a good proxy indicator of food quality and (or) food security (Ruel, 2002; Torheim *et al.*, 2004; Goshuet *et al.*, 2013; Sedodo *et al.*, 2014); reflecting the possibility of nutrient adequacy in terms of energy and proteins requirements, and some other essential nutrients (Goshuet *et al.*, 2013). A more diverse diet helps to ensure adequate intake of essential nutrients and promotes good health (Sedodo *et al.*, 2014).

Dietary diversity can be defined as "the number of individual foods or food groups consumed over a given reference period" (Swindale and Blinsky, 2006). Among studies that have adopted this operational definition in capturing dietary diversity include Torheim *et al.* (2004), Swindale and Bilinsky (2006), Akerele and Shittu (2015). Although most studies have consistently established the positive impacts of income on diet diversity (Ruel, 2002; Taruvinga *et al.*, 2013; Doan, 2014; Harris-Fry *et al.*, 2015; Akerele and Shittu, 2015), the effects of household demographic factors such as age, education, household size/composition, among others are inconsistent. For example, Doan (2014), Zakaria and Laribick (2014), Akerele and Shittu (2015), Harris-Fry *et al.* (2015) and Workicho *et al.* (2016) reported positive relationship between education, and dietary diversity, Taruvinga *et al.* (2013) found both negative and positive relationships between households' head's educational attainment and dietary diversity. According to Taruvinga *et al.* (2013), education of the household's head relates positively to high dietary diversity and negatively to low dietary diversity; but with households having a higher possibility of achieving high level

of dietary diversity than a low dietary diversity with increase in the level of education of their heads. While Mayanja *et al.* (2015) found insignificant relationship between household head's education and household's dietary diversity. It therefore, becomes important that the roles of socioeconomic factors be examined since these variables can be manipulated to play complementary roles in formulating policy that would affect household diet.

Besides, with respect to the impact of agricultural production on dietary diversity, while a number of studies have documented positive and significant relationship between farm-level diversity and dietary diversity, some found negative relationship while other established statistically insignificant effect of diversified farm systems on consumption of varied diets. It would thus appear that the role of agricultural production on diet diverseness should be understood within specific context and that a positive relationship between diversified farm systems and dietary diversity may not exist universally.

In recent years, there has been growing interest on the role home gardens could play as an integral part of local food systems in enhancing dietary diversity, and consequently, household food security and nutrition (Galhena *et al.*, 2013). Home gardening is a traditional land use practice carried out around a homestead (Iannotti *et al.*, 2009; Olney *et al.*, 2009), consisting of various species of plants that are produced and maintained by the family members with the main objective of meeting the consumption needs of the family. Home gardens can improve household income and enhance rural employment through additional or off-season production. The environmental benefits of home garden includes, among others, recycling water and waste nutrients, controlling shade, dust and erosion, and maintaining or increasing local biodiversity (Lan, 2011).

Despite the increasing recognition of the prominent roles home gardening can play in enhancing diet diverseness and fulfilling household consumption needs, the size of home-gardens in Nigeria for most of the families who own one, is small such that the contribution of home gardening to food availability may be deemed insufficient. This leaves a fundamental question as to whether ownership (engagement in) home garden can significantly enhance consumption of

more varied diets. Hence, the main focus of this study is to examine the influence of ownership of home garden on dietary diversity among households.

Apart from the roles socio-economic factors, home gardens and farm-level production diversity could play in influencing food consumption variety, heterogeneity in the perception of household head about his/her health status or that of members can make a substantial difference in dietary choices (and hence food consumption variety) among households. The role of health status perception has been marginalized or overlooked in many studies on food consumption diversity, especially in developing countries. The deliberate or accidental omission of such untraditional, noneconomic variables may have harmful consequences on the estimates of the models explaining dietary diversity. It is thus important to examine whether a significant relationship exists between health status perception and variety and food consumption among households. A critical appraisal of the level of food diversity of households and items influencers in Nigeria is needed given the existing large population of undernourished people in country, despite previous efforts to encourage food security and nutrition. The outcomes of the study can be used in other studies as an indicator of food quality and (or) food security and as a tool for making policies in the study area as well as the country at large.

Materials and Methods

Study area

Ido Local Government is one of the 33 Local Government Areas of Oyo State. It covers a land mass of about 1,016.95 Square Kilometers, sharing boundaries with Oluyole, Ibarapa East, Akinyele, Ibadan North West, Ibadan South West, Ibadan North local governments in Oyo state and Odeda local government in Ogun state. The officially documented population of the local government by the National Population Commission was 104,087 (National Bureau of Statistics, 2010). It has ten zones that are classified as rural or urban based on the presence of social amenities, population and the socio-economic activities of the area (Ido local government secretariat- information office). The rural zones are Ilaju, Akufo, Akinware, Idi-Iya, Erinwusi and Ido while the urban zones are Apete/Ologuneru, Gbekuba/Elenusonso, Omi-Adio, Onidoko/Benbo.

