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Assessment of the Calorie-Protein Consumption Pattern among Rural and Low-Income Urban Households in Nigeria

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Abstract: The study assessed the calorie-protein consumption pattern among rural and low-income urban households ion Nigeria using the survey data collected between July and October 2005 from two Local Government Areas (LGA) in Edo State, Nigeria. The two Local Government areas are Orhionmwon representing the rural community and Ikpoba-okha representing the low-income urban community. Three hundred and eighty-four (384) individuals within the 90 randomly selected households (44 from Ikpoba-okha and 46 from Orhionmon) were interviewed using a 48-hour recall method to obtain information on their daily food intake. The data collected were analysed using descriptive statistics, nutrient (calorie-protein) estimation technique and test of differences between means. The results showed that their average monthly expenditure (N8, 146.97 for the rural and N14,401.51 for the low-income urban households) was higher than their average monthly income of N7,541.73 for the rural and N12,243 for the low-income urban households-implying they are net consumers. Food was found to be the single major item (32-38%) in their consumption-expenditure basket. Among the food items consumed roots and tubers (which are mainly carbohydrate) contributed over 61% of the total in both LGA. The rural households had higher calorie intake 2,322kal as against 2,201kcal for the low-income urban. However, the low-income urban households had higher daily protein intake (in particular form animal products) than the rural households. This was attributed partly to the higher level of education and income of the low-income urban households. As to the recommended minimum daily calorie-protein intake, households in both LGA consumed significantly less than the FAO specified minimum calorie of 2,400kal and 44.4g of protein.

Key words: Calorie-protein consumption · Rural and low-income urban · Nigeria

INTRODUCTION

The nutritional intake of people is determined by four major factors - the availability, type, quality of food [1] as well as the income level of the consumers. In most developing countries (Nigeria inclusive) food is not sufficiently accessible to a very large segment of the population; the types of food consumed are often nutritionally inadvisable and the quality of food is poor [1]. Part of this food crisis situation has been blamed on lack of explicit and comprehensive food policy and the low priority given to food self-sufficiency goal. This has therefore led to several problems affecting the availability of food [1]. Some of them which are more of supply side factors include [1].

- The continued concentration of agricultural production effort on cash crops while the traditional food sector is being relatively neglected.
- The introduction of inappropriate modern technology (or the introduction of new technology in an inappropriate fashion) which has had negative effects.
- The rise in price of several foods in the present inflationary situation which has made the lower income group and fixed wage earners to be able to afford less and less food.
- The unequal income distribution both internationally and within third world countries which has meant that a minority of people enjoy an excess of food (to the point of obesity) while the majority does not have the financial means to obtain it; and

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- The effect of advertisement on the choice made by people on the types of products and of foods to consume.

Peng [1] observed in particular that penetration of the consumer culture (due to lure of advertising) into developing countries has made poor people to divert away form buying the food essential for their family's nutritional needs, much of which has resulted in massive expenditures on relatively unnecessary or even harmful products. Farmers who can hardly make ends meet are known to spend a third of the family income on cigarettes and alcoholic drinks while lowly paid factory and office girls use up a sizeable part of their meager salaries on cosmetics, expensive clothes and shoes [1]. The young children on the other hand are attracted to sweets, lollipops and other types of non-value "junk foods", thus displacing the traditional foods from the farm which are rich in nutrient content. The food crisis in the developing countries is therefore not only in the supply and distribution of food but also in the choices made by the people on the types of products and of foods to consume.

This study assessed the food consumption pattern of the low-income urban and rural households in Nigeria with greater focus on the consumption of food related products.

Specifically, the Study:

- Highlights the consumption expenditure pattern of households in the rural and low-income urban areas in Nigeria.
- Assesses the calorie and protein consumption pattern among the two groups within the population
- Compares the calorie and protein consumption pattern between sex within and between the rural and low-income urban populace.

