Original Research Article

Snack consumption pattern of adults in the University of Calabar & its health implications

.

ABSTRACT

Aims: To determine the snack consumption pattern of adults and the effect of consumption of certain snacks on the health status of adults in the University of Calabar.
Study design: Cross-sectional survey.
Place and Duration of Study: University of Calabar, Calabar - Nigeria. June to July, 2017.
Methodology: After a multi-staged random sampling technique, a cross-sectional survey was carried out on 400 adult respondents using a well-structured questionnaire. Food frequency questionnaire (FFQ) and 24hour dietary recall were also administered to the respondents. The data obtained from the survey instruments were analysed with the aid of Microsoft excel. For the dietary intake assessment, Food and Agricultural Organisation's (FAO) 'Guidelines for Measuring Household and Individual Dietary Diversity' was used to calculate individual's dietary diversity score (DDS) before recording.
Results: It was observed that 84% of the respondents skipped meals and breakfast was the most skipped meal followed by lunch. Most people (46%) skipped breakfast because they left early for work while majority who skipped lunch did so because they had no time for food at work (53%). Only 8.6% of the respondents did not eat snacks, and most of those who consumed snacks did so because they preferred snacks to food (32%). The most commonly consumed snacks among the respondents was pastries (36.5%), followed by biscuits (25.7%) while the least consumed snacks were vegetables (1%) followed by sweets and gums (1.1%). Consequently, pastries contributed the most snack calories to the study population.
Conclusion: Most people skip meals; and snacks serve as a substitute for such skipped meals. Only few people frequently consume healthy snacks such as fruits and vegetables. Most people were discovered to eat pastries as snacks and these pastries (such as cakes and pies) are highly processed foods which could increase the risk of non-communicable diseases (NCDs) in their consumers.

Keywords: snacks, adults, consumption, meals

1. INTRODUCTION

Snacks can be said to be any light food eaten in between the three main meals – breakfast, lunch and dinner [1]. Nowadays, soft drinks are one of the most common snack choices among young adults [2] followed by pastries. The choice of snacks in most adults is based mainly on taste rather than nutrition, resulting in the tendency to choose salty, high-sugar or high-fat foods as snacks instead of healthier alternatives such as fruits and vegetables [3]. Some of these high-sugar and high-fat snacks have been reported to be responsible for the increase in the incidence and prevalence of some diet-related disease conditions such as obesity, diabetes and hypertension [4]. Reports from past studies suggests that men and

women who are obese snack more often than normal weight men and women[5].The results from a study carried out at an elementary school in Philippines, show that those who snacked the most were more than twice as likely to be overweight compared to those who consumed the fewest snacks [6]. On the other hand, small controlled studies from Canada and Iran found that healthy snacking can lead to lower levels of cholesterol, triglycerides, and lower density lipoproteins, and higher levels of high-density lipoproteins [7,8]. Some foods are considered healthy (such as natural, organic fruits, vegetables, cereals, etc.) depending on their nutrient content while others are considered unhealthy (such as processed foods, foods high in sugar, salt and trans fats, etc.) [9]. Healthy diets (including both meals and snacks) are essential for maintaining good health and preventing diseases.

As the world becomes more industrialized, there is increase in the consumption of 'fastfoods' which are most times 'junk food' because they are not so nutritious and may lead to diseases when consumed frequently [8]. This is due to the fact that people now spend a lot of time at work and many do not have enough time to cook nutritious foods at home, so they just grab whatever foods/snacks they can find in the course of the day. This development, in addition to reduced physical activity, has led to an increase in the prevalence of diet-related diseases such as obesity and diabetes [8].

It is important that people, particularly adults, become aware of the health consequences of their snack/food choices. This will make them better informed and enable them choose healthier snack alternatives that will at the same time boost their immunity to disease while supplying them with the necessary energy to do work. Fruits such as watermelons, oranges, cucumbers and sugarcanes are also very good hydrants that can replace the consumption of fizzy drinks which lack essential nutrients [10]. These fruits/vegetables may also be made into salads, smoothies or even juiced for easy consumption.