Sampling procedure and data collection

A multi-stage sampling procedure was used to select 80 households. The first stage featured selection of three wards out of the six relatively rural political wards, and two wards out of the four relatively urban political wards in the study area. At the second stage, two towns were randomly selected from each of the selected wards to make a total of ten towns (six relatively rural and four relatively urban wards). At the town level 8 houses/buildings were randomly selected. In each building, only one household available for interview was selected. This made up a total of 80 households. Although questions were asked from the household head or the representative person (spouse) who could provide adequate information about the household characteristics and livelihood activities and outcomes of the household, other members who could provide supplementary information, did. The foods that were included are those prepared in the home and consumed in the home or outside the home as well as foods purchased or gathered outside and consumed in the home. The 24 h dietary recall method was used to obtain information about the varieties of food consumed by the households. Before administering the questionnaire, a question about whether the previous 24 h was a feast or a day of fast or anything less than usual was asked because food consumption patterns during festive or fasting periods do not reflect a typical diet. Data on the socio-economic characteristics of the households was

collected. These include monthly income, types of food consumed, household size, age and occupation of members and sources of income. Other pertinent information obtained include: household involvement in home gardening of food as well as whether households are purely into cropping, mixed farming (crop-livestock enterprise mix) or non-farm enterprise (without crop or livestock), among others. In analyzing the dietary diversity score, the total number of food groups consumed by members of the household was added together and given a value between 1 and 12, since there were 12 food groups. The extent of food consumption diversity was evaluated by classifying the number of food groups consumed into three categories: 1-5 (relatively low dietary diversity), 6-8 (moderately diverse diet), 9-12 (relatively high dietary diversity).

Analytical procedure

Descriptive statistics such as mean, percentage and frequency tables were used to analyse the households' socio-economic characteristics and diversity in household diets while Poisson regression (count data model) was used to analyse the factors influencing household dietary diversity scores.

Poisson Regression (Count Data) Model: The model is much more appropriate in explaining relationships in which the outcome (dependent) variable assumes discrete count. This is because the distribution data follows the Poisson and rather than the normal distribution (Cameron and Trivedi, 2010). The Poisson regression (count data) model is as specified.

$$prob(v_j = k_j) = \frac{\exp^{-\lambda_j} \lambda_j^{k_j}}{k_j!}, \quad k = 1, 2, 3, \dots, Q$$

Where (v_j) is a random variable with its observed value denoted by k_j . By construction, k is the number of food groups consumed/purchased by the household, while Q is maximum number of food groups consumed/purchased by the household. For this study there are 12 food groups, so $Q=12$. Poisson model is a one-parameter distribution having mean and variance as v_j and λ_j respectively.

In order to accommodate a set of explanatory variables (Z_j) into the analysis, and to avoid negativity of v_j , the Poisson model (equation) is re-specified with parameter, λ_j given as:

$$E(v_j | Z_j) = \lambda_j = \exp(\alpha + \eta_1 Z_{1j} + \eta_2 Z_{2j} + \eta_3 Z_{3j} + \eta_4 Z_{4j} + \dots + \eta_{16} Z_{16j})$$

Z_1 = Location (relatively urban dummy) (1 if location of household is relatively urban, 0 otherwise)

Z_2 = Age of household head (years)

Z_3 = Sex of the household head (male dummy) (1 if male, 0 otherwise)

Z_4 = Marital status of the household head (married dummy)

Z_5 = Educational level of the household head (years of schooling)

Z_6 = Household with child (1 if household has a member that is less than 12 years, 0 otherwise)

Z_7 = Household with adolescent (1 if household has a member that is between 12 and 18 years, 0 otherwise)

Z_8 = Household with adult members only (1 if all members of household is above 18 years, 0 otherwise)

Z_9 = Household income in Naira (Natural logarithm)

Z_{10} = Household with crop farm only (1 if household grows crop only, 0 otherwise)

Z_{11} = Household with crop and livestock (1 if household with crop and livestock farms only, 0 otherwise)

Z_{12} = Household with home garden alone (1 if household has home garden alone, 0 otherwise)

Z_{13} = Household without farms and home garden (1 if household is without home garden and crop and livestock farms, 0 otherwise)

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Z₁₄= Excellent Health status (1 if household heads perceived his or members health status as excellent, 0 otherwise)

Z₁₅= Poor health status (1 if household heads perceived his or members health status as poor, 0 otherwise)

Z₁₆= Number of adults in the household

Denoted by $n_1, n_2, n_3, \dots, n_{16}$ are the coefficients associated with the respective explanatory variables.