MATERIALS AND METHODS

Data Collection and Analysis: The primary data used for the study were obtained from a survey conducted between July and October 2005 in two Local Government Areas (LGAs) in Edo State, Nigeria - Orhionmwon and Ikpoba-okha. Data were obtained through personal interviews using structured questionnaire. A total of 120 households (60 from each LGA) were randomly selected for the study. However only 90 households (46 from Orhionmwon and 44 from Ikpoba-okha were finally used for the analysis. The communities in Orhionmwon LGA represent the rural area while those of Ikpoba-okha LGA represent the low-income urban area.

A 48 - hour recall method was used in collecting data, from 460 individuals within 90 households, on their daily food intake. However the data used for the analysis were from three hundred and eighty four (384) members out of the initial 460 selected from the 90 households. Children below the age of one year (10 in number) were excluded from the analysis as they were still being breast-fed.

Each household member was asked the food he/she consumed the previous day and a day after. The data collected included types of food and the quantity consumed per meal/day. However, since one grm weight of rice cannot be equated to a grain of yam in terms of calorific value for instance, all the food items were converted to gram equivalent before the proportion of each (and other items) were estimated from the total food intake. The calorific and protein content in each food item consumed were used in estimating the proportion in the total food intake. For convenience the various food items consumed were categorized into 11 groups as shown in Table 1.

Data were also collected on the demographic/ socio-economic characteristics of household members (such as household size, sex, age, occupation, education level, religion, income, marital status. Etc).

Table 1: Categories of Food Items Consumed by Household Members (in groups)

Group	Food Items
Roots	Eba, Fufu, Amala, Lafun, Potatoes, Garri, Cocoyam.
Tubers	Yam, Pounded yam, Porridge
Cereals	Rice, Ogi/Custard, Maize, Bread, Biscuits
Legumes	Beans, Moin-moin, Akara, Melon, groundnut.
Vegetable	Vegetables (leafy and fruit), Pepper, tomato.
Fats and Oils	Butter, Palm oil, vegetable oil
Fruits	Plantain, Orange, Pawpaw, Banana, Garden Egg.
Beverages	Tea/Coffee, Sugar, Bournvita/Milo
Meat	Pomp, Beef, Pork, Sheep meat, Chicken
Fish	Fish of all kinds
Other Animal Product	Milk, Eggs.

The data collected were subjected to descriptive analysis (frequency, percentages, mean, etc), nutrient (calorie and protein) estimation and test of difference between means.

RESULTS AND DISCUSSION

Demographic Characteristics of Households in Ikpoba-okha and Orhionmwon LGAs: Demographic and socio-economic characteristics of households are among other factors that could influence household consumption patterns. The observed profile for the populations sampled - the rural (Orhionmwon) and households low-income urban (Ikpoba-okha) are presented in Tables 2 through to 4.

As shown in Table 2, about 62% of the total sampled respondents were male and 38% were female. As much as 92% and 98% of the household members from the low-income urban and rural areas respectively were regular residents within the households sampled. Thus the information obtained from them would be quite representative of the characteristics of the two locations (the rural and low-income urban area). The average age of the respondents were 40 years and 37 years for the low-income urban and rural areas respectively. These fall within the economically active age group.

As regards education, majority (78%) of the sampled household members had some form of basic education. The analysis showed that on the average about 60% of the household members had primary education (with a higher percentage (66%) in the low-income urban area as against 54% in the rural area). However illiteracy level was higher in the rural area (38%) as compared to 8% in the low-income urban area. This could be attributed to the fact that rural households who are usually farmers attach lesser value to education. Education could have significant influence on the nutritional status of the household as pointed out by Davis [2]. Similarly the characteristics of the household heads (who usually take most decisions in the household could have influence on the entire household nutritional status.

The characteristics of the household heads in the sampled population is presented in Table 3. The result showed that majority of the household heads in the low-income urban area (95%) and all of them in the rural area (100%) were male. Most of the household heads also resided within the household (Table 3). Their presence at home is expected to have positive influence on the quality of food intake within the household, thus assuring food security of the household. The mean age of household head in the rural area was 47 years and 50 years for the low-income urban area. Age standard deviations were ±15.35 and ±17.08 for the rural and low-income urban household heads respectively. The implication of this statistics is that given the resources and opportunities the household heads still have the potential to meet the food/nutritional requirement of their households as they are still within the economically active age group.

