Original Research Paper

Pattern of fruit and non-alcoholic beverage consumption in Sokoto metropolis, Nigeria

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Considering that Sokoto metropolis is located in the dry savannah region where for the most part of the year the temperature is always high, non-alcoholic beverages (NABs) and fruit consumption will be expected to be high, at least to cool down the body temperature and compensate the body loss of minerals. Surprisingly, there is a scarcity of documented information on the consumption pattern of these products in the metropolis. This study, therefore, examined patterns of household-level consumption of fruit and NABs in Sokoto metropolis. It also compared the consumption pattern of these products across some household socioeconomic variables. The Metropolis was grouped into four clusters with one hundred households randomly selected from each cluster. Data were collected with the aid of a structured food frequency questionnaire (FFQ). Descriptive and chi-square analytical tools were used to analyse the data. The results showed that 75% of the respondents consumed fruit regularly (at least once a week). Of the NABs, the bottled soda is the most regularly consumed with 63% of the respondents. The chi-square results showed that the consumption of fresh fruit and bottled soda were significantly related to sex, ethnicity, location, education and economic status of the household heads. The age of the household heads showed a significant relationship with the consumption of fresh fruit only, while tetra pak juice was significant only with ethnic variables. Consumption frequency of NABs showed no significant relationship with household sizes. It could be concluded that fruits and NABs were widely accepted in the study area as a means of hydration and source of nutrient .The study recommends that there is the need to put measures that will increase the income of the people and reduce the cost of juice beverages; as it has been shown that the consumption of this very important beverage is low. Also, bottled soda should be fortified with healthy nutrients as this will helps reduce malnutrition among the populace and to stimulate demand.

Keywords: Sokoto metropolis, fruits, non alcoholic beverages, consumption pattern, chi-square

INTRODUCTION

Sokoto metropolis is located in the dry savannah region where for the most part of the year the temperature is high and reaches up to 45°C during the hot season. Therefore, consumption of non-alcoholic beverages (NABs) will be expected to be much more prevalent among the populace, if not for any reason but to cool down the body temperature and quench thirst. Nutritionally, fruits are juicy food items with high mineral content that are mostly preferred in hot weather to compensate the body loss of minerals. Given that fruit's sugar is very digestible, fruit consumption is expected to fit well with the prevailing Sokoto weather condition. In support of the health benefits of fruits, Kamga

et al. (2013) report that fruit deficiency is a major independent risk factor for non-communicable diseases, which is estimated to be the major cause of death in sub-Saharan Africa by year 2020. Also, Bazzano (2006) reports that consumption of fruits and vegetables has been associated with decreased incidence and mortality caused by non-communicable diseases such as cardiovascular diseases, stroke, hypertension, diabetes, obesity, and certain cancers.

However, results obtained by Rickman et al. (2007) indicate that exclusive consumption of fresh fruit ignores the nutrient benefits of canned and frozen food. This was corroborated by Phillip et al. (2013) who note that non-alcoholic beverages (NABs) such as fruit juice and carbonated drink provide consumers with the basic refreshment function to enhance mood, pontificate nutrients and are utilized for celebration of specific social occasions. The authors aver that sugar sweetened NABs like carbonated drinks, are rich in easily digestible dietary energy that may meet the dietary energy needs of children in poor households.

Memon et al. (2009) observe that in general, consumer behaviour indicates the process and activities people engage in when searching, selecting, purchasing, using, evaluating and disposing of products and services; in order to satisfy their needs and decisions. According to Kanagaraju *et al.* (2012) consumption pattern of a particular product is a deciding factor for the development of the enterprise geared towards the production of such product. This was echoed by Dalhatu and Ala (2011) as they note that consumers' tastes and preferences affect the demand for a given product and that an increase in consumers' taste and preferences for a particular product tends to increase the quantity demanded of that product. However, Yayar (2012) reports that consumer's consumption behaviour and preferences may vary among countries.

Consumption of non-alcoholic beverages (NABs) - Juices and carbonated drinks- has been a basic form of refreshment among Nigerians of all ages, tribe and socioeconomic backgrounds (Phillip et al., 2013). NABs have been widely recognized for their various contributions to household food and nutrition in general, and especially, for their role in body hydration (Phillip et al., 2013). They noted that fruit and vegetable based juices are important contributors of vitamins, minerals and dietary fibre. Although, the benefits of juice consumption have been reported by many authors (Phillip et al., 2013; Flake and Nzeka, 2009) but that of the carbonated soda has been a subject of debate. For example, Valentine (2001) notes that intake of as little as one or two glasses of sodas per day is undeniably connected to a myriad of pathologies. The most commonly associated health risks of soda consumption are obesity, diabetes and other blood sugar disorders, tooth decay, osteoporosis and bone fractures, nutritional deficiencies, heart disease, food addictions and eating disorders, neurotransmitter dysfunction from chemical sweeteners, and neurological and adrenal disorders from excessive caffeine (Valentine, 2001).

Objective of the study

Though fruit consumption is associated with decrease incidence of mortality triggered by non-communicable diseases, and that non-alcoholic beverages are important source of nutrients and for body hydration, yet there is no information about the consumption pattern of fruit and NABs in Sokoto metropolis. Such information is important for producers, marketers and policy-makers to target specific measures that will promote and facilitate the consumption of fruit and NABs in the state.

Therefore, this investigation was conducted to address the following objectives: specify the household consumption patterns of fruit and NABs in Sokoto metropolis, compare the consumption pattern of fruits and NABs across age, gender, location, ethnicity, household size, educational level and economic status of household heads, asses the prevailing consumption pattern and to provide suggestions for further research.

