

*Original Research Article*

# Food Consumption Patterns of Households in the North West Region of Cameroon

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Abstract

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This study determined the food consumption pattern and nutritional status of rural households in the North West Region of Cameroon. Multi-stage random sampling was used to select 480 households. Ethical approval/informed consent were obtained. Structured questionnaires, dietary assessments and focus group discussions provided information on household food consumption pattern and food security. Descriptive and inferential statistics were used to analyze collected data and significance at  $p < 0.05$  accepted. Data obtained and analyzed showed that 76.5% of households in urban and 100% in rural communities practiced homestead gardening. Medium dietary diversity score was observed in infant and young children 6-59 months of age, women of reproductive age and households in the urban and rural communities. Food intake was adequate in quantity, not quality in both communities. Urban households had moderate food insecurity as compared to the rural households. Severe food insecurity was observed more in rural households as compared to urban households. Corn fufu with huckleberry were the most frequently consumed meals with little or no animal source protein. Protein and B group vitamins intake of respondents in both communities were below the FAO/WHO recommended values while energy, iron, vitamin A and C were in excess for most age groups.

**Keywords:** Food consumption pattern, Households, Sources of nutrients

## INTRODUCTION

Food is a necessity of life as everyone seems to know, but the knowledge of good nutrition and appropriate food consumption patterns is not common to all. Life cannot be sustained without adequate nourishment. Humans normally need food for growth and development and to lead an active and healthy life. Food in essence, is any substance liquid or solid, which after consumption, digestion and absorption by the body, nourishes the body, supplies energy, promotes good physical and

intellectual growth and development, repairs the worn out tissues and regulates all the body processes. The materials necessary to perform these functions are referred to as nutrients. Nutrients are components in foods that an organism uses to survive and grow. Each nutrient has its own functions in the body and is vital to life. The nutrients must be consumed in the right proportion for the maintenance of good health. Metabolic processes become deranged when the nutrients in the

body are present in abnormal quantities (Ake-Tano et al., 2011). A number of different nutritional disorders may occur within the population, depending on which nutrients are inadequate, excessive or disproportionate in the body (Spolidoro et al., 2012).

Man's desire to choose certain foods is often controlled by instinct, but is sometimes learnt through experiences by which we come to conclude that certain foods contribute to good health and nutritional status. The value of any food product is a measure of its nutritional potentials, which in turn are determined by its chemical composition, the level of food toxicants as well as the bio-availability of the nutrients (Kanasop et al., 2011). Nutrition plays an integral role in the optimal functioning of the body. The health condition of an individual or group as influenced by diet, the level of nutrients in the body and the ability of those levels to maintain normal metabolic integrity is referred to as nutritional status (Shubhangini, 2012). Nutritional status according to Srilakshmi (2016) is the physiological condition of an individual that results from the balance between nutrient requirements and intake, and the ability of the body to use these nutrients. A healthy population is essential for any country in order to be productive and to promote national development. It is therefore the paramount duty of every nation to monitor and care for the health of her population. It can be determined by correlation of information obtained through a careful medical and dietary history, taking physical measurements of the body, clinical examination and appropriate laboratory investigations. Srilakshmi (2016) also reported that nutritional status is influenced by food consumption patterns, income, religion, attitudes, cultural practices, gender, lifestyle, educational status, physiological state and age. These factors affect the quality and quantity of nutrient intake. Adequate food intake is essential as nutritional well-being plays an important role in health promotion and maintenance. Poor nutritional status is associated with inappropriate food consumption patterns.

Food consumption patterns are among the oldest and most deeply entrenched aspects of any culture. They have deep psychological roots and are associated with love, affection, warmth, self-image and social prestige (Nolla et al., 2014). Culture and socio-economic status of the population influence food choices and patterns of consumption. Consumption of some food items is likely to vary according to season and often based on availability and price. Food consumption patterns can be defined as the combination of foods that constitute the usual dietary intakes of an individual over certain periods. It fundamentally reflects nutritional wellbeing of the individual (Nolla et al., 2014). Food consumption patterns change over time, the major lead for such changes being the developments in technology. Poor food consumption

patterns may sometimes cause overweight or obesity, tooth decay, high cholesterol levels, high blood pressure, heart disease and stroke, type 2 diabetes, osteoporosis and some cancers.

Cameroon, which is the target of this research is one of the world's most ethnically diverse countries with a variety of people and cultures. Each area has its own regional favourites, which depend on customs, traditions and norms. The different foods available also depend on the season. There are particular foods that some communities regularly consume in large quantities, which supply the bulk energy needs of the community. They are "staple foods" and include cereals, roots and tubers, organisms, fruits and legumes. The consumption pattern of food is greatly influenced by the socio-economic status of the household which in turns affects the quality and quantity of nutrient intake.