Results and Discussion

Socio-economic characteristics of households and household heads

The results of the socioeconomic characteristics of households and the household heads are presented in Table 1. The table shows that the majority (72.50%) of the households were headed by males. Approximately 66.25% of the household heads were between age 21 and 40 years. The average age of the household heads was 38.54 years. The majority (92.5%) of the household heads had access to formal education with larger percentage (47.5%) having secondary school education as the highest educational attainment. Most (55.0%) of the households had less than 5 members and the mean household size was 5 persons. In terms of household composition, the result indicates that 80% of the households had members who are children (less than 13 years) and/or adolescents (13 to 18 years) while the remaining 20% are households with purely adult members (age above 18 years). Differences in household composition are expected to have effect on diverseness of household diets. The majority (82.5%) of the household heads are married, while others were either divorced or widowed. Most (65%) of the households earns between ₦20000 and ₦70000 as monthly income. The mean income of the households is approximately ₦67937.50. Higher income is expected to stimulate consumption of more varied diets in the household.

Household food consumption diversity

Table 2 presents the results of the extent of household dietary diversity as captured by dietary diversity scores. Approximately 46.25 of the households had dietary diversity score within the range of 7 and 9, indicating a moderately high food variety score. In addition, 41.25% of the households had more than 9, reflecting very high food variety score. Only 12.5% of the households had dietary diversity scores between 5 and 6, depicting a comparatively lower diversity score. The mean dietary diversity score for the entire sampled households is 8.99 (approximately 9), suggesting that the diets of an average household is moderately high in terms of the varieties of the foods consumed. It can therefore, be deduced from the findings that the diets of the majority of households in the study area are of good quality. This is contrary to evidence obtained from rural South African households (Taruvingaet *al.*, 2013) of poor dietary diversity composed majorly of starchy food items relative to protein and vitamin rich food items. Also, there is evidence of poor dietary diversity amongst Ethiopian households as reported by Workicho *et al.* (2011) and Sibhatu *et al.* (2015). From Northern Ghana, Zakaria and Laribick (2014) reported that majority of the women of child bearing age had very poor dietary diversity score, which is about 5 out of the 15 major food groups considered during their study. Some empirical evidences likewise from Nigeria as reported by Akerele (2015) and Akerele and Shittu (2015) indicated that the average households in Nigeria consumed less varied diets. The reasons for the difference in between this and the erstwhile may be due to heterogeneity in study samples. While the findings of Akerele and Shittu are based on national average, this finding is at a much more disaggregated/smaller level-revealing that some important specific information may be crowded by

nationwide analysis. Other studies reporting relatively/moderately high level of dietary diversity similar to our results include Sibhatu *et al.* (2015) which found moderately high dietary diversity amongst the sampled farm households in Malawi.

Table 1: Distribution of households and household heads by socio-economic characteristics

Variables	Frequency	%
Age of household head (years)		
21-30	30	37.50
31-40	23	28.75
41-50	5	6.25
51-60	18	22.50
61-70	4	5.00
Mean age	38.54	
Sex of household head		
Male	58	72.50
Female	22	27.50
Marital status of household head		
Married	66	82.50
Divorced/widowed	14	17.50
Education status of household head		
Primary education	15	18.75
Secondary education	38	47.50
Tertiary education	21	26.25
No formal education	6	7.50
Household size		
1-4	44	55.00
5-8	35	43.75
9-12	1	1.25
Mean household size	4.5	
Household monthly income (Naira)		
Less than 20000	16	20.00
20000 – 39999	36	45.00
40000-70000	16	20.00
Above 80000	12	15.00
Mean income	67937.50	
Household classification by ownership of farm and/or home garden		
Household without farm and home garden	32	40.00
Household with farms and home garden	19	23.75
Household with home garden alone	9	11.25
Household with crop farm alone	15	18.75
Household with crop farm and livestock alone	5	6.25
*Household composition		
Household with children (less 12 years)	25	31.25
Household with adolescents (13 to 19 years)	14	17.50
Household with children and adolescents	25	31.25
Household with adults alone	16	20.00
Household classification by perception of member/s health status		
Excellent	53	66.25
Average	22	27.50
Poor	5	6.25
Total	80	100.00

Source: Field survey, 2015

Table 2: Distribution of households by dietary diversity score

Z	Frequency	Percentage
Less than 7	10	12.50
7 – 9	37	46.25
Above 9	33	41.25
Total number of households	80	100.00
Minimum dietary diversity score	5	
Maximum dietary diversity score	12	
Mean Dietary diversity score	8.99	