MATERIALS AND METHODS

Study area

This study was carried out in Sokoto metropolis. It is located between latitude 13° 3' 49^{0}N and longitude 5°14' 89^{0}E and at an altitude of 272 m above sea level(Figure 1). The metropolis lies in the dry coast surrounded by sandy terrain and isolated hills. The annual rainfall is 550 mm starting in June and ending October. The climatic conditions is characterized by hot season, particularly in March and April with highest temperatures of 45°C while a dry cold and dusty conditions succeed from November- February. The metropolis comprises Sokoto North, Sokoto South and parts of Dange-Shuni, Kware and Wamakko Local Government Areas. Metropolis has a population of 1,078,092 (NPC, 2013). The demographic structure of the city is cosmopolitan with Hausa/Fulanis predominating; and Hausa is the common language. Also, resident in the city are people of ethnic groups from other parts of Nigeria, especially Yoruba, Igbo, Zabarmawa, Nupe, and other minority tribes from within and outside Nigeria. Occupation of inhabitants in the city is trading, with a reasonable proportion of the population working in organized private and public sectors. The metropolis is the capital city of Sokoto state and displays a classic example of urban primacy as it harbours nearly 95 percent of the modern business and commercial ventures in the state.

Sampling procedure and sample size

The metropolis is expanding rapidly due to increase in
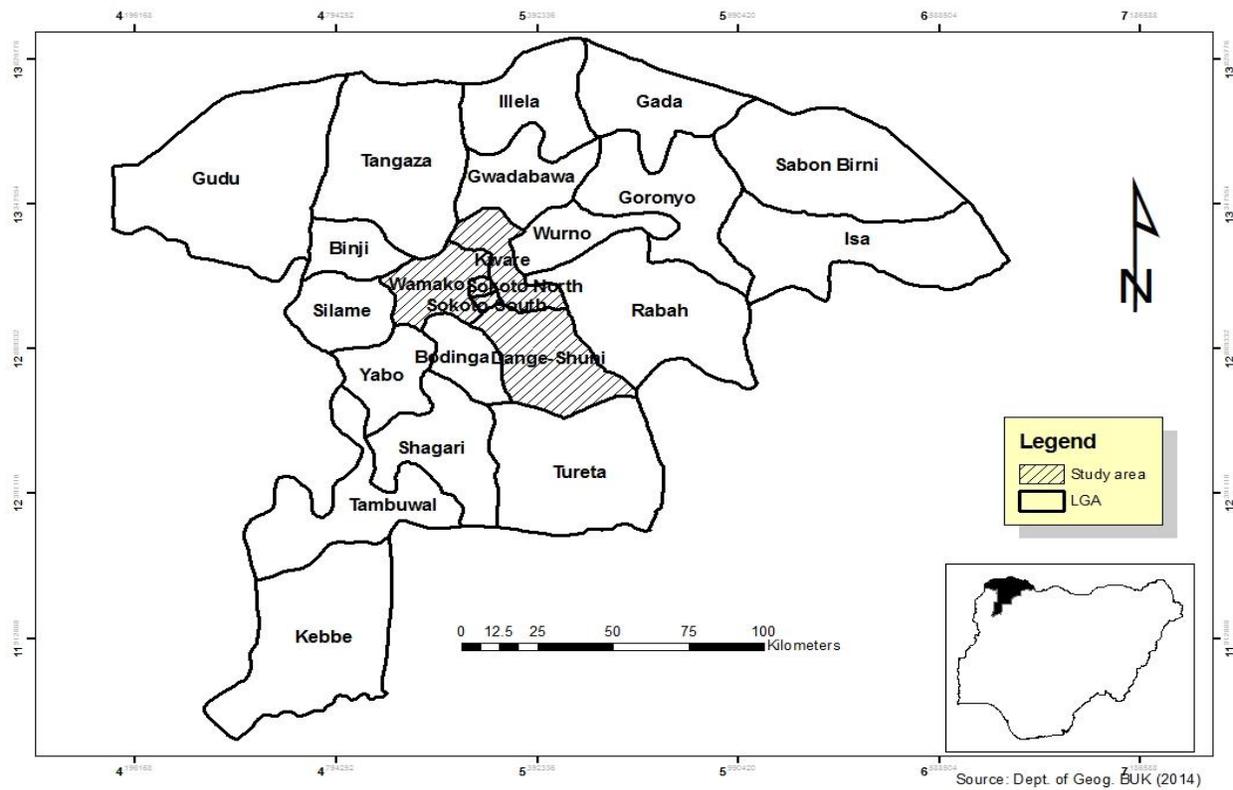
Figure 1: Depiction of study area

population size, economic activities and constraints in land for settlements. This had forced human settlement and economic activities to move outside the old city into the suburb and peri- urban areas resulting into distinct settlements groupings. Thus, this informed the adoption of cluster sampling technique; whereby the metropolis were grouped into four homogeneous clusters, namely peri-urban, Sokoto main (city centre), G R As, and resident community. In each of the cluster one hundred households were randomly selected to give a total sample size of four hundred households.

Sokoto main cluster

This is the ancient Sokoto town where the original inhabitant of the metropolis lives. The area is urban according to Mullins et al. (1994). It is within the city municipal limits and majority of households infrequently or never engage in farming activities.

GRAs cluster

This is a high brow area located outside the Sokoto main. It houses institutional estates such as University quarters, CBN quarters. It is where the civil servants and the

educated elites live.

Resident communities cluster

Is an area where the people of ethnic origin other than the dominant Hausa/Fulanis live.

Peri-urban cluster

peri-urban as defined by Mullins et al. (1994) is a community outside a town or city/municipal limits in which there is feasible commuting access to the city for a (i.e. daily) work force, and some households may maintain farms, though, It is not a farming-based community. Therefore, going by this definition, the following towns were classified as peri-urban areas; Dange, Gagi, Kware, Kalambaina, Shuni and Wamakko.

Data collection

The primary data for this study was collected from June-August 2013 using pre-tested structured food frequency questionnaires (FFQ). The information collected included socio-demographic characteristics such as age, sex, marital status, household size, ethnicity, location of households,

education level of the household head, nature of occupation of household head and economic status of household head. Also, the types, frequencies and quantities or monetary value of fresh fruits and NABs consumed in the households were evaluated in this survey. For the purpose of this study, NABs refers to juice and carbonated drinks, while fruit refers to orange, mango, banana, watermelon, apple, grapes, guava, pineapple, paw paw and coconut. The economic status of household heads was classified based on the following monthly income ranges: below average ≤₦50, 000 (≤ $312), ≤ ₦100, 000 (≤ $625) as average and >₦100, 000 (>$625) as above average as described by Kassali et al. (2010).