Eating patterns in Cameroon have been influenced by many ethnic diets. Most ethnic diets consist of unrefined grains, legumes, fruits and vegetables and low in sources of simple sugars. However, many ethnic diets include less milk and meat, focusing more on legumes (beans) as a source of protein. Social status and food consumption patterns are closely linked. Foods perceived as prestigious foods are expensive and most desirable. Individuals accorded higher social status are privileged to eat these foods and to reject less desirable foods. In many cultures, family food distribution is similar, the woman offers the best choice of food to her husband or to the elders and then to the "productive members of the family. Toddlers, children and the women are frequently the last to be served (Germaine *et al.*, 2013). In some societies such as Cameroon men and women eat separately, the men are served first, the women and children receive the leftovers.

The frequency of eating usually varies from once a day to three times a day. This habit is acquired from childhood. People who eat once a day probably do so for convenience, for example, farmers, who get up very early in the morning and travel long distances to their farms, may not have time to eat until the afternoon, when they will consume large amounts of food. This eating pattern will tend to distend the stomach, and can cause discomfort. Most people eat three times daily but light refreshments between meals. In this way, the body is able to cope with the demands made on it during the day. However, children have a tendency to fill themselves with bread, garri in water, biscuits, puff-puff, gateau and sweets between meals. Another practice is serving food to all the children in the family on one large plate, so that they all sit round the plate and eat together. When this is done it is likely that the slow eaters will not get enough food and fewer nutrients (Djeukeu *et al.*, 2013). However, this pattern is not common.

## Literature Review

### Food consumption patterns in Cameroon

There are particular foods that some communities regularly consume in large quantities, which supply the bulk energy needs of the community. They are “staple foods” and include cereals, roots and tubers, organisms, fruits and legumes. Cameroon, which is the target of this research is one of the world’s most ethnically diverse countries with a variety of people and cultures. Each area has its own regional favourites, which depend on customs, traditions and norms. The different foods available also depend on the season. The socio-economic status of the household affects the quality and quantity of nutrient intake. Households from higher socio-economic status groups in general consume high and better quality foods. Their children have better nutritional status than children from lower socio-economic groups (Germaine *et al.*, 2013). Tanya *et al.* (1997) earlier reported that children from higher socio-economic groups tend to have higher intake of protein, iron and calcium derived from intake of animal protein than children from lower socio-economic status /group.

Dietary patterns in Cameroon have been influenced by many ethnic diets. Most ethnic diets consist of unrefined grains, legumes, fruits and vegetables and low in sources of simple sugars. However, many ethnic diets include less milk and meat, focusing more on legumes (beans) as a source of protein. Social status and food consumption patterns are closely linked. Foods perceived as prestigious foods are expensive and most desirable. Individuals accorded higher social status are privileged to eat these foods and to reject less desirable foods. In many cultures, family food distribution is similar, the woman offers the best choice of food to her husband or to the elders and then to the “productive members of the family. Toddlers, children and the women are frequently the last to be served (Germaine *et al.*, 2013). In some societies such as Cameroon men and women eat separately, the men are served first, the women and children receive the leftovers.

### Meal pattern and distribution in Cameroon

Cameroonians typically eat two large meals during the day and depending on the family, many also consume a light breakfast. The most important meals are served at noon and generally consist of carbohydrate food served with leafy vegetables or soup depending on the community. The green leafy vegetables and soups may be served with or without fish or meat. The ingredients typically present include palmoil, onions, pepper and salt. Crayfish may sometimes be used (Kanasop *et al.*, 2014).

Midday and evening meals are usually served on separate plates among children according to gender and age. It also takes into consideration the number of people in the household. In most houses, the male head of the household is served his own plate, which includes a more generous portion of meat and other sought after food ingredients such as fish, snails etc.

Access to adequate food constitutes the most serious problems in most Cameroonian households today. There are several schools of thoughts on the nature of the Cameroonian food problem (Nolla *et al.*, 2013). One school of thought holds that there is no shortage of food. Food is physically available in rural and urban markets. Food is always physically available in market places except during planting season. The real problem is the lack of economic stability by many households to purchase food of reasonable nutritional standards. A study carried out in Makèpè Missokèin Douala identified stunting, wasting and overweight as the physical forms of malnutrition. Besides macronutrients, there were poor intakes of micronutrients due to inappropriate feeding linked to poor knowledge of available foods and poverty (Djeukeu *et al.*, 2013). The assertion that “food is physically available and thus there is really no problem” can therefore be easily dismissed. Another school of thought believes that there is enough domestic production of food in Cameroon and the problem lies in poor storage, marketing and distribution channels, which greatly reduce available market supplies of food.

The frequency of eating usually varies from once a day to three times a day. This habit is acquired from childhood. People who eat once a day probably do so for convenience, for example, farmers, who get up very early in the morning and travel long distances to their farms, may not have time to eat until the afternoon, when they will consume large amounts of food. This eating pattern will tend to distend the stomach, and can cause discomfort. Most people eat three times daily but light refreshments between meals. In this way, the body is able to cope with the demands made on it during the day. However, children have a tendency to fill themselves with bread, garri in water, biscuits, puff-puff, gateau and sweets between meals. Another practice is serving food to all the children in the family on one large plate, so that they all sit around the plate and eat together. When this is done it is likely that the slow eaters will not get enough food and fewer nutrients (Djeukeu *et al.*, 2013). However, this pattern is not common.

