

Consumption Pattern of Beverages among Nigerian Undergraduates in Some Selected Federal Universities: A Cross-Sectional Study

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ABSTRACT

Background: It has been reported that university undergraduates consume beverages more than their uneducated peers.

Objectives: The study was aimed at assessing the consumption pattern of beverages among undergraduate students in Nigerian federal universities.

Methods: Multi-stage sampling technique was used to select 3248 respondents for the present study. A structured, self administered questionnaire was used to obtain information on the socio-demographic status and pattern of beverage consumption of the respondents. Data was presented using descriptive and inferential statistics and analyzed using the Statistics Product for Service Solution (SPSS) version 20. A probability (p) value of < 0.05 was considered statistically significant.

Results: More than half (56.20%) of the respondents were in the age range 20-24 years and majority (95.10%) of them were single. Nearly all (95.30%, 95.30% and 96.40%) of the respondents in Ahmadu Bello University (ABU) Zaria, university of Ibadan (UI) and University of Nigeria, Nsukka (UNN) consumed different types of beverages, respectively. There was significant difference ($p < 0.05$) in the intake of beverages across the three institutions.

Conclusion: There was high prevalence of consumption of beverages by the respondents across the three institutions; however, students from UI consumed healthier and nutritious beverages compared to others in ABU and UNN. Therefore nutrition education should be carried out in Nigerian universities to the intake of more nutritious beverages in order to promote health.

Keywords: Consumption pattern, Beverages, Nigerian undergraduates.

Introduction

Beverages comprise of several fluids that can be consumed to rehydrate the body especially when thirsty. They include hot drinks, milk drinks, soft drinks (noncarbonated soft drinks (NCSD) and carbonated soft drinks) and alcoholic drinks. Hot drinks are made up of tea and coffee. According to Sayed and Abdellatif [1] soft drinks are subdivided into five major categories as carbonated

soft drinks; dilutables, (squash, powders, cordials and syrups); fruit juices (100% fruit juice and nectars (25–99% juice content); still drinks, including ready-to-drink (RTD) teas, sports drinks and other noncarbonated products with less than 25% fruit juice). Alcoholic drinks contain ethanol and they include beer, wine, spirits, cider, sake and flavoured alcoholic beverages. Off all the

different types of beverages, milk, soft drinks, and fruit juices are the healthier ones and they should be consumed more than others [2, 3]. Milk contributes to energy, protein, fat, calcium and vitamin A intake, while fruit juices contributes to energy, calcium, iron, vitamin C, vitamin A, and fiber intake, and soft drinks contributes in energy and vitamin C (in fortified fruit drinks) intake [4]. In addition, energy drink has been identified as one important category of beverage that college students could consumed to either restore energy or stimulate them to be awake. Reissig, Strain and Griffiths [5] reported that intake of energy drinks is a rapidly growing trend among youth globally. They may contain sugar or not in addition to large amounts of caffeine, which may cause adverse such as the increased risk of cardio metabolic diseases and change in sleep pattern [6]. Water has been proposed to form the major part of fluid source to humans because it contains no added sugar or other nutrient that may affect the body negatively.

Water is an essential nutrient that constitutes a major part of humans' body and it is difficult to survive without it. This is due to the fact that water is regularly lost from the body and there is need to replace the lost amount in order to maintain water balance. The body keeps water in a balanced state by controlling intake and excretion. Apart from drinking water to maintain this balance, beverages are another major source through which the body can be rehydrated. Distortion of fluid balance causes either a negative or a positive water balance. Negative water balance is not desirable because it leads to dehydration which is characterized by a reduction of water and salt in varying proportions compared with the normal state. Some of the causes of dehydration are failure to replace obligatory water losses or malfunctioning of the body regulatory mechanism. Thirst stimulates humans to drink fluid in order to preserve body fluid homeostasis and survive [7]. Thus, humans need a minimum of 1.44 L of water every day to cover the fluid lost and to maintain the water equilibrium [8]. However, following the rising consumption of beverages other than water by the majority of university students, there is a potential danger that beverage may be used to replace plain water intake by the students. In addition to fulfilling a basic need of contributing to the human fluid requirements and energy, beverages from a part of the culture of human society. In spite of these, the type of beverage consumed has been suggested to influence the diet of the contemporary society [9] due to the changes in dietary habits especially nutrition transition that characterize the modern diet.