Method of data analysis

The data were analyzed using descriptive statistics such as percentages, histogram, bar-chat, tables and chi-square to test for a significant relationship between the socioeconomic variables and consumption of fruit and NABs in the metropolis. Chi-square is specified as:

$$X^2 = \Sigma (O\text{-}E)^2/E$$

$$(1)$$

Where:

X^2 = Chi- square;

Σ = Summation of;

O = Observed value of variable; and

E = Expected value of variable

RESULTS AND DISCUSSIONS

Socio-demographic characteristics

Majority of the respondents were males (83.75%), married (77.5%) with an average household size of 7.38. More than 67% of the respondents were educated up to the tertiary levels. The mean age of respondents was 38.71, which is considered as middle age. In Nigeria, the dominance of household is headed by middle age people as also reported by Onyemauwa (2010). The percentage of female headed households was recorded to be 16.25%, which is far from the average reported for Sokoto state at 1.7% (NBS, 2010). This outcome could be attributed to education as over 60% of the respondents were educated up to a tertiary level, and 20% of these were females and most probably hold a job. Also, 25% of the respondents were people of ethnic background other than Hausa/Fulani, in which the female members are much more likely to hold a job. The proportion of highly educated people in this study is due to the clustering effect. Bamidele et al. (2010) note that higher level of education most often translates into higher level of income. Therefore, it is not surprising that over half of the respondents in this study have an economic status ranging from average to above average. Other socio-demographic profiles are presented in Table 1.

Preferences

The most preferred product is fruits with over 84% of the respondents having chosen fruits as their most preferred. Tetra-pack juice was the second preference with 5.5% of the respondents, and over 24% of the respondents chose it as the second most preferred product after fruits. The third preferred product is bottled soda, which is the number one choice for just 4% of the respondents, but 17% of the respondents chose it as the third most preferred product. Details of other products are presented in Figure 2. The overwhelming preference for fresh fruits by the respondents was not surprising as it has also been reported by Adenegan and Adeoye (2011), where they noted that fresh fruits are relatively cheap and readily available.

Frequency of consumption

Table 2 provides information on the frequency of consumption of fruit and NABs for the metropolis. It shows that 99.25% of the respondents consume fruit, which is higher than the 96% reported by Adenegan and Adeoye (2011). Of this, 75% consume fruit at least once a week with about 31% consuming fruit on a daily basis. This daily intake is however; lower than the 39.1% reported by Henry-Unaeze and Okonkwo (2011). Concerning the NABs, the bottled soda is the most widely consumed products with about 63% of the respondents. Of this, 58% consume the product at least once a week, of which only about 15% consume it on a daily basis. With respect to Tetra pak juice, about 35% of the respondents consume this product. Only 4.92% consumed the product on a daily basis. The results of other products and periods are presented in Table 2.

Chi-square analysis

The result shows that the consumption of fresh fruit and bottled soda were significantly related to sex, ethnicity, location, education and economic status of the household heads. This implies that these variables positively aid the intake of fruits and NABs in the metropolis in terms of frequency, volume and preference. While, the age of the household heads shows a significant relationship with the choice of fresh fruit only, which may be attributed to medical advices that aged people should take more fresh fruits than NABs, which has higher sugar content. The tetra pak juice was significant only with ethnic variables, implying that this variable is the only important factor affecting the consumption of tetra pak juice in the metropolis. Finally the chi square results revealed no significant relationship between household sizes and the consumption of fruit or any of the NABs; signifying that fruits and NABs are widely consumed irrespective of the location of the household among the clusters. The decision rule in each case was to reject the null hypothesis and accept the alternative hypothesis that there is a significant

Table 1. Showing socioeconomic characteristics of the respondents

Characteristics	Frequency	Percentages
Age		
Below 26	38	9.5
26------35	156	39
36------45	104	26
46------55	67	16.75
Above 55	35	8.75
Total	400	100
Mean Age (years)	38.71	
Household size		
1--------5	176	44
6--------10	131	32.75
11-------15	58	14.5
16-------20	14	3.5
Above 20	21	5.25
Total	400	100
Mean household size	7.38	
Educational status		
Not attended	35	8.75
Primary	42	10.5
Secondary	54	13.5
NCE/OND	64	16
Degree/HND	144	36
Postgraduate	61	15.25
Total	400	100
Economic status		
Low	165	41.25
Average	185	46.25
Above average	50	12.5
Total	400	100

relationship between these variables and the consumption of the corresponding product (Table 3).

Consumption prevalence by socioeconomic variables

Age

The consumption of fresh fruit cut across all age groups, with almost all the age groups reporting 100% consumption prevalence (Figure 3). With regard to Tetra pak juice, there is an inverse relationship between age and its consumption. For example the highest prevalence of 47.44% was recorded by the 26-35 years age group. This continues to decrease with increase in age, reaching the lowest (8.57%) by respondents of above 55 years. This inverse relationship between age and consumption prevalence was also noticed with pets and cans. The reason that can be adduced to this negative relationship is household sizes viz a viz the relative cost of these products. In other words, households headed by the elderly are much larger as such may not be able to afford these types of products. Bamidele et al. (2011) note that as larger households have less per capita income than smaller households, it is expected that larger households will tend

to consume more of the cheaper products than the smaller household.

Sex

The result of the study shows that the consumption prevalence for NAB is higher for female headed households than male headed households, and almost equal for fresh fruit (Figure 4). This result is in agreement with that of Cooper and Al-Alami (2011) as well as Ruel et al. (2005) as they all noted that the consumption of comfort foods is widespread among females than males, and that women tend to give higher priority to diet quality than men.