### Sources of nutrients in Cameroonians diet

The diet in Cameroon is dominated by tubers and cereals. Starchy foods commonly cultivated and consumed in Cameroon include corn, millet, sorghum,

cassava, yam, cocoyam, potatoes, plantains, unripe bananas and rice (Mennen et al., 2000; Nolla *et al.*, 2013; Sharma et al., 2007). They are available throughout the year and are very cheap. However, cassava has the lowest protein to energy ratio compared to other tubers. Yam and plantains are the most expensive food stuffs compared to cassava and sweet potatoes (Germaine *et al.*, 2013). According to Jaarveld et al. (2005), sweet potatoes and yams are nutritionally superior to other tubers, with high carotenoids and vitamin C content. Cereals are richer in nutrients when compared to tubers. However, they are limited in some essential amino acids. Rice is limited in lysine and threonine, maize in lysine and tryptophan and millet in tryptophan despite its high protein content. Traditional alcoholic beverages such as maize beer, millet beer and palm wine are served as sources of carbohydrates in Cameroon (Ejeta Hassen and Mertz, 1987).

Foods in Cameroon are richer in insoluble fibre compared to soluble fibre. According to Tanya, Lantum and Tanya (1997), soluble dietary fibre has beneficial effects on carbohydrate and lipid metabolism. It also has therapeutic effects. Huckleberry, bitter leaves and okra provide the highest total dietary fibre in Cameroonian diets followed by legumes and seeds, fruits, tubers and cereals. Studies have shown that bush mango seeds commonly used in Cameroon could significantly decrease the level of low density lipoprotein cholesterol and triglycerides due to its high soluble fibre level (Ngondi, Oben, Musoro, Etame and Mbaya, 2006). Hemallatha, Platel and Srinivasan (2006) stated that insoluble dietary fibre (lignin) which is present in most cereals and legumes may interfere with the absorption of micronutrients especially iron and zinc. According to Germaine *et al.* (2013), the high fibre content of Cameroonian dishes could be contributing to the increasing prevalence of iron and zinc deficiency in Cameroon.

## MATERIALS AND METHODS

The study was carried out using a cross-sectional descriptive research design. The population of study comprises of households from the North West regions having subjects between the age ranges of 6 months to 60 years. The sample had a total of 480 households. This was determined using the equation by Lutz (1982). This sample was drawn using a multi-stage sampling technique.

Data for this study were collected using a well validated semi-structured questionnaire drawn by the research and focus group discussions (FGD). The consent of participants was freely obtained by asking them to read and sign an informed consent form which

contained adequate information like the title, objective of the study, methods used, and participants' role in the study and expected benefits of the study. The forms were signed by mothers of the households with the consent of their husbands. The reason being that the mothers were available at almost all times. Those who could not read and write were assisted by the research assistants. The information obtained was strictly confidential as code numbers instead of names were used in the study.

Descriptive statistics (frequencies and percentage), standard deviation (SD), student t-test, one-way analysis of variance using statistical package for social sciences version 20.0

## Data analysis

### Daily household meal consumption pattern

Table 1 presents daily household meal consumption patterns. About 80% of households in urban and rural communities ate twice daily. There was no significant difference in the meal consumption pattern between the two communities. Urban households had significantly ( $p < 0.05$ ) low values in collective meal consumption (6.21%) compared to rural households (14.89%) while the reverse was recorded in individual meal consumption within a household. Though no significant difference was observed on who is given priority in times of food insufficiency in urban and rural communities. Over half of the respondents (54.00 %) gave priority to fathers, while more respondents in the urban (25.00 %) gave priority to children compared to their rural counterparts (20.21%).

### Meal skipping pattern of respondents and reasons

Table 2 presents meal skipping patterns of respondents and reasons in both urban and rural communities. No significant difference was seen in the proportion of urban (32.60 %) and rural (21.30 %) household respondent who admitted skipping meals either in the morning, noon or evening, however, more than half of respondents in urban (61.90 %) and rural (65.00 %) households prefer skipping breakfast compared to lunch and dinner. The major reason for skipping breakfast in both urban (75.64 %) and rural (61.53%) households was lack of time. The next major reasons were no leftover food which was significantly ( $p < 0.05$ ) higher among rural households (38.46 %) compared to urban (15.38%). Some households in urban (35.00 %) communities skipped dinner due to their long working hours while the reason as why they were too tired to cook was significantly ( $p < 0.05$ ) higher among households in rural (100%) communities compared to urban (65.00 %).