With the increase in malnutrition and prevalence of non-communicable diseases (NCDs) worldwide, it has become necessary to study the aetiology of growing number of diet-related diseases which populations are being faced with, in a bid to proffer solutions. These NCDs are not transferrable from one person to another have become a leading cause of death globally [4]. Dietary adjustments/modifications have also become quite popular and effective in the treatment and management of non-communicable diseases [4]. Proper nutrition education is also needed especially in rural or semi-urban areas in order to enlighten the people on how to make healthy food choices that will prevent disease and maintain health.

This study therefore seeks to determine the snacking choices of the study population, and to ascertain the effect of dietary consumption of fats and sugar from snacks on their health status. It also seeks to evaluate the contribution of some frequently consumed snacks to the dietary intake of a population.

2. METHODOLOGY

2.1 Consumption survey and Dietary assessment

2.1.1 Area of study

The study was carried out in University of Calabar, Calabar in Cross River State. The records available at the University's Registry showed the current student population as 40,000 and staff as 3,000 bringing the total population as 43,000. The University community is comprised of people from different ethnic groups in Nigeria and other nationalities like Cameroun, Ghana and Liberia; but the predominant tribes are the Efiks, Ibibios and Ibos.

2.1.2 Population of the study

The population for the cross-sectional study consisted of the 3,000 staff- men and women within the age range of 25 to 65 years, working at the University of Calabar, Calabar.

2.1.3 Sample size determination

This was calculated using Cochran's formula [11] as shown below:

$$n = \frac{t^2 \times p\,(1-p)}{m^2}$$

n = required sample size
t = confidence level at 95% (standard value of 1.96)
p = estimated prevalence of hyperlipidaemia in the area (31.5%)
m = margin of error at 5% (standard value of 0.05)

According to a study by Akpa [12] carried out in Port Harcourt (South-South, Nigeria), the prevalence of hyperlipidaemia was 31.5%.

$$n = \frac{1.96^2 \times 0.315\,(1 - 0.315)}{0.05^2} = 332$$

The sample size was increased by 20% to make room for contingencies like dropouts, non-responses or incorrectly-filled questionnaires. That is, 332 + 66 = 398. This was then rounded up to 400 adults.

2.1.4 Sampling procedure

A two-stage sampling technique was employed for selecting the sample of the study. In the first stage, University of Calabar was stratified into the 10 Faculties, 3 Institutes, Bursary, Registry and Vice Chancellor's office (16 sample clusters in all). A list of staff in each of the 16 sample clusters was obtained (sampling frame). In the case of faculties, the staff list was obtained from the various departments. In the second stage, a specific number of participants proportional to the size of each cluster was randomly selected for the study to make up the required sample size of 400.

2.1.4.1 Exclusion criteria: Participants who did not meet the desired sample criteria- those who were chronically ill, diabetic, hypertensive patients, pregnant and lactating mothers, were dropped from the study (particularly the detailed dietary assessment) and replaced by others in the same sample cluster. The health status of the participants was determined by observation and interaction, during which medical history was taken.

2.1.4.2 Ethical approval: Appropriate ethical approval was obtained from the University of Calabar Teaching Hospital (UCTH) for this research work.

2.1.4.3 Informed consent: An informed consent form was designed containing information on this research. The participants were made to read and then sign the informed consent form to formally indicate their consent to participate in this study.

2.1.4.4 Questionnaire design and administration: A semi-structured questionnaire was designed to gather information from the 400 participants who had read and signed the consent form. The questionnaire was structured to gather socio-economic data, medical history, information on dietary intake (including egg consumption pattern) and lifestyle of the participants. A food frequency questionnaire and 24 hour dietary recall form was also attached. The questionnaires were filled mostly by interviewer-administered pattern (in order to minimize errors) except in some cases where the respondents were literate enough to complete them.

2.1.5 Dietary intake using 24 hour dietary recall Deleted

2.2 Data analysis

In the questionnaire analysis, after coding, data was entered into the computer and also analysed using Microsoft Excel 2013 spreadsheets and SPSS version 20.0. Descriptive statistics such as frequencies, percentages, graphs and charts were used to present the results of the questionnaire analysis.