Household sizes

The result prevalence of consumption of fresh fruit and NABs according to the household size is as expected. The greater the household size the lesser the consumption prevalence except for bottled soda whose consumption prevalence increases with an increase in household sizes (Figure 5). The high prevalence of bottled soda consumption in larger households may be attributed to its relatively lower cost compared to other NABs.
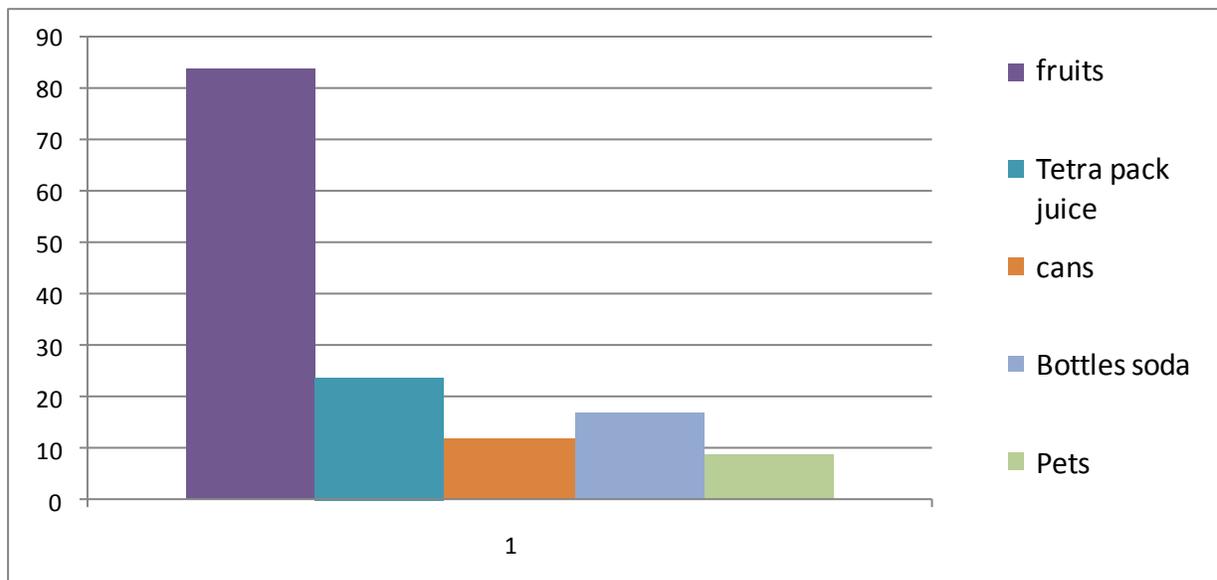
Figure 2: Showing the preference structure for the various products

Table 2: Consumption frequency by ranking for fruit and NABs in Sokoto metropolis

	Daily		2-3 times		Weekly		Occasionally		Monthly		Totals	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Fresh fruit	125	31.49	132	33.24	54	13.6	78	19.65	8	2.02	397	99.25
Bottled soda	36	14.23	83	32.81	30	11.85	87	34.39	17	6.72	253	63.25
Cans	19	11.59	44	26.83	27	16.46	58	35.36	11	6.92	159	39.75
Tetra pak	7	4.92	32	22.54	32	22.54	49	34.51	22	15.49	142	35.5
Pets	7	7.95	26	29.55	12	13.63	35	39.77	8	9.10	88	22

Source: field survey, 2013

Consequently, as larger households have less per capita income than the smaller households (Bamidele et al. 2010**);** bottled soda can be termed as an inferior product whose consumption decline with rising income. Yayar (2012) reported that larger families were more likely to consume less expensive beverages than smaller families.

Ethnicity

While there is not much difference in the consumption prevalence for fresh fruit across the ethnic divide, the results shows clearly the influence of this variable in the consumption of NABs. In fact, the consumption prevalence for the Hausa-Fulanis is less than that of the non Hausa-Fulanis across all the NABs (Figure 6). This is particularly so in the more expensive tetra pak juice and cans, where the consumption prevalence for the non Hausa-Fulanis was about twice as much as that of the Hausa-Fulanis. This result conforms to that of Jansen (1992), which noted that people from Southern Nigeria consume more of the manufactured beverages than the indigenous Hausa-Fulanis.

Locations

While fresh fruits are consumed equally in all locations in the metropolis, NABs consumption varies with locations (Figure 7). For example, nearly three quarters of the expensive NABs (Tetra pak juice and cans) consumers live in the GRAs and the Resident communities. Njarui et al. (2011) also reported that the pattern of consumption in urban households was different from that of rural areas. Also, Ruel et al. (2005) noted the diets of urban dwellers are generally more diverse than those of their rural counterparts. It is believed that this is due to a combination of factors, including the availability of a wider variety of foods in urban markets, the availability of storage facilities, changes in lifestyles and cultural patterns, and the need for convenience leading to the purchase of more processed foods.

Educational level of household heads

The results show that the higher the educational level of household heads the higher the prevalence of consumption

Table 3. Chi-square test of relationship between the socioeconomic characteristics of the respondents and the frequency of consumption of the fruit and NABs in Sokoto metropolis