**Table 1.** Daily household meal consumption pattern

Variation	Sub-variable	Urban	Rural	Chi test
Average number of meals eaten daily	Twice	309 (80.05%)	75(79.78%)	
	Three times	77(19.94%)	19(20.21%)	
	Total	386 (100%)	94 (100%)	
Sharing of household meals	Collectively	24(6.21%)	14(14.89%)	P<0.05
	Individually	362(93.78%)	80(85.10%)	
	Total	386 (100%)	94 (100%)	
Priority to eat when food is insufficient	Father	207(53.62 %)	51(54.25 %)	
	Children	100(25.9%)	19 (20.21%)	
	Elderly	45(11.65 %)	10(10.63%)	
	Adolescents	18(4.66 %)	7(7.44%)	
	Mother	16(4.14 %)	7(7.44%)	
	Total	386(100%)	94(100%)	

**Table 2.** Meal skipping pattern of respondents and reasons

Variation	Sub-variable	Urban	Rural	Chi test
Skip meals	Yes	126(32.64 %)	20 (21.27 %)	
	No	260 (67.35 %)	74(78.72%)	
	Total	386(100%)	94((100%)	
Meal normally	Breakfast	78 (61.90 %)	13 (65.00%)	
Skipped	Lunch	28 (22.22%)	4(20.00 %)	
	Dinner	20 (15.87%)	3 (15.00 %)	
	Total	126(100%)	20(100%)	
Reason for skipping	No time	59 (75.64%)	8(61.53 %)	
Breakfast	Dislike breakfast	7 (9.97 %)	0(0.00%)	
	No leftover food	12 (15.38 %)	5(38.46 %)	p<0.05
	Total	78(100%0)	13(100%)	
Reason for skipping	No cooked food	10(35.71%)	3 (60.00%)	P<0.05
Lunch	Busy at school/ work	16 (57.14%)	1 (40.00%)	
	Prefers snack	1 (3.57 %)	0(0.00%)	
	Weight control	1 (3.57 %)	0(0.00%)	
	Total	28(100%)	4(100%)	
Reason for skipping dinner	Close late from work	7(35.00%)	0(0.00%)	
	Too tired to cook	13 (65.00 %)	3 (100%)	P<0.05
	Total	20(100%)	3 (100%)	

### Snack consumption pattern of respondents

Table 3 presents the snack consumption pattern of respondents in urban and rural households. Household respondents who admitted consuming snacks were significantly ( $p<0.05$ ) higher in urban communities (67.10 %) than in rural (39.10 %). More respondents in urban (40.32%) households admitted absence of cooked food was the reason for consuming snacks while time conservation was the reason why 43.33% of rural and 35.50 % of urban households consumed snacks. IYC 6-59 months who consumed snacks once daily had significantly ( $p<0.05$ ) fewer in urban households (29.70 %) compared to rural (46.70 %) while those who consumed snacks twice daily were significantly higher in

urban (70.27%) than in rural (53.30 %) communities. More children 6-9 years (64.48%), adolescents (46.24%), pregnant and lactating women (67.05%) in urban and rural households consumed snacks twice daily while snack consumption once daily was most prevalent amongst the elderly (66.41 %) though no significant difference was seen in urban and rural households for these age groups.

### Frequency of consumption of foods from different food groups in a week

In Table 4, among the starchy foods, corn fufu, was consumed by all respondents in both urban and rural

**Table 3.** Snacks consumption pattern of households

Variation	Sub-variable	Urban	Rural	chi test
Household snack consumption	No	127(32.90%)	64(68.08%)	P<0.05
	Yes	259(67.09%)	30(31.91%)	
	Total	386(100%)	94(100%)	
Reasons for eating snacks	No cooked food	106 (40.92%)	7(23.33%)	P<0.05
	It saves time	92 (35.52%)	13 (43.33%)	
	Prefer snacks	37 (14.28%)	6(20%)	
	Reduces cost	24 (9.26 %)	4 (13.33%)	
	Total	259(100%)	30(100%)	
Number of times children (6-59 months) eat snacks daily	Once	77 (29.72%)	14 (46.66%)	P<0.05
	Twice	182 (70.27%)	16 (53.33%)	
Number of times children (6-9yrs) eat snacks daily	Total	259(100%)	30(100%)	
	Once	89(34.36%)	11(36.66%)	
	Twice	170(65.63%)	19(63.33%)	
	Total	259(100%)	30(100%)	
Number of times adolescents eat snacks daily	Once	108(41.69%)	10(33.33%)	
	Twice	110(42.47%)	15(50.00%)	
	Three times	41(15.83%)	5 (16.66%)	
	Total	259(100%)	30(100%)	
Number of times pregnant and lactating women eat snacks daily	Once	93 (35.90%)	9(30.00%)	
	Twice	166 (64.09%)	21(70.00%)	
	Total	259(100%)	30(100%)	
Number of times the elderly eat snacks daily	Once	180 (69.49%)	19(63.33%)	
	Twice	79(30.50%)	11 (36.66%)	
	Total	259(100%)	30(100%)	

**Table 4.** Frequency of consumption of starchy foods by rural and urban subjects in a week

Food	Urban (n=386)/ Number of times(wk)				Rural (n =94)/ Number of times(wk)			
	Consume	1-3	4-6	Daily	consume	1-3	4-6	Daily
Corn fufu	386(100%)	0	107(27.72%)	279(72.27%)	94(100%)	0	20(21.27%)	74(78.70%)
Roasted cassava	-	-	-	-	-	-	-	-
Water fufu	-	-	-	-	-	-	-	-
Raw cassava	-	-	-	-	-	-	-	-
Pottage plantain	48(12.43%)	48(100%)	0	0	-	-	-	-
Roasted plantain	-	-	-	-	-	-	-	-
Fried plantain	-	-	-	-	1(1.06%)	1(100%)	0	0
Boiled plantain	70(18.13%)	70(100%)	0	0	1(1.06%)	1(100%)	0	0
B unripe banana	36(9.32%)	36(100%)	0	0	11(11.70%)	11(100%)	0	0