In terms of education, about 80% of the low-income urban household heads had at least primary school education as against only 61% for the rural household heads. With this scenario, food security in the rural household may be on the threat level, given the fact that nutritional value judgement/appreciation is expected to be positively correlated with level of education.

The study also showed that 48% of the household heads in the rural area were farmers as against 23% in the low income urban area. This situation would probably guarantee more food for the rural dwellers since they cultivate food crops first, hence easy access to consumption without much extra effort to purchase them from the market.

Most of the household size were between 4 and 6 persons (65% for the rural and 59% for the low income urban households), while a fairly equal percentage of them (23% and 22%) had between 7 and 9 persons per household. The average mean household size for both locations was about 6 persons. As Aboyade [3] noted household size can have a considerable influence on the dietary pattern of either an individual within a household and/or the household itself.

In terms of household type, all the sampled household heads in the rural area were married with children while only 64% (out of the 98% married in the low-income urban area) had children. This scenario might reflect different expectations in meeting household food security demand.

Income Status and General Consumption Expenditure Pattern among Households in Ikpoba-okha and Orhionmwon LGAs: Income status (income level) as well as the amount or proportion of income spent on general goods (i.e consumption expenditure pattern) are two separate indicators that have been widely used both in poverty and consumption studies at various levels (individual, national and regional). The two show, among other things, the standard of living among the targeted population. The average monthly income of an average household in Ikpoba-okha and Orhionmwon LGAs and their general consumption patterns are shown in Tables 4 and 5.

Table 2: The Socio-Demographic Characteristics of Households in Ikpoba-okha and Orhionmwon LGAs

	Ikpoba-okha		Orhionmwon		Aggregate	
Demographic Characteristics	Freq.	%	Freq.	%	Freq.	%
Sex:						
(a) Male	141	59.2	146	65.8	287	62.4
(b) Female	97	40.8	76	34.2	173	37.6
Total	238	100	222	100	460	100
Relation to Household Head:						
(a) Wife	51	21.4	49	22.1	100	21.7
(b) Children	173	72.7	170	76.6	343	74.6
(c) Parent	2	0.8	0	0	2	0.4
(d) Close relations	10	4.2	3	1.3	13	2.8
(e) Distant relations	3	0.8	0	0	2	0.4
Total	238	100	222	100	460	100
Residential Status:						
Usually resident	220	92.4	218	98.2	438	95.2
Not usually resident	18	7.6	4	1.8	22	4.8
Total	238	100	222	100	460	100
Age (Years):						
(a) 0 - 19	54	22.7	49	22.2	103	22.4
(b) 20 - 39	80	33.6	71	32.0	151	32.8
(c) 40 - 59	86	36.1	73	32.9	159	34.6
(d) 60 - 79	12	5.0	20	9.0	32	6.9
(e) 80 >	6	2.5	9	4.0	15	3.3
Means Age	39.6		36.64		38.68	
Total	238	100	222	100	460	100
Education Level:						
(a) No Formal Education	18	7.6	84	37.8	102	22.2
(b) Primary education	158	66.4	120	54.1	278	60.4
(c) Sec. Sch/Modern/Com. Sch.	36	15.1	15	6.8	51	11.1
(d) Tertiary	27	11.3	3	1.4	30	6.5
Total	238	100	222	100	460	100

Source: Field Survey, July - Oct. 2005.