3. RESULTS AND DISCUSSION

3.1 Food consumption and snacking habits

Table 1 shows the food consumption and the snack consumption pattern of the respondents including the various reasons for skipping meals. Approximately 85% of the respondents ate between two to three meals per day. Only a small fraction (4.5%) of the study population bought all their meals; most of the respondents (60%) both cooked some and bought some meals. Majority of the respondents (84%) skipped meals and the most frequently skipped meal was breakfast (46%). The most frequent reason given for skipping breakfast was 'early departure for work' (45.9%), while that of lunch was 'no time at work' (52.9%) and that of dinner was 'weight watching' (34.9%). Many respondents (91%) consumed one kind of snack or the other; most of them consumed snacks simply because it was preferred to food at certain times (32.1%), others because there was no time at work (28.2%), no cooked food available (22.5%) or due to weight watching (14%). The most consumed snack was pastries such as meat pies (36.5%), followed by biscuits (25.7%) and fruits (19.6%).

University of Calabar is an enlightened community, with most people being aware of health risk factors causing them to eat healthy and exercise regularly. This was also reflected in the dietary diversity scores (DDS) obtained from the 24 hour food recall, where up to 60% of the respondents had medium DDS while 32% had a high DDS. Only very few had low DDS. Education and awareness go a long way in informing people of the need for consuming healthy snacks and diets and for healthy feeding practices, especially as a person ages. This enables people make enlightened snack/food choices. Some people are not able to make the right snack/food choices as a result of the work environment or unavailability of healthy choices at work, hence they consume soda drinks and fried snacks just to assuage their hunger when at work. Most of these drinks are sugar dense while the fried snacks are high in trans fats, saturated fats and cholesterol. These could predispose their consumers to some of the diet-related NCDs such as hypertension, stroke, diabetes and obesity [13].

157 **Table 1. Food Consumption and Snacking habits**

Variable	Responses	Frequency (N)	%
Frequency of daily food intake	Once	16	4.0
	Twice	189	47.5
	Three times	188	47.2
	More than three times	5	1.3
	Total	398	100
Skip meals	Yes	330	84
	No	63	16
	Total	393	100
Meals skipped	Breakfast	148	41.0
	Lunch	110	30.5
	Dinner	13	3.6
	All meals	58	16.1
	Breakfast & Dinner	12	3.3
	Breakfast & Lunch	20	5.5
	Total	361	100
	Reason for skipping meal:		
Breakfast	Early departure for work	107	45.9
	Lack of time	44	18.9
	No appetite	55	23.6
	Weight watch	14	6.0
	Fasting	13	5.6
	Total	233	100
Lunch	No cooked food available	28	14.7
	No time at work	101	52.9
	Preference of snack to food	17	8.9
	Watching weight	28	14.7
	Others	17	8.8
	Total	191	100
Dinner	Close late at work	21	25.3
	Too tired to cook	17	20.5
	Desire to be alert & work at night	4	4.8
	Watch weight	29	34.9
	Others	12	14.5
	Total	83	100
Eats snack	Yes	373	91.4
	No	24	8.6
	Total	397	100
Reasons for eating snacks	No cooked food available	82	22.5

	No time at work	103	28.2
	Preference to food	117	32.1
	Watch weight	51	14.0
	Others	12	3.2
	Total	365	100

158

159

160 **3.2 Snack consumption pattern of respondents**

161 From the analysis of the questionnaires, figure 1 shows the snack consumption pattern of
162 the respondents in percentages. Pastries (such as meat pies, fish pies, doughnuts, eggrolls
163 and cakes) were the most frequently consumed snacks by most of the respondents (36.5%).
164 This was followed by biscuits (25.7%) and fruits (19.6%). Only very few respondents (1.0%)
165 had vegetables (such as carrots and pumpkin) as their most consumed snack; this was the
166 least frequently consumed snack followed by sweets and gums (1.1%).

167 Pastries (such as cakes, pies and egg rolls) which were frequently consumed are usually
168 produced using flours, eggs, fats (such as margarine/butter and frying oils) and a lot of
169 sugar. Research has shown that these high-carbohydrate and high-fat food components
170 (which trigger hyperglycaemia and hyperlipidaemia), are some of the main culprits
171 responsible for many of the diet-related NCDs which have become increasingly prevalent in
172 many countries [14]. This fact, coupled with globalization and the sedentary lifestyles of
173 people, has brought about a lot of health challenges in recent times [7]. It may be necessary
174 for proper dietary adjustment and healthy lifestyle changes in order to prevent obesity and
175 also to reduce the risk of diabetes mellitus which has become quite prevalent in the southern
176 region of the country [4].