	Variables	Df	Value	Prob.	Decision
Age	Fresh fruit	260	319.0382	0.007***	Reject the Ho
	Tetra pak	136	132.8625	0.560	Accept the Ho
	Pets	136	123.2568	0.776	Accept the Ho
	Cans	416	381.9333	0.883	Accept the Ho
	Bottles	184	176.6659	0.638	Accept the Ho
Sex	Fresh fruit	5	11.7685	0.038**	Reject the Ho
	Tetra pak	4	0.9351	0.919	Accept the Ho
	Pets	4	5.9640	0.202	Accept the Ho
	Cans	4	3.8553	0.426	Accept the Ho
	Bottles	4	10.4264	0.034**	Reject the Ho
Household sizes	Fresh fruit	140	138.0912	0.530	Accept the Ho
	Tetra pak	76	85.7925	0.207	Accept the Ho
	Pets	80	70.0660	0.779	Accept the Ho
	Cans	76	89.4091	0.139	Accept the Ho
	Bottles	100	99.6404	0.491	Accept the Ho
Ethnicity	Fresh fruit	5	33.9254	0.000***	Reject the Ho
	Tetra pak	4	10.6207	0.031**	Reject the Ho
	Pets	4	5.6581	0.226	Accept the Ho
	Cans	4	4.3320	0.363	Accept the Ho
	Bottles	4	17.6251	0.001***	Reject the Ho
Location	Fresh fruit	15	79.6488	0.000***	Reject the Ho
	Tetra pak	12	7.9076	0.792	Accept the Ho
	Pets	12	18.0904	0.113	Accept the Ho
	Cans	12	22.5690	0.032**	Reject the Ho
	Bottles	12	37.8571	0.000***	Reject the Ho
Education	Fresh fruit	25	73.4192	0.000***	Reject the Ho
	Tetra pak	20	19.4239	0.494	Accept the Ho
	Pets	20	26.2294	0.158	Accept the Ho
	Cans	20	25.9655	0.167	Accept the Ho
	Energy	20	24.3494	0.227	Accept the Ho
	Bottles	20	38.5169	0.008***	Reject the Ho
Economic status	Fresh fruit	10	27.8607	0.002***	Reject the Ho
	Tetra pak	8	10.4612	0.234	Accept the Ho
	Pets	8	9.9546	0.268	Accept the Ho
	Cans	8	7.8891	0.444	Accept the Ho
	Bottles	8	19.1754	0.014**	Reject the Ho

Note. ***=P<0.01. **=P<0.05. *=P<0.10

of NABs. For example the consumption prevalence for Tetra pak was 2.86% for the uneducated households; this percentage increased to 25% for NCE/OND holders and reached a peak of 50.82% for postgraduate holders. Except for bottle soda, similar trends were discernible for the other NABs (Figure 8). Melesse and Beyene (2009) noted that the educational level of household head has been shown to influence the consumption of beverages. While Fuller et al. (2004) observed that educational achievements within the household, independent of the additional income it brings, increase consumption of NABs such as fluid, milk and yogurt.

Economic status of household heads

The result for the more expensive NABs is as expected;

whereby the economic status of household heads is shown to positively affect the prevalence of consumption of these products (Figure 9). For example, the consumption of Tetra pak juice for the below average was 11.63%, 44.14% for the middle class and 59.18% for the high economic status household. Similar situations were obtained for other NABs except for bottled soda, whose consumption prevalence exceeded 50% for all income groups. Bamidele et al. (2010) noted that as consumption is usually hypothesized to be a function of disposable income it follows therefore that income determines the household level of consumption

Methods and Possible reasons for Fruits and NABs consumption

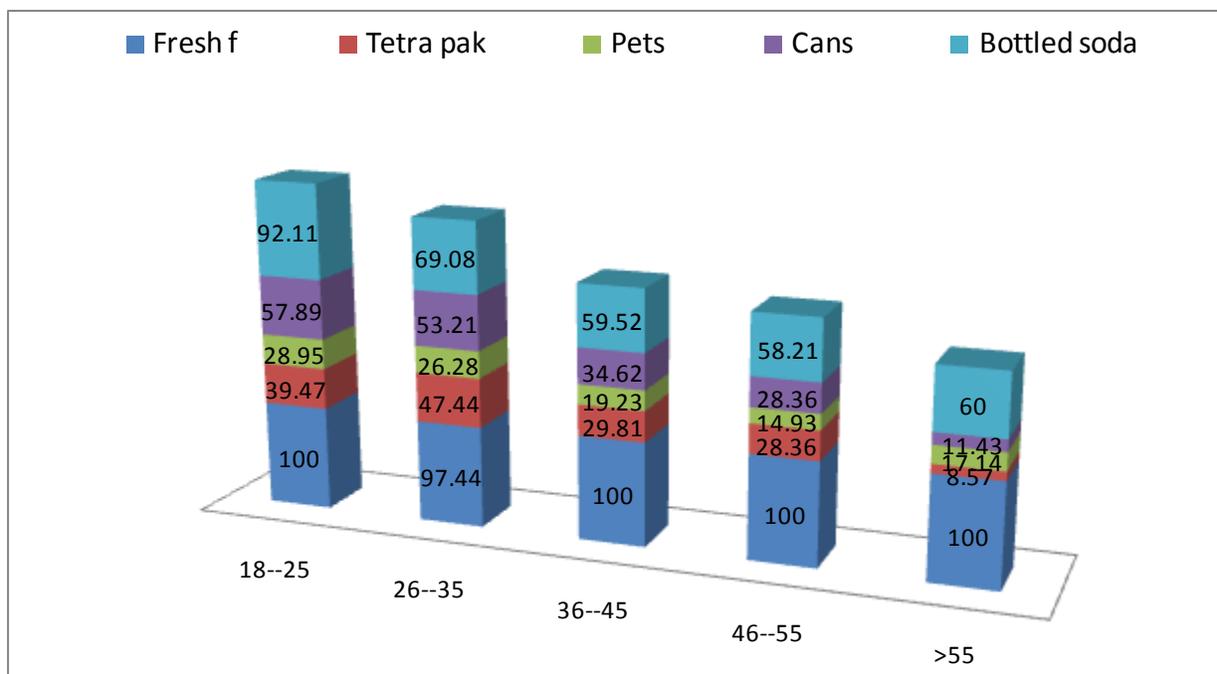Nearly half (44.5%) of the respondents reportedly take only