**Table 4.** Continue

Boiled Cocoyam	63(16.32%)	63(100%)	0	0	13(13.82%)	13(100%)	0	0
Pounded cocoyam	123(31.86%)	123(100%)	0	0	63(67.02%)	63(100%)*	0	0
Roasted cocoyam	-	-	-	-	3(3.19%)	3(100%)	0	0
Pottage cocoyam	38(9.84%)	38(100%)	0	0	14(14.89%)	14(100%)	0	0
Garri	60(15.54%)	60(100%)	0	0	14(14.89%)	13(92.8%)	1(7.14%)	0
Boiled potatoes	124(32.12%)	122(98.3%)	1(0.80%)	1(0.80%)	49(52.12%)	49(100%)*	0	0
Fried potatoes	40(10.35%)	10(25%)	30(75.00%)	0	14(14.89%)	2(14.28%)	12(85.71%)	0
Pottage potatoes	290(75.12%)	290(100%)	0	0	81(86.17%)	81(100%)	0	0
Roasted potatoes	-	-	-	-	-	-	-	-
Bread	172(44.55%)	171(99.4%)	1(0.80%)	0	16(17.02%)	16(100%)*	0	0
Rice	332(86.01%)	300(90.30%)	14(4.21%)	18(5.42%)	67(71.27%)	66(98.50%)	1(1.49 %)	0
Maize	360(93.26%)	4(1.11%)	300(83.33%)*	56(15.56%)	94(100%)	0	53(56.38%)	39(41.48%)*

B unripe banana; \*Significant at  $p < 0.05$

**Table 5.** Frequency of consumption of fats and oils by rural and urban household in a week

Food	Urban (n =386)/ Number of times(wk)				Rural (n =94)/Number of times(wk)			
	Consume	1-3	4-6	Daily	Consume	1-3	4-6	Daily
Margarine	28(7.25%)	26(92.85%)	2(7.14%)	0	-	-	-	-
Gnut oil	71(18.39%)	70(98.59%)	1(1.41%)	0	12(12.76%)	12(100%)	0	0
Cotton oil	-	-	-	-	-	-	-	-
Soybean oil	-	-	-	-	-	-	-	-
Corn oil	-	-	-	-	-	-	-	-
Red palm oil	386(100%)	7(1.81%)	356(92.22%)*	23(5.95%)	94(100%)	11(11.70%)	14(14.89)	69(73.40%)
Rapeseed oil	-	-	-	-	-	-	-	-
Sunflower oil	-	-	-	-	-	-	-	-

Gnut oil; Groundnut oil \*Significant at  $p < 0.05$

communities. This was followed by rice (86.00 %), pottage potato(75.00 %), bread(44.60 %) and pounded cocoyam(31.60 %) in the urban communities and potato (86.00%), rice(71.00 %), cocoyam(67.00 %) in rural communities. In terms of frequency, over 70.00 % of households in urban and rural communities consumed corn fufu on a daily basis. Apart from rice, the other starchy food was eaten by respondents 1-3 times per day.

Only about 9.60 % ate rice 4 times or more per week. The proportion of households that consumed bread at least once weekly was significantly ( $p < 0.05$ ) lower in rural than in urban households while significantly ( $p < 0.05$ ) higher values were observed in the proportion of rural households that consume pounded cocoyam at least once weekly compared to urban households. Major fats and oils consumed in the urban communities were red palm oil (100%), followed

by groundnut oil (18.40 %) and margarine (7.25%) while in the rural area, it is red palm oil (100%) followed by groundnut oil (12.70 %). Significantly more rural households (73.40 %) consumed red palm oil on a daily basis compared to 5.95% in the urban community. Majority of households in the urban communities consumed palm oil 4-6 times per week. Majority of urban and rural households consumed margarine 1-3 times per week. This is presented in Table 5.

**Table 6.** Frequency of consumption of animal source food (ASFs) by rural and urban household in a week

Food	Urban (n = 386)/Number of times(wk)				Rural (n = 94)/Number of times(wk)			
	Consume	1-3	4-6	Daily	Consume	1-3	4-6	Daily
Meat	326(84.45%)	224(68.71%)	102(31.29%)	0	49(52.12%)	40(81.63%)	9(18.36%)	0
Organ meat	43(11.13%)	43(100%)	0	0	10(10.63%)	9(90%)	1(10%)	0
Crayfish	362(93.73%)	292(80.66%)*	12(3.31%)	58(16.02%)	47(50.00%)	25(53.19%)	12(25.53%)	10(21.28%)
Eggs	38(9.84%)	38(100%)	0	0	1(1.06%)	1(53.19%)	0	0
Milk	44(11.39%)	44(100%)	0	0	1(1.06%)	1(100%)	0	0
Chicken	36(9.32%)	36(100%)	0	0	1(1.06%)	1(100%)	0	0
Fresh fish	69(17.89%)	64(92.75%)	3(4.35%)	2(2.90%)	9(9.57%)	9(100%)	0	0
Dry fish	324(83.93%)	236(72.83%)	22(6.79%)	66(20.37%)	72(76.59%)	62(88.61%)	7(9.72%)	3(4.17%)
Snail	6(1.55%)	6(100%)	0	0	1(1.06%)	1(100%)	0	0