177 Detailed statistical analyses of the food frequency questionnaire also showed that over 50%
178 of the respondents ate pies at least once a week, over 60% ate fried snacks at least once a
179 week and up to 12% ate both pies (such as meat, fish and bean pies) and fried snacks over
180 3 times a week. It was also observed that a good number of the respondents consumed
181 other pastries such as burgers, cookies and cakes quite frequently in a week (mostly about 3
182 times a week).

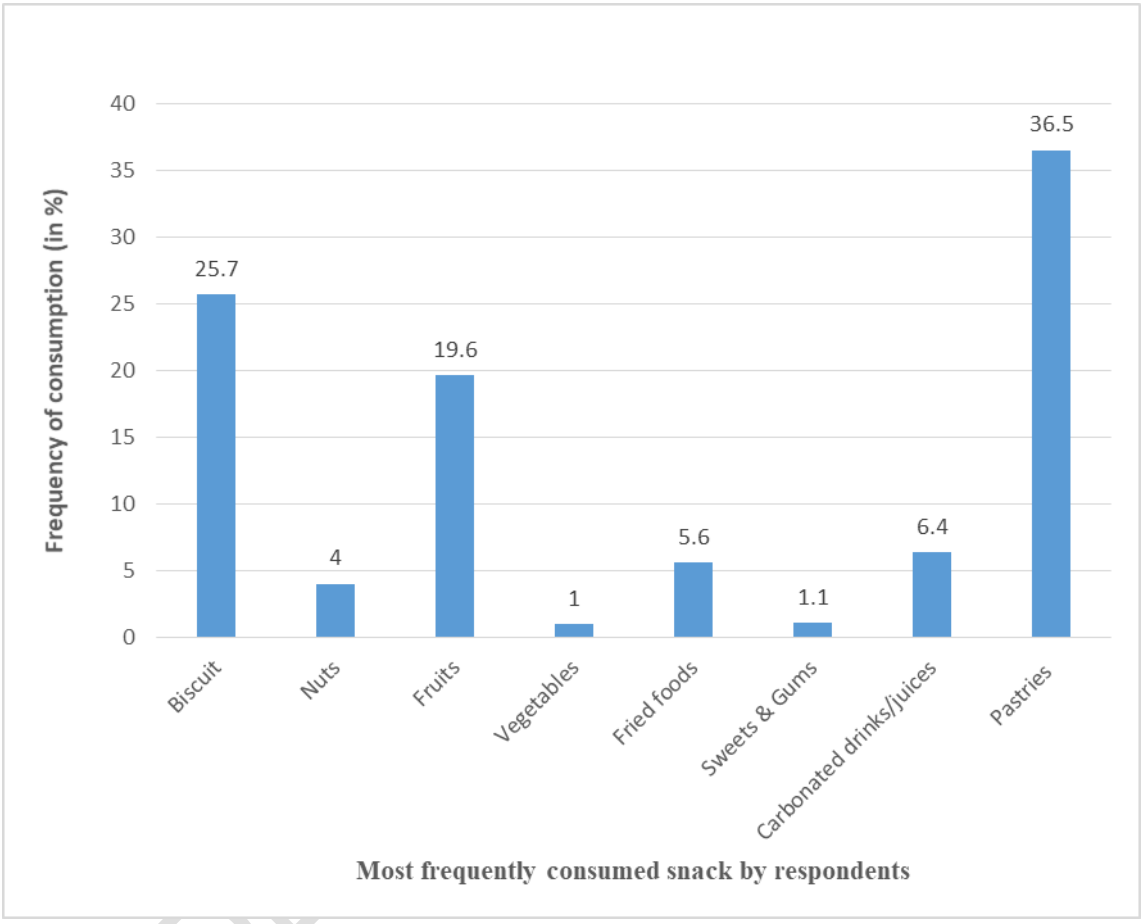
183 This means that a large portion of these processed carbohydrate and fatty foods are
184 consumed on a weekly basis by the study population. In a similar study [15], it was also
185 observed that snacking more times in a day is associated with consuming more calories and
186 that the foods and beverages contributing the most calories at snacks are not the most
187 nutritious options. In their study [15], it was reported that alcoholic and sugar-sweetened
188 beverages contributed the highest percentage of snack calories to that population. In this
189 study, it was pastries that contribute the most snack calories as it was most frequently
190 consumed by the respondents.