Figure 3: Showing the consumption prevalence according to the age of the household heads
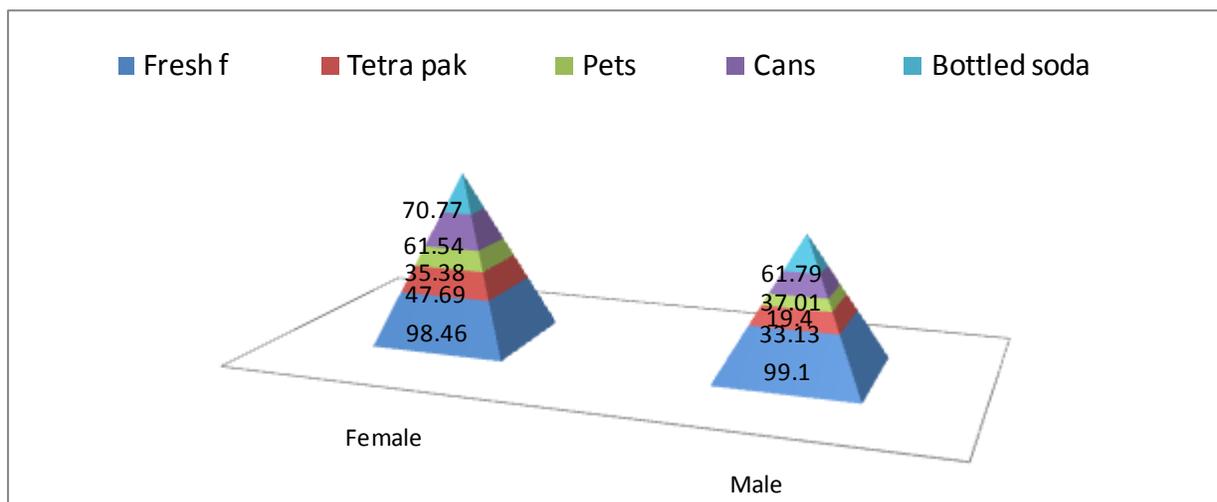
Figure 4: Showing the consumption prevalence according to the sex of the household heads

fruits and NABs, while about one third (35.5%) consume them along with meals (Figure 10). With regards to possible reasons for the consumption, over half (57%) of the respondents cited health benefits as the main reason for their intake of fruits and NABs. While a quarter (27%) reported children as the reason for the purchase of fruits and NABs. The third most important reason given by 6.25 % respondents was convenience. Other reasons are presented in Figure 11. Similar results were reported by Cooper and Al-Alami (2011); Adenegan and Adeoye (2011); Phillip et al. (2013); and Kamga et al. (2013).

CONCLUSION AND RECOMMENDATION

The result of the survey has shown that over 90% of the respondents take fruits across all the clusters, socio-cultural and economic background. Similarly, 63% of the respondents preferred NABs with bottled soda being the highest due its low cost. However, the most preferred of the NABs is tetra pak juice, implying that the respondents were consuming not their most preferred NABs but the most affordable. The Chi-square analysis showed that fruits and NABs consumption were significantly related to all the
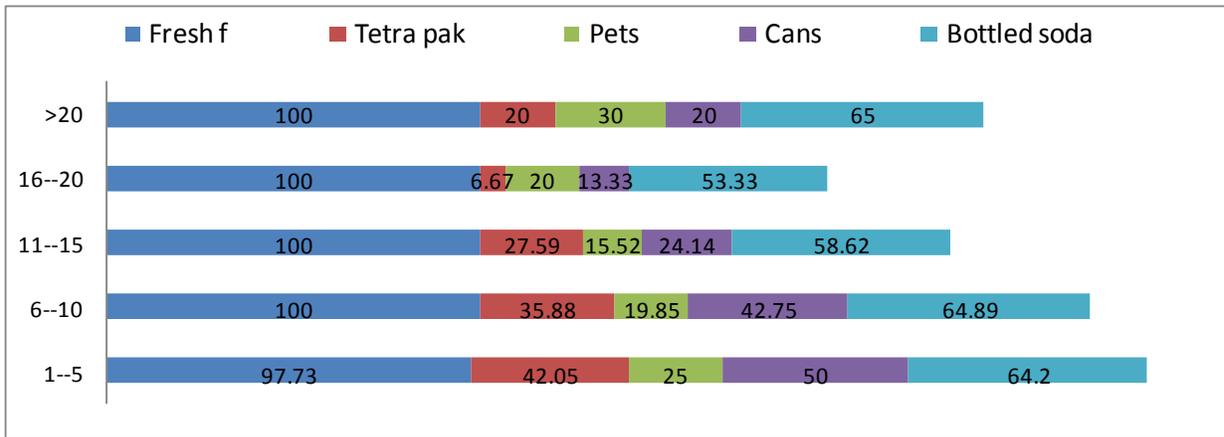
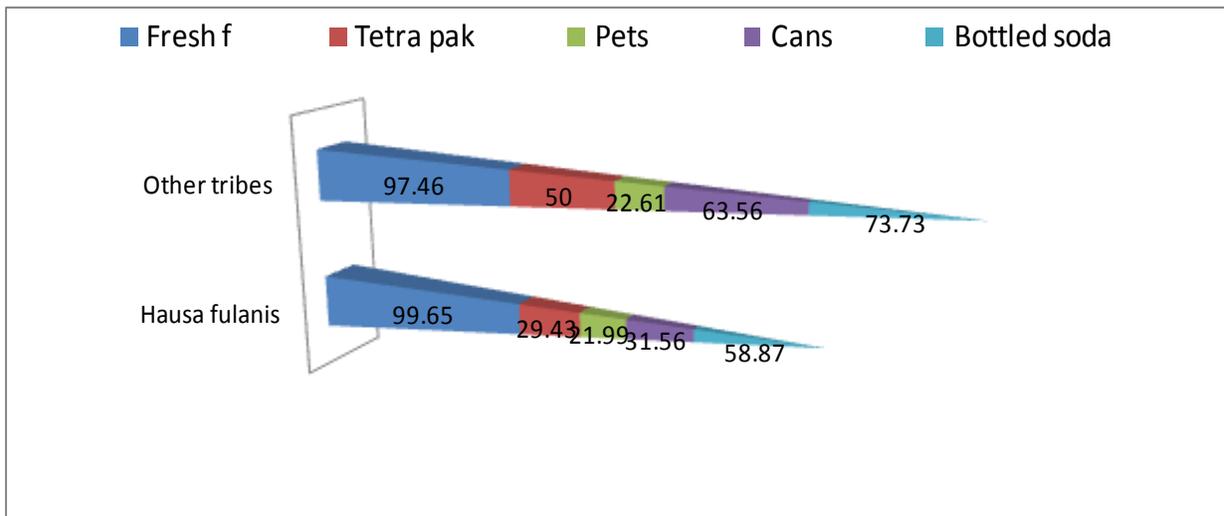**Figure 5:** Showing the consumption prevalence according to the household sizes