\*Significant at  $p < 0.05$ 

Consumption of animal source foods (ASFs) is presented on Table 6. Major ASFs consumed in urban communities were crayfish, meat and dry fish as they were consumed by 93.70 %, 84.50 % and 84.90 % of the households within the week, whereas in the rural communities dry fish was consumed by 76.50 % of the households followed by 52.00 % who consumed meat and 50% who consumed crayfish. More urban households (31.29 %) consume fish 4 or more times per week, compared to 18.30 % in the rural community. Just about 10.00 % of urban and 1.06% of rural communities consumed eggs, chicken and milk. A significantly high percentage of urban households (17.90 %) consumed fresh fish compared to rural households (9.60 %). Majority of respondents, 68-100% in the urban and 53-100% in the rural communities consume ASFs 1-3 times per week. A greater percentage of rural households (46.58%) consumed crayfish more than 4 times per week compared to those in the urban communities (9.33%). On the other hand, a greater percentage of those who consumed dry fish 4 times or more were in the urban areas (27.16%) than in the rural areas

(11.89%). Consumption of meat and crayfish at least once weekly had significantly ( $p < 0.05$ ) higher values in urban compared to rural households.

Table 7 shows that lima bean (83.9%) and groundnut (77.46%) were more consumed by the urban households compared to lima bean (59.57%) and groundnut (55.36%) in the rural communities who consumed them. All respondents in the urban and rural communities consumed ASFs 1-3 times per week. Consumption of lima beans and boiled groundnuts at least once weekly, had significantly ( $p < 0.05$ ) higher values in urban areas compared to households in rural communities likewise, *Irvingia gabonensis* (ogbono), melon and groundnut soup.

The fruits vegetable consumption in urban and rural households is shown on Table 8. The least consumed vegetables among urban and rural households were cabbage, pumpkin and *Gnetum africanum*, while the least consumed fruits were apples (0-13%) and tangerines (0-11.39%). A higher proportion of urban households (25.38%) consumed pawpaw, compared to the 5.30 % of rural households. Only *Solanum scabrum* was

consumed by all rural and urban households. Significantly ( $p < 0.05$ ) a higher proportion of urban households compared to rural households, consumed ripe banana (99.00 % vs 44.00 %), cooked garden eggs (68.00 % vs 53.00%), tomatoes (93.00 % vs 20.00 %), onion (95.85% vs 25.50 %) and *V. amygdalina* (65.00 % vs 47.00 %). Ripe bananas however, had significantly ( $p < 0.05$ ) higher values in urban households compared to rural households.

In terms of frequency of consumption, the majority of the urban and rural households consumed fruits and vegetables 1-3 times per week. The most frequently consumed vegetable is *Solanum scabrum* as 36% of urban and 46.8% rural households consumed it 4 or more times per week. This was significantly ( $p < 0.05$ ) higher in rural compared to urban households. Although the proportion of the urban households (94.3%) consuming ripe banana was higher than that of the rural households (44.68%), frequency of consumption was higher among rural households as 51.14% of rural consumers ate it 4 times or more times per week compared to <1.00 % among urban households.



**Table 7.** Frequency of consumption of legumes, seeds and nuts by rural and urban households in a week

Food	Urban (n =386)/Number of times(wk)				Rural (n =94)/Number of times(wk)			
	Consume	1-3	4-6	Daily	Consume	1-3	4-6	Daily
Lima beans	324(83.93%)	324(83.93%)*	0	0	56(59.57%)	56(59.57%)	0	0
Soya bean	6(1.55%)	6(1.55%)	0	0	6(6.36%)	6(6.36%)	0	0
G/nut soup	86(22.27%)	86(22.27%)	0	0	12(12.76%)	12(12.76%)	0	0
Cashew nut	-	-	-	-	-	-	-	-
Cowpea	-	-	-	-	-	-	-	-
Walt nut	-	-	-	-	-	-	-	-
BG nut	299(77.46%)	299(77.46%)*	0	0	52 (55.3 1%)	52 (55.3 1)	0	0
Melon soup	56(14.50%)	56(14.50%)	0	0	12(12.76%)	12(12.76%)	0	0
<i>Cucurbita Seed</i>	-	-	-	-	-	-	-	-
<i>I.gabonensis</i>	34(8.80%)	34(8.80%)	0	0	4(4.25%)	4(4.25%)	0	0