Table 3: Characteristics of Households Heads in Ikpoba-okha and Orhionmwon LGAs

	Ikpoba-okha		Orhionmwon		Aggregate	
Variables	Freq.	%	Freq.	%	Freq.	%
Sex:						
(a) Male	42	95.5	46	100	88	97.8
(b) Female	2	4.5	0	0	2	2.2
Residential Status:						
Age (years):						
< 30	8	18.2	6	13.0	14	15.6
30 - 39	1	2.3	2	4.4	3	3.3
40 - 49	8	18.2	20	43.5	28	31.1
50 - 59	8	18.2	11	23.9	19	21.1
60 - 69	7	15.9	5	10.9	12	13.3
> 69	12	27.3	2	4.4	14	15.6
Mean	50.1		47.3		49.32	
Educational Level:						
•Not formal education	9	20.5	18	39.1	27	30.0
•Primary education	14	31.8	20	43.5	34	37.8
•Sec/Modern/Com. Sch.	10	22.7	6	13.0	16	17.8
•OND/NCE/HND/B.Sc	11	25.0	2	4.4	13	14.4

Table 3: Continued

Occupation:						
•Non-farmers	13	29.6	1	2.2	14	15.6
•Farmer	10	22.7	22	47.8	32	35.6
•Salary/wage earner	9	20.5	3	6.5	12	13.3
•Non-salary/wage earner	12	27.3	20	43.5	32	35.6
Household Size:						
1 - 3	5	11.4	5	10.9	10	11.1
4 - 6	26	59.1	30	62.2	56	62.2
7 - 9	10	22.7	10	21.7	20	22.2
10 - 12	3	6.8	1	2.2	4	4.4
Total	44	100	46	100	90	100
Mean Household Size	6.42		5.94		6.23	
Type of Household:						
•One person	1	2.3	0	0	1	10.1
•Married with one child	15	34.1	0	0	15	16.7
•Married with children	28	63.6	46	100	74	82.2

Source: Field Survey, July - Oct, 2005

Table 4: Average Monthly Income of Households in Ikpoba-okha and Orhionmwon LGAs

	Ikpoba-okha		Orhionmwon		Aggregate	
Average Monthly Income (N)	Freq.	%	Freq.	%	Freq.	%
< 2,500	1	2.27	2	4.35	3	3.33
2,501 - 5,000	5	11.36	3	6.52	8	8.89
5,001 - 7,500	4	9.09	1	2.17	5	5.56
7501 - 10,000	15	34.09	17	36.96	32	35.56
10,001 - 12,500	6	13.64	10	21.74	16	17.78
12,501 - 15,000	3	6.82	5	10.87	8	8.89
15,001 - 17,500	4	9.09	3	6.52	7	7.78
17,501 - 20,000	1	2.27	3	6.52	4	4.44
20,001 - 22,500	2	4.54	1	2.17	3	3.33
22,501 - 25,000	1	2.27	0	0	1	1.11
25,001 - 27,500	2	4.54	1	2.17	3	3.33
27,501 - 30,000	0	0	0	0	0	0
Total	44	100	46	100	90	100
Mean Income (N)	12,242.66		7,541.73		10,402.68	

Source: Field Survey, July - Oct, 2005

Table 5: Consumption Expenditure Pattern of an Average Household Per Month in the Study Area

	Ikpoba-okha		Orhionmwon		Aggregate	
Expenditure Item	(N)	%	(N)	%	(N)	%
Rent	960.63	6.68	340.68	4.18	648.55	5.73
School fees	1,866.42	12.98	830.84	10.20	1,368.63	12.09
Medical Expenses	865.64	6.02	480.62	5.90	670.40	5.92
Clothing	1,870.88	13.02	991.83	12.17	1,402.42	12.39
Remittances	563.00	3.72	1,005.25	12.34	750.63	6.63
Transportation	1,643.66	11.43	1,097.33	13.47	1,366.50	12.07
Social/Religion	1,200.40	8.35	771.92	9.47	980.18	8.66
Food	5,430.62	37.78	2,628.50	32.26	4,129.58	36.49
Total	14,401.51	100	8,146.97	100	11,316.89	100

Source: Field Survey, July - Oct. 2005

Income Status of Households in Ikpoba-okha and Orhionmwon LGAs: Income from various income-generating sources of the households (on monthly basis) were used in estimating the average monthly income per household. The study revealed an average monthly income of N12,242.66 and N7,541.73 for the low-income urban and rural households respectively (Table 4). This means that household size of six persons on the average, at the two locations, have N12,242.66 and N7,541.73 respectively to spend in a month. These probably might be insufficient considering the prevailing market price of most food-stuffs at the time these data were collected. However the higher average monthly income observed for the low-income urban households is probably because they are more exposed to other economic income earning activities.