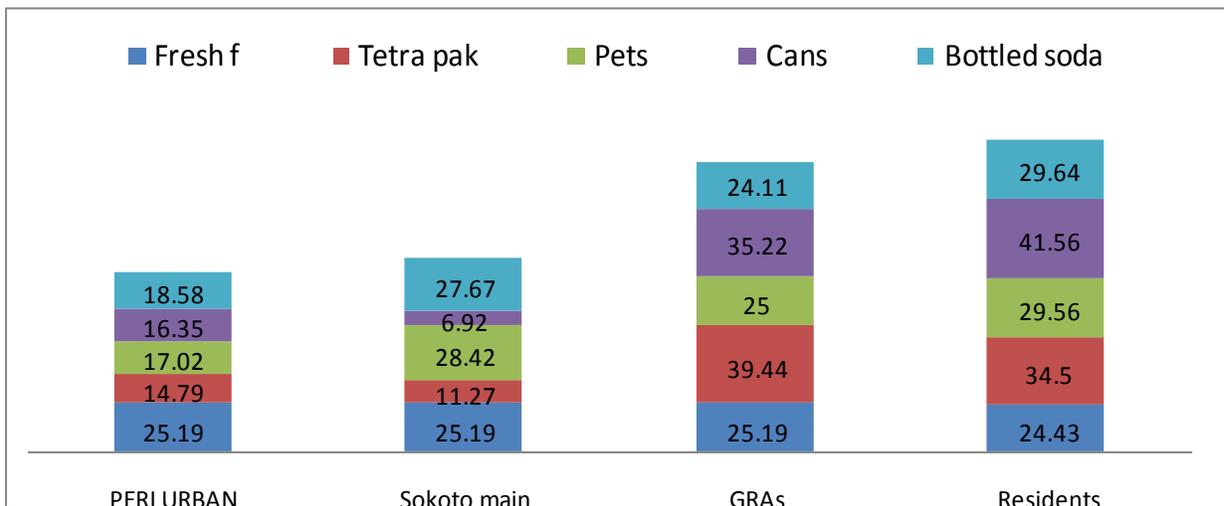**Figure 6:** Showing the consumption prevalence according to the ethnicity of the household heads

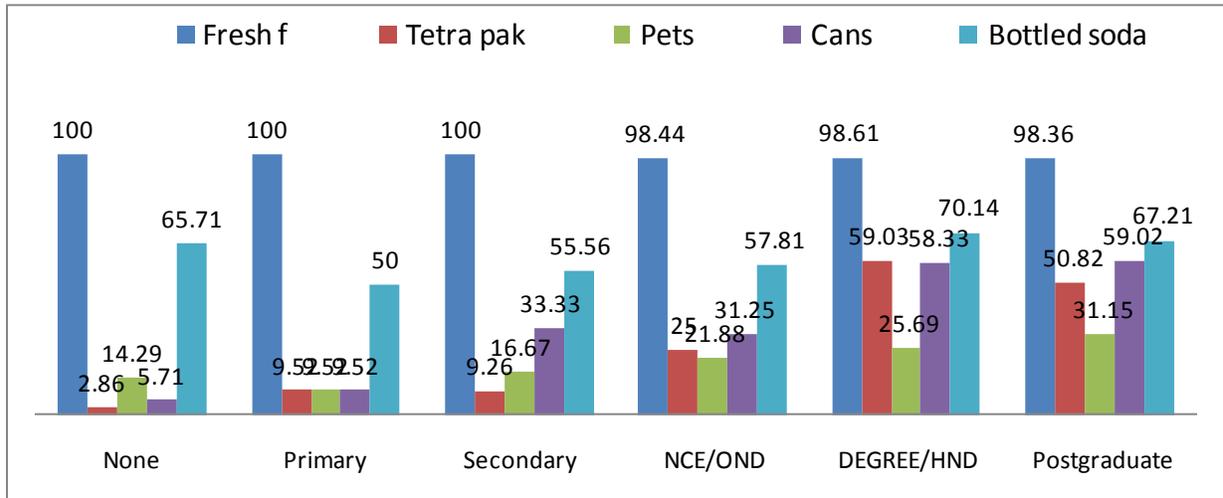**Figure 7:** Showing the consumption prevalence for the various locations