BG nut Boiled groundnuts; \*Significant at p<0.05

**Table 8.** Frequency of consumption of fruits / vegetables by rural and urban household in a week

Fruits/vegetables	Urban (n =386)/Number of times				Rural (n =94)/Number of times			
	Consume	1-3	4-6	Daily	Consume	1-3	4-6	Daily
Mangoes	308(79.79%)	306(99.35%).	2(0.65 %)	0	81(86.17%)	67(82.72%)	14(17.28%)	0
Avocado pear	288(74.61%)	282(97.92%)	6(2.08%)	0	75(79.78%)	75(100%)	0	0
Oranges	286(74.09%)	286(100%)	0	0	78(82.97%)	78(100%)	0	0
Pawpaw	98(25.38%)	96 (97.96%)	2(2.04%)	0	5(5.31%)	5(100%)	0	0
Apples	52(13.47%)	52(100%)	0	0	-	-	-	-
Tangerines	44(11.39%)	44(100%)	0	0	-	-	-	-
Ripe banana	364(94.30%)	361(99.16%)*	3(0.82 %)	0	42(44.68%)	18(42.86%)	24(57.14%)	0
Uncooked garden egg	106(27.4650%)	100(94.34%)	6(5.66%)	0	30(31.91%)	29(96.66%)	1(3.33%)	0
Cooked garden egg	226(68.91%)	226(100%)*	0	0	50(53.19%)	43(86.00%)	7(14.0%)	0
Tomatoes	359(93.00%)	257(71.58%)*	102(28.40%)	0	19(20.21%)	19(100%)	0	0
Onions	370(95.85%)	370(100%)	0	0	24(25.53%)	24(100%)	0	0
Carrot	264(68.39%)	254(96.21%)	10(3.78%)	0	69(73.40%)	69(100%)	0	0
Okra	81(20.98%)	78(96.21%)	3(0.70%)	0	23(24.46%)	23(100%)	0	0
Cucumber	89(21.50%)	89(100%)	0	0	-	-	-	-
<i>Solanum scabrum</i>	386(100%)	246(63.73%)	120(31.08%)	20(5.18%)	94(100%)	50(53.19%)	20(21.27%)	24(25.53%)
Cabbage	10(2.71%)	10(100%)	0	0	-	-	-	-
<i>V. amygdalina</i>	251(65.02%)	250(99.60%)	1(0.40 %)	0	45(47.87%)	44(97.78%)	1(2.22%)	0
Pumpkin L	26(6.73%)	26(100%)	0	0	-	-	-	-
<i>G.africanum</i>	34(8.80%)	34(100%)	0	0	-	-	-	-

\*Significant at p<0.05

**Table 9.** Frequency of consumption of beverages, others and potash by rural and urban subjects

Food	Urban (n =386)/Number of times(wk)				Rural (n =94)/Number of times(wk)			
	Consume	1-3	4-6	Daily	Consume	1-3	4-6	Daily
Coffee	11(2.84%)	11(100%)	0	0	13(13.82%)	12(92.30%)*	1(7.69%)	0
Tea	130(33.67%)	130(100%)	0	0	34(36.17%)	33(97.05%)	1(2.94%)	0
Beer	-	-	-	-	-	-	-	-
Palm wine	-	-	-	-	-	-	-	-
Spirit	-	-	-	-	-	-	-	-
Cola nut	-	-	-	-	-	-	-	-
Spices	198(51.29 %)	198(100%)*	0	0	33(35.10%)	33(100%)	0	0
Soft drink	353(91.45%)	349(98.8 %)*	4(11.33%)	0	22(23.40%)	16(72.72%)	6(27.27)	0
Potash	44(11.39%)	25(56.82%)	19(43.18%)	0	45(47.87%)	33(73.33%)*	12(26.57%)*	0

\*Significant at p&lt;0.05

Table 9 shows the consumption of beverages and spices and potage by rural and urban households. Results showed that none of the households in the rural and urban communities consumed beer, palm wine, spirits and cola nuts at the time of the study. Significantly more urban households (91.45%) consumed soft drinks compared to 23.00 % of the rural households. This was followed by tea and coffee (33.67% urban and 36.17% rural) and coffee (2.80 % urban and 13.80 % rural). Spices were used significantly more by urban (51.29%) households than their rural (35.10%) counterpart, while more rural households (47.80 %) used potash compared to 11.39% urban counterpart. Most of the urban and rural households took beverages 1-3 times per week except for soft drinks where a higher proportion of rural (27.27%) households consumed soft drink 4 times or more compared to 11.33% in the urban households. In the same

vein, there was a high frequency of consumption of potash compared to 26.67% in the rural communities. Soft drinks and spices had significantly ( $p<0.05$ ) higher values in urban households compared to rural households while the reverse was observed for coffee and potash.