Rhazi and Garcia-Larsen [10] defined nutrition transition as the changes that populations experience in quality and quantity of dietary behaviors and patterns. These changes are accompanied with other lifestyle-related factors like physical activity, work and family environments, and general health and socioeconomic well-being, all of which influence energy expenditure. The current status of the nutrition transition is characterized by a high consumption of energy, fat, and sugary and salty foods and low intakes of dietary fiber and low physical activity level [11]. According to Damle, Bector and Saini (12) one of these types of beverage known to contribute to energy content of food is carbonated beverages which are high in sugar, energy and caffeine that could predispose an individual to certain kind of diseases. Moreover, Zohouri et al. (4) reported high prevalence of overweight and obesity with increased intake of carbonated beverages.

Available data from both developed and developing countries now indicates that university students are more prone to consuming high amount of all types of beverages. The probable reason for this may be relating to admission to the university, which is a transition period that may expose the students to life of independence and freedom to the individuals who has previously been fully dependent on his/her parents for virtually everything. As a transition period it is generally associated with changes in social activities, lifestyle and behaviour, dietary habits including fluid intake habits. Studies on eating habits among university students found low adherence to healthy eating habits [13]. Adepoju and Ojo [14] found that 74.6% of students in the university of Ibadan drank more of carbonated energy drinks with 42.4% of them taking at least a can of it each week compared to the percentage that took fruit juices.

The assessment of the use of alcohol and other substances among university student in some private campuses southwestern Nigeria concluded that 72% of the respondents take alcohol [15]. In Bangladesh, Bipasha, Raisa and Goon [16] found that most students (95.4%) consumed sugared beverage intake and 53.6% reported more than two days in a week intake. Male students were more likely than female students to report regular sugary beverages intake (85.4% vs. 14.5%). Wicki, Kuntsche and Gmel [17] reported that the prevalence of harmful drinking habit exhibited by undergraduates with a corresponding

unawareness that their drinking habits had exceed normal levels. Despite the high prevalence of beverage consumption among students in the higher institution of learning, little researches have been conducted to assess the beverage consumption pattern among undergraduate students in Nigerian federal universities. It is in the light of these that this study seeks to assess the consumption pattern of beverages among Nigerian undergraduates in some selected federal universities. This study will bridge the gap in knowledge about intake of beverage and encourage nutrition education for students where necessary.

MATERIALS AND METHODS

Study area

The study was conducted in three federal universities located at Enugu, Kaduna, and Oyo States of Nigeria. Nigeria lies on the west coast of Africa between latitudes 4°16' and 13°53' north and longitudes 2°40' and 14°41' east. The population of Nigeria is estimated to be 198 million in 2018 [18].

Study population

The study population included all healthy university undergraduates between the ages of 16-24 years in the three federal universities in Nigeria. Pregnant women and lactating mothers were excluded from the study.

Sample size and sampling technique

The sample size was derived from 10% of the total number of students from each university and the WHO (16) guideline for calculation of sample size in a survey.

$$n = \frac{z^2 \times p(1-p)}{e^2} \frac{z^2}{1 + \frac{z^2 \times p(1-p)}{e^2 N}}$$

Where n = sample size of the selected schools, z = level of confidence (1.96) is a constant, p = baseline levels of the indicators (0.5 or 50%), e = margin of error (0.05 or 5%) and N = Population size. Proportionate calculation was used to ascertain the number of respondents to be selected from each of the universities. A total of 3248 undergraduate students (1121, 1159 and 1620) for ABU, UI and UNN, respectively were randomly selected.