Figure 8: Showing the consumption prevalence according to educational status of the household heads
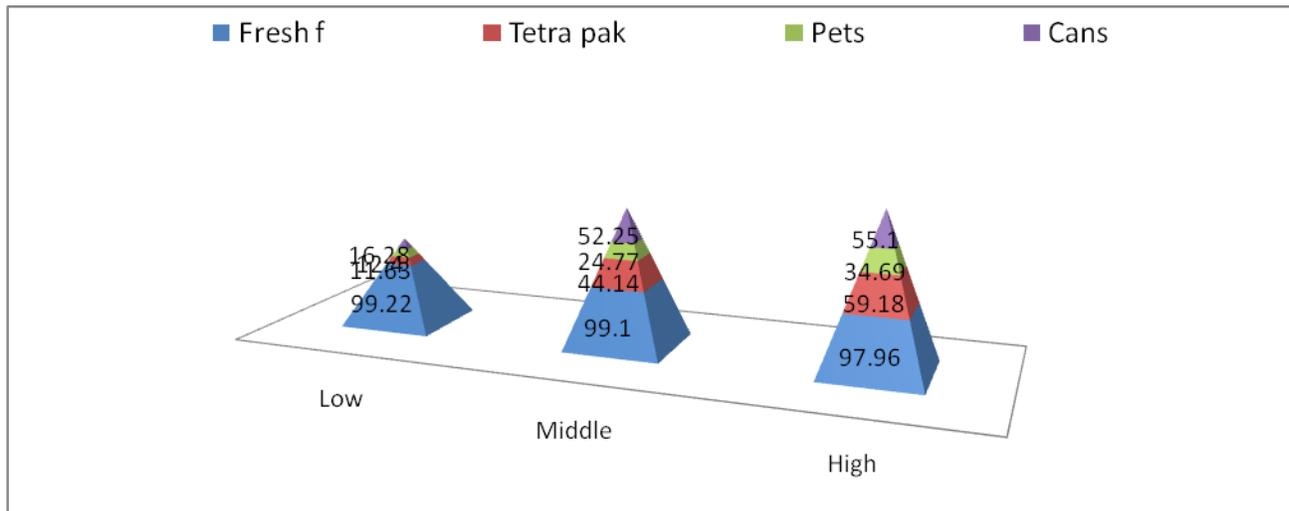

Figure 9: Showing the consumption prevalence according to the economic status of the household heads
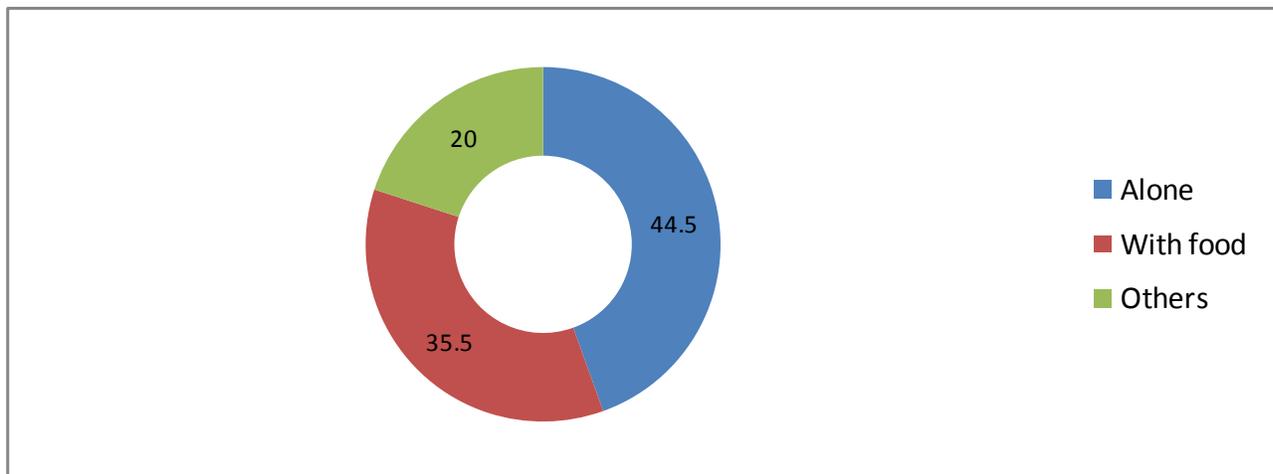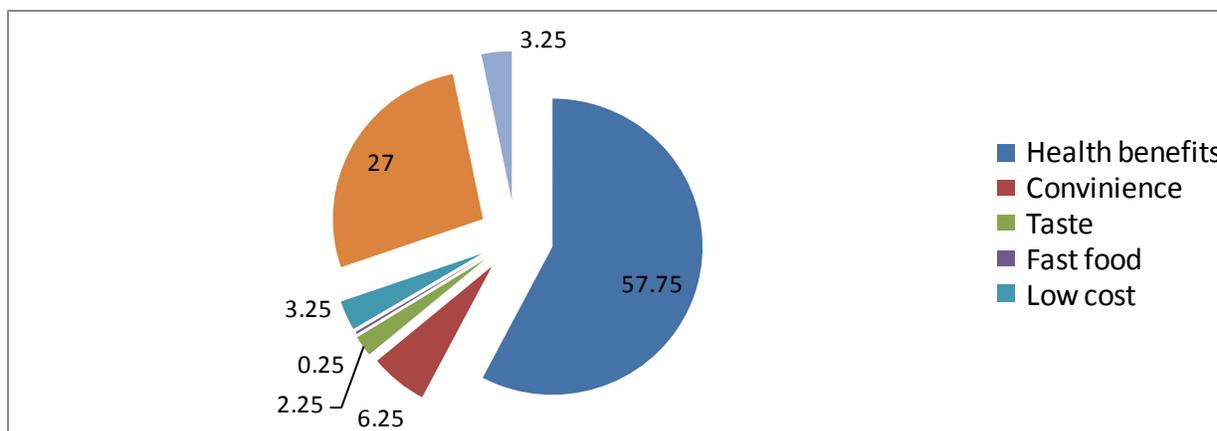

Figure 10: Showing the methods for the consumption of fruit and NABs in the metropolis

Figure 11: Showing the possible reasons for the consumption of fruit and NABs in the Metropolis

socio-economic factors, except the household size, which implied that this variable have no significant impact on fruits and NABs consumption in the metropolis. While the high consumption prevalence for fresh fruit is commendable and shows that the respondents were aware of the health benefits of fruit, therefore, efforts towards its sustenance should be put in place through public enlightenment. And, there is the need to implement measures that will increase the income of the people and or reduce the cost of juice beverages. The result of this study has shown that the intake of this beverage is low and that most of the respondents who would have loved to consume juice were forced to patronise cheaper and less nutritional bottled soda. Meanwhile, considering the wide acceptability of bottled soda, it is hereby recommended that manufacturers of bottled soda should fortify the beverage with healthy nutrients. This will helps to reduce malnutrition among the populace, and stimulate demand.

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