General Consumption Expenditure Patterns of Households in the Study Area: General consumption expenditure here refers to expenditures on food, clothing, medicine and other domestic related expenses. The expenditure was broken down into eighty (8) different categories as shown in Table 5. The total expenditure of an average household per month in the low-income urban and rural areas were N14,401.51 and N8,146.97 respectively. This shows that at both locations, the amount expended on general consumption exceeded the average monthly income of the household and this has great implications for food security. One might make a submission that the households probably consume from their past savings or do not only make cash expenditure, but also in credit, kind and materials like in food, social/religion, etc.

Also the table shows that the largest share of monthly expenditure goes for food. For the low-income urban it was N5,430.62 (or 38% of total expenses) while for the rural household it was N2,628.50 (or 32% of total expenses). Following this, in order of magnitudes, is clothing, transportation and social/religions activities for the low-income urban households. The pattern was slightly different for the rural households with transportation coming second, remittances, clothing and social/religion activities taking on the 3rd, 4th and 5th positions respectively. On the whole food, clothing, school fees, transportation and social/religion took on shares of 36.49%, 12.39%, 12.09%, 12.07% and 8.66% of total monthly consumption expenditure of households at both locations. The first two (food and shelter) represents two of the three essentials (food, cloth, shelter) needed for man's survival, while transportation also plays very vital role especially with respect to commerce and communication.

However with monthly consumption expenditure being greater than monthly realized income and food taking the lion share of total expenditure, there is a great probability for households to consuming less than the recommended minimum nutrient intake level. Moreso, access to enough food for a healthy life at all times (food security) might be greatly threatened.

For convenience, the calorie/protein content in each of the food items consumed (i.e the calorie/protein intake level) was used in this study to describe the food consumption pattern of households. Also the food consumption situation within households (particularly level of food security) was analysed by sex and location. The distribution pattern of household members used for the study, based on age, sex and location are shown in Table 6. A total of three hundred and eighty-four (384) out of the four hundred and sixty (460) household members in the 120 households sampled were used for the analysis. The age category of less than 1 year (10 in number) was excluded from the analysis since they were still breat-feeding and adequate quantification of the breast-milk intake could not be done.

Food consumption pattern as, defined by Aromolaran [4] refers to peoples food eating habits showing what constitutes the food basket of an individual or group of people (e.g. household) in a particular location. The breakdown of the food eating habits along gender line in the study area in terms of calorie and protein intake are shown in Tables 7 and 8.

The result in Table 7 showed a marked variation in the eating habits between the low-income urban and rural dwellers. There was however not much distinct variation across sex except for roots and cereals in the low-income urban location where there was marked variation across sex. On the aggregate, roots cereals and legumes in a decending order dominated the calorie food intake of the respondents in both locations. The diet of household members at both locations was dominated by roots and tubers (65% and 61%) both of which are mainly carbohydrate. This finding also supports the report of Hoefle and Baker [5] which revealed that the diets of inhabitants of Nigeria is made up of 56 - 67% starchy roots.

The study also noted that at both locations the daily per capita calorie intake of females was lower (2,010.75 and 2179kcal for the low-income urban and rural respectively) than the male inhabitants (2391 and 2465.5 respectively). This difference could be linked to the fact that males

Table 6: Distribution of Household Members Used in the Food Consumption Analysis by Age, Sex and Location