#### DISCUSSION OF FINDINGS

From the study, it was observed that urban households spend more (> 10,000 CFA) on weekly food expenditure compared to their rural counterparts. This is as a result of the inability of most respondents in urban households to produce certain foods consumed by family members. Rather, they purchase these foods because majority engage in civil service and trading activities, unlike in rural communities where majority engage in farming activities, thus pro-

ducing most of the foods consumed within their households and beyond. Although most household heads in both communities were men with income-generating activities, and were principally responsible for the welfare of their families, the women decide on the food to purchase and prepare meals consumed by household members including infants and young children (IYC). Regarding IYC feeding practices, more households in rural communities with IYC 6-23 months were still breast feeding their infants. The reason for early cessation of breastfeeding in urban households could be due to their engagements in civil service jobs and trading activities outside their homes. Although they was high compliance to WHO recommendation on continuous breast feeding in rural households, more women in urban households decide on foods fed to IYC and prepare such foods separately from family foods. Due to their educational status and income

levels, urban women are more exposed and are able to make important decisions concerning food availability and consumption within their household including complementary food for IYC. The practice of preparing IYC food with family foods as observed in about 37.50% of households in rural communities is due to their belief that they are old enough to eat family foods. This may reduce the food and nutrient intake of the IYC thus, predisposing them to inadequate nutrient intake and the risk of under-nutrition and infection due to weakened immunity (UNICEF, 2013). Compliance to WHO recommendation on complementary feeding practices was inadequate in both urban and rural households. This is because continuous breastfeeding is not practiced in about a quarter of urban and rural households likewise adequate complementary feeding in rural households. Complementary foods should be prepared separately from family foods and should complement breast milk not replace it as observed mostly in rural households. Breastfeeding should therefore continue on demand for two years or beyond while giving complementary foods (PAHO/WHO, 2002; WHO, 2012).

The frequency of eating usually varies from twice a day to three times. About 80.00% of households in both communities eat two times daily. The meals are usually eaten individually by most households. Eating of meals individually is advantageous because it actually allows household members to have adequate portion sizes unlike collective eating where food is served to all the children in the family on one large plate for them to eat together. This practice of household members eating from the same pot/plate may adversely affect the nutrient intake of those members who cannot eat fast enough, especially children and the elderly (Djeukeu *et al.*, 2013; Dangwe *et al.*, 2016). About half of respondents in both urban (53.62%) and rural (54.25%) communities give priorities to the head of households (fathers) and some especially in urban household would give priorities to children during meal time. Fathers were given priority especially in times of food insufficiency and then young children were necessary. To further support this, response from the FGD "(Chorus response) *Madam we generally remove the breadwinners own first, followed by the children and lastly ourselves. Some of us usually discriminate against children of other family members living with us. We give more food to our husbands first and our own children before others*" corresponds with their actual practices. Other report shows that in Cameroon, similar cultures and family food distribution exist. Previous studies have indicated that women are expected to give preference to their husbands in food distribution as regards quantity and/or quality of food (Community Studies Team and Chennamaneni, 2007; Nwajiuba and Okechukwu, 2008; Martínez and Pascual, 2013; Gadegbeku *et al.*, 2013). They found out that

nutrient intake for adolescent girls and adult women were low. The woman offers the best choice of food to her husband or to the elders and then to the "productive members of the family. Toddlers, children and the women are frequently the last to be served (Germaine *et al.*, 2013). Meat in certain areas of Africa is regarded not as "Food" but rather as luxury items which "sweetens the mouth". It is reserved for the men rather than for the women or children (Germaine *et al.*, 2013). These practices could benefit the health of some household members while impairing the health of other members due to the quality and quantity of food distributed among household members (Sharma *et al.*, 2007).

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The study was conducted to determine food consumption patterns and nutritional status of urban and rural households in the North West region of Cameroon. Data on Socio- economic and demographic characteristics, food consumption and dietary practices, food security, anthropometric measurements, biochemical analysis, weighed food intake and 24-hour dietary recall/Dietary diversity were obtained using questionnaire. Anthropometric indices were taken and acceptable cut-off values were used to determine nutritional status. Individual food intake was calculated and group means were obtained and compared with FAO/WHO reference standards to ascertain nutrient adequacy and their effect on the nutritional status of respondents in both communities. Blood nutrient levels of respondents in both communities were determined. Locally available foods consumed in the area, their methods of preparation and factors that determine food choices were identified through a focus group session with women of reproductive age. The region has sufficient quantity and diversity of food resources but culture and lack of good nutritional knowledge influenced food choices, frequency of food consumption and preparation pattern. Food consumption patterns in both urban and rural households indicated that the foods consumed were almost monotonous and were rich in carbohydrates, fats, legumes, fruits and vegetables. The consumption of meat of all types, milk and milk products, eggs and fresh fish was low. The low consumption of these food items indicates that, the diets of household members in both communities are generally of poor quality and therefore the occurrence of both over nutrition (obesity and overweight) and under-nutrition is not unexpected.

## Recommendation

The following recommendations may help food policy makers to determine the areas of priority:

- To parents of the households

Men, as well as women, should be educated on the peculiar nutritional needs of the family members to avoid improper distribution of food. The women should be taught the foods needed for good health, and nutritional values of various locally-produced foods. They need to attend and participate in nutrition seminars and other nutrition education programs put at their locality by either the government or NGOs. Knowledge and practice of family planning should be intensified so as to control family sizes. It is easier to clothe, educate and feed a small-sized family.

There is a need for households to modify some traditional nutrition practices such as cooking of garden eggs and huckleberry without meat, fish, and crayfish. Diversification of foods consumed in both communities should be encouraged.

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