Source: Field Survey, 2015

Factors affecting household dietary diversity

The results of the factors influencing consumption of varied diets are presented in Table 3. The log pseudo-likelihood value (-169.453) associated with the Wald Chi-square value (121.59) is statistically significant at 1%, implying that the all the explanatory variables in the model exerted joint influence of dietary diversity. The coefficients associated with the dummy variables capturing the presence of children and adolescents are positive and statistically significant at 10%, respectively; indicating that the presence of children and adolescents in the household would substantially raise consumption of varied foods in the household. This may be explained by the fact that younger individuals, especially children require high quality nutrients for proper growth and development. However, the coefficient of the number of adults is negative and statistically significant, suggesting that an increase in the number of adult member decreases consumption of more diverse diets. This can be possible especially if the additional adult member does not contribute significantly to household income. Hence, household may cope with the burden of increased household size by reducing dietary diversity. The coefficient of income is positive and statistically significant, meaning that increases in income would results in consumption of more diverse diets. Higher monthly income may be an indicator of better living conditions, which would impact positively on household's food consumption diversity. This has been confirmed by a number of studies (Ruel, 2002; Taruvinga *et al.*, 2013; Doan, 2014; Akerele and Shittu, 2015; Harris-Fry *et al.*, 2015). Although not statistically significant, the negative coefficients associated with the dummy variable capturing household engagement in crop farm only may raise concerns as to whether the kind of crop farming practices among households

in the study area can enhance diversity in household diets. The result suggests that crop-livestock enterprise mix holds positive signal, nonetheless, minuscule effect for food consumption variety among households. The positive sign and the statistical significance of the coefficient of the dummy variable representing household that has home gardening, suggest that having home garden in the household can substantially increase consumption of more varied foods in the household. The implication of this is that diversifying food systems in Nigeria through encouragement of home garden is vital for dietary quality improvement, reduction of food insecurity and nutritional and related health problems in the country. This finding goes in line with previous empirical evidences (Taruvinga *et al.*, 2013; Sibhatu *et al.*, 2015) of the positive impact of agricultural production diversity and access to home gardening on households' dietary diversity. The statistically significant and positive coefficients of the dummy variable associated with poor health status (perception) indicates that households whose heads perceived the health status of one or more members of the households as poor consumed more varied foods than households whose heads adjudged members' health status as average. Households headed by someone who perceived the health status of members as excellent appeared to share some negative, howbeit, small sentiments for consuming more diverse diets. Although the negative coefficients is statistically insignificant, it is still imperative to stress that reliance on self-perception/judgment for excellent health is somewhat unreliable, and this should not be a key factor/parameter in household behaviour towards dietary diversity choice.

Table 3: Factors influencing food consumption variety among households

Variables	Coefficient	T-value	P-value	Marginal effect
Location (relatively urban dummy)	0.049	1.150	0.249	0.441
Age of household head	0.002	1.300	0.192	0.022
Sex (male dummy)	0.070	1.630	0.102	0.610
Marital status (married dummy)	0.059	0.850	0.395	0.513
Educational level	-0.003	-0.760	0.445	-0.027
Household with children	***0.188	2.770	0.006	1.738
Household with adolescents	***0.234	3.620	0.000	2.176
Household with adults member only	***0.261	3.830	0.000	2.535
Household income in Naira (Natural logarithm)	**0.044	2.510	0.012	0.390
Household with crop farm only	-0.085	-1.480	0.138	-0.747
Household with crop farm and livestock	0.135	1.360	0.173	1.277
Household with home garden alone	**0.101	2.030	0.042	0.913
Household without farms and home garden	0.059	0.960	0.337	0.525
Excellent Health status	-0.017	-0.420	0.671	-0.151
Poor health status	**0.164	2.340	0.019	1.573
Number of adults in the household	***-0.053	-3.290	0.001	-0.472
Constant	1.506	7.920	0.000	
Log Pseudo-Likelihood	-169.453			
Wald Chi-square value	121.59			
Prob>Chi-square	0.000			
Predicted (Mean) dietary diversity Score	8.891			

Conclusion

The study examined the potential impact of home garden, household socio-economic characteristics and health status perception on variety in food consumption. Most of the sampled household heads are married and had one form of formal education or the other. Less than 50% of the households had gardens in their homes. An average household consumed fairly highly diverse foods which is indicative of quality diets. Household consumption has heterogenous

impacts on dietary diversity with presence of children enhancing diverseness in food consumption and increases in the number of adults likely to depress it. Home garden has statistically significant and positive impacts on food consumption variety while perception of health as being excellent may have depressing effect. This study sheds light on the possible repressing effects subjective health judgment could portend for household food security and nutrition in developing countries.

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