	Ikpoba-okha		Orhionmwon		Aggregate				
Age Categories (Years)	Male	Female	Male	Female	Male	% of Total	Female	% of Total	Total
1 - 3	11	9	9	6	20	5.21	12	3.13	32
4 - 6	11	9	11	11	22	5.73	20	5.21	42
7 - 10	15	15	19	16	34	8.85	31	8.07	65
11 - 14	10	9	9	5	19	4.95	14	3.65	33
15 - 18	18	6	4	4	22	5.73	10	2.60	32
19 - 50	22	28	30	28	52	13.54	56	14.58	108
51 - 59	6	10	6	2	12	3.13	12	3.13	24
60 - 64	4	6	3	3	7	1.82	9	2.34	16
65 - 74	12	7	3	2	15	3.91	9	2.34	22
75^{+}	3	7	2	1	5	1.30	3	0.78	8
Total	112	98	96	78	268	54.17	176	45.83	384

Source: Field Survey, July - Oct. 2005

Table 7: Calorie Consumption Patterns in Ikpoba-okha and Orhionmwon LGAs by Sex (in percentage)

	Ikpoba-okha			Orhionmwon			Aggregate		
Food Item	Male	Female	Both sex	Male	Female	Both sex	Male	Female	Both sex
Roots	56.50	62.63	59.61	54.58	54.64	54.61	55.98	58.23	59.6
Tubers	5.88	5.51	5.73	6.62	6.88	6.73	6.27	6.26	6.23
Cereals	20.64	15.02	17.75	22.22	21.69	21.99	20.99	18.69	19.10
Legumes	8.72	8.02	8.44	8.29	7.87	8.11	8.50	7.94	7.60
Vegetables	1.62	1.76	1.66	2.15	2.36	2.22	1.89	2.09	2.11
Oil	3.29	3.83	3.51	3.85	4.41	4.09	3.58	4.15	3.11
Fruits	0.22	0.20	0.21	0.16	0.12	0.15	0.19	0.16	0.10
Beverages	0.39	0.33	0.36	0.50	0.37	0.44	0.44	0.35	0.35
Meat	0.84	0.83	0.84	0.32	0.20	0.27	0.57	0.49	0.45
Fish	1.47	1.63	1.53	1.28	1.47	1.37	1.37	1.54	1.25
Other Animal Products	0.42	0.25	0.35	0.035	0.00	0.02	0.22	0.11	0.20
Total Calorie per Capita Daily Intake (kcal)	2,391.0	2,010.75	2200.93	2,465.49	2,178.90	2,322.20	2,428.25	2,094.83	2,261.54

Source: Computed from field Survey data, July - Oct. 2005

Table 8: Protein Consumption Pattern in Ikpoba-okha and Orhionmwon LGAs by Sex (in Percentage)

	Ikpoba-okha			Orhionmwon			Aggregate		
Food Item	Male	Female	Both sex	Male	Female	Both sex	Male	Female	Both sex
Roots	9.182	10.533	9.718	9.524	9.667	9.586	9.358	10.054	9.644
Tubers	5.114	5.047	5.087	5.980	6.235	6.090	5.558	5.704	4.654
Cereals	20.403	16.326	18.784	23.440	22.733	23.132	21.963	19.869	21.090
Legumes	32.038	30.964	31.612	31.667	30.167	31.013	31.847	30.523	31.290
Vegetables	9.083	10.493	9.643	12.605	13.863	13.152	13.152	12.356	12.565
Oil	0	0	0	0	0	0	0	0	0
Fruits	0.138	0.145	0.141	0.086	0.073	0.080	0.111	0.105	0.145
Beverages	0.351	0.266	0.317	0.296	0.046	0.187	0.323	0.144	0.132
Meat	7.145	8.015	7.490	3.021	1.938	2.550	5.026	4.654	4.990
Fish	14.607	17.024	15.566	13.322	15.281	14.117	13.894	16.060	15.405
Other Animal Products	1.941	1.187	0.641	0.163	0	0.092	1.027	0.530	0.085
Total Protein per Capita daily intake(g)	43.40	38.86	41.13	43.39	36.60	40.00	43.40	37.73	40.57

Source: Computed from field Survey data, July - Oct. 2005

Table 9: Test of Significance of Nutrient Intake Levels in Ikpoba-okha (Urban) and Orhionmwon (Rural) LGAs