191

192

193

Figure 1. Snack consumption pattern of respondents in percentages



4. CONCLUSION

The results of the cross-sectional survey and the dietary intake assessment showed that most people consumed a lot of pastries and soft drinks as snacks (making these the major contributors of snack calories). Many people are yet to realize the health benefits of using nutritious alternatives such as fruits and vegetables as snacks. There is the need for enlightenment in the area of making healthy snack choices in order to achieve the necessary dietary adjustments that will help in keeping adults energized and still reduce the risk of diseases such as obesity and diabetes mellitus. This will go a long way in increasing longevity, boosting productivity and reducing the prevalence of many non-communicable diseases.

COMPETING INTERESTS

No competing interests exists.

REFERENCES

1. Bigler-Doughten, S. & Jenkins, R. M. (1987). Adolescent snacks: nutrient density and nutritional contribution to total intake. *J Am Diet Assoc*, 87(12):1678-1679

2. Ludwig, D. S., Peterson, K. E., Gortmaker, S. L. (2001). Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *Lancet,* 357: 505-508.

3. Cross, A. T., Babicz, D. & Cushman, L. F. (1994). Snacking patterns among 1800 adults and children. *J Am Diet Assoc*., 94(12): 1398-1403.

4. Ezzati, M., Hoorn, S. V. & Rodgers, A. (2002). Comparative Risk Assessment collaborating Group Estimates of global and regional potential health gains from reducing multiple major health risk factors. *The Lancet* 362 (9380): 271-80.

5. Berteus, F. H., Torgerson,JS, Sjostrom, L., & Lindroos, A.K. (2005). Snacking frequency in relation to energy intake and food choices in obese men and women compared to a reference population. *International Journal of obesity.29(6*):711-719.

6. Gonzalez-Suarez, C.B., Lee-Pineda, K., Caralipio, N.D., Grimmer-Somers, K., Sibung, E.O., & Velasco, Z.F.(2015). Is what Filipino children eat between meals associated with body mass index? *Asia Pac J Public health*, 27(2):NP650-61.

7. Jenkins D. J., Khan, A., Jenkins, A. L., Illingworth, R., Pappu, A.S., *et al*., (1995). Effect of nibbling versus gorging on cardiovascular risk factors: serum uric acid and blood lipids. *Metabolism*, 44(4): 549-555.

8. Rashidi M. R., Mahboob, S., & Sattarivand, R. (2003). Effects of nibbling and gorging on lipids profiles , blood glucose and insulin levels in healthy subjects. Saudi J Med, 24(9): 945-948.

9. FAO (2013). Combating Micronutrient Deficiencies: Food-based Approaches. The Food and Agriculture Organization of the United Nations. Eds B. Thompson and L. Amoroso).

10. Williams, I. O., Onyenweaku, E. O. & Atanghwo, I. J. (2016). Nutritional and antimicrobial evaluation of *Saccharum officinarum* consumed in Calabar, Nigeria. *African Journal of Biotechnology*. Vol. 15 (33): 1789 – 1795.

11. Bartlette, J. E., Kotrlik, J. W. & Higgins, C. C. (2001). Organizational research: determining appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal*, 19(1): 43-50.

12. Akpa, M. R., Agomouh, D. I. & Alasia, D. D. (2006). Lipid profile of healthy adult Nigerians in Port Harcourt, Nigeria. *Nigerian Journal of Medicine,* 15(2): 137-140.

13. Onyenweaku, E. O., Ene-Obong, H. N., Oko, G. E. & Williams, I. O. (2019). Contribution of Eggs and Other Cholesterol-containing Foods to Total Dietary Cholesterol intake, and Their Influence on Serum Lipid Profile of Adults in Calabar, Nigeria. *European Journal of Nutrition & Food Safety*, Vol. 9 (4): 329 – 340.

14. Opadijo, O. G., Akande, A. A., & Jimoh, A. K. (2004). Prevalence of Coronary Heart Disease risk factors in Nigerians with systemic hypertension. *African Journal of Medical Sciences*, 33(2): 121-125.

15. Sebastian, R. N., Wikinson, E. C. & Goldman, J. D. (2011). Snacking Patterns of US Adults: What we eat in America, NHANES 2007-2008. Food Surveys Research Group Dietary Data Brief No. 4. June 2011. Available at: http://ars.usda.gov/Services/docs.htm?docid=19476.