	Calorie		Protein	
Variable	T - cal	P > /t/	T - cal	P > /t/
Low-Income Urban Vs Rural	-1.66	0.0098	-0.86	0.039
Low-Income Urban Vs FAO	4.19	0.016	4.49	0.025
Rural V FAO	6.25	0.013	6.95	0.04
Male Vs Female (Low-income urban)	2.83	0.01	2.23	0.046
Male Vs Female (rural)	2.02	0.04	1.60	0.011

Source: Computed from field Survey data July - Oct. 2005

usually do the harder and more energy consuming jobs in the homes hence they require more calorie food intake. The daily per capita calorie intake for the male and female rural dwellers (2465.5 and 2179kcal respectively) was higher compared to 2391 and 2010.75kcal for the male and female low-income urban inhabitants. The implication of these results is that only the male inhabitant daily. Calorie intakes (at both locations) was close to FAO recommended daily per capita calorie intake of 2,400kcal.

In Table 8 the eating habits of household members in terms of daily protein intake is presented. The result showed variations though not so remarkable between locations (rural and low-income urban) and sex except for proteins derived from meat, fish and other animal products. On the aggregate, the household per capita daily protein intake was 40.57grams and this was mainly from legumes (31.29%) and cereals (21.09%) while protein from animal source only accounted for 20.48% of the total protein intake. Again the females had lesser daily protein intake than the males but the difference could not be attributed to one single category of food listed. Both male and female in the study area did not attain the FAO [6] recommended minimum protein per capita daily intake of 44.4g. The male intakes which were 43.4g for low-income urban and 43.39g for rural area were closer to the recommended minimum as compared to 38.86g and 36.6g respectively for the females. These results tend to indicate that male members in the households had better food intake in terms of both calories and food protein content than the female members. However this statement could only be confirmed by carrying out the test of difference between the means.

Test of Significance of Nutrient Intake in the Study Area: The results of the test of significance of the level of per capita daily calorie/protein intake of respondents are presented in Table 9. The results showed that per capita daily calorie and protein intake of the low-income urban and rural households were significantly different at the 1 percent and 5 percent α-level respectively. The comparison of the nutrient intake of the low-income urban and rural households with that of the FAO recommended minimum intake showed a significant difference from the FAO values at 1 and 5% α-level. The analysis also showed that per capita daily calorie/protein intake was significantly different at 1 and 5% α-level between the male and female in the low-income urban and rural areas respectively.

CONCLUSION

This study tried to determine the average monthly income of households in the rural and low-income urban areas, their food consumption pattern and the per capita daily calorie/protein intake. The study found that the average monthly income of the rural households was about 38% (N7,541.73) lower than that of the low-income urban households (which was about N12,243). Their monthly expenditure followed the same pattern with the rural households spending about N8, 146.97 while the low-income urban households spent about N14,401.51. In both cases their average monthly expenditure exceeded their average monthly income implying they are net consumers. Food was the single major item (32 - 38%) in the consumption - expenditure basket.

With respect to daily calorie intake that of rural households were higher (2465.5kcal for male and 2179kal for female) as against 2391kcal for male and 2011kcal female for the low-income urban households. The difference was probably as a result of their higher consumption of tubers and cereals by the rural households. In both locations roots and tubers contributed over 61% of the total food consumption basket reflecting a heavy dependence on starchy foods in the diet. For daily protein intake, the study revealed that the low-income urban households consumed more than the rural households and the difference was linked to the higher consumption of animal protein products by the low-income urban households and probably also their higher levels of income and literacy (92% for urban

households as compared to 62% for the rural households). The study also confirmed that the daily calorie - protein intake levels at both locations were significantly lower than the FAO recommended minimum levels. By implication this study has revealed that education has a major role to play in trying to improve the quality of daily food intakes of households in Nigeria.

The study also showed that unless the cereals and other plant related foods being consumed in the rural areas are fortified with protein based elements the rural dwellers would continue to feed on low quality foods in terms of protein content. Low protein intakes in human diets is known to retard body growth, reduce human resistance to diseases and therefore high mortality rate.

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