Inclusion and exclusion criteria

Non pregnant and lactating women without any health condition like fever, diarrhea vomiting, kidney diseases or medical complications of

chronic diseases such as edema or undergoing medical treatment or therapy related to management of body weight, not undergoing vigorous physical activity and male and female within 16-24 years in both halls of residence and off campus were eligible. Pregnant and lactating mothers, sick students having any apparent disease that is capable of distorting water balance like kidney disease, and diabetes mellitus or on medication including supplements, under or above the age range, poor completion of questionnaire and refusal to give consent were excluded from the study.

Method of Data Collection

Trained research assistants (2 from each university) were recruited and trained on administration and collection of the questionnaire, Liq.In⁷ record and refractometer used to elicit information for the fluid intake and hydration status, respectively. Data were collected using structured questionnaire which elicited information on the socio-demographic status of the students (16-24 years) including sex, age (in years), place of residence, marital status and educational level.

Assessment of beverage consumption pattern

Authors developed questionnaire based on the area of interest and data obtained from literature. Questions were portioned into different sections ranging from A to C. Section A assessed the assessed demographic information such as age, sex and others. Question B was a screening question, used to identify those that drink beverages, and asked "Do you drink beverage? This had two options of "Yes or No" and respondents who answered yes were asked to proceed to other questions like "what time of the day do you like drinking beverage(s) alone or with meals? With the following options: a Morning b Afternoon c night d any time of the day; if you took beverage with meals what meal do you usually consume with them? A list of different types of beverages and type of meals were provided from where the respondents chose from. This list contained beverages like milk and milk products, hot beverages, soft drinks, fruit drinks, energy and sport drinks, malt drinks, flavoured water, alcoholic beverages, zobo, kunu and others. From mid of February to the last week of April 2020, 15 trained research assistants (undergraduates) were recruited from the three institutions to participate in the study. The research assistants first ensured that those they approached was students at the university and that the student had not previously completed the

questionnaire. To diversify our sample, research assistants varied the time of day and days of the week during week days to recruit respondents. In compliance with the ethical approval for the use of human subjects in research, all the participants were informed of the study protocol and those who gave their consent were included in the study by completing the self-administered questionnaire. Registration Number: NHREC/TR/08/10/2013A) was obtained from the Federal Ministry of Health, Abuja.

Statistical analysis

The data from the questionnaire was analyzed using descriptive and inferential statistics with the IBM SPSS Statistics software version 20. Descriptive and Chi-square tests were used to determine the relationship between beverage consumption of the respondents in the three universities. The result was expressed as frequencies and percentages. The significance level was accepted at $p < 0.05$.

Results

Table 1 shows the socio-demographic characteristics of the respondents. A total of 3,248 respondents aged 16-24 years participated in this study. More than half (56.2%) of the respondents were males, and 65.9% were 20-24 years old. Over fifty percent (57.1%) of the respondents lived in the hostel while 42.9% lived off-campus at the time of the study. Most (95.1%) of the respondents were single. Approximately 28% of the respondents were 100 level students.

ABU=Ahmadu Bello University, Zaria, UI=University of Ibadan, UNN=University of Nigeria, Nsukka, X^2 = chi-square, df = degree of freedom, p = level of significance, F = frequency, % = percentage

Beverage consumption of the respondents by institutions was presented in Figure 1. Almost all the respondents (95.3%) in ABU, (95.3%) in UI and (96.4%) in UNN took one form of beverage or the other. Only very few (4.7%), (4.7%) and (3.6%) in ABU, UI and UNN, respectively did not consume beverages at all.

ABU=Ahmadu Bello University, Zaria, UI=University of Ibadan, UNN=University of Nigeria, Nsukka

Figure 2 presents the time beverages were consumed alone and with meals by respondents.

Although majority of the respondents across the three universities took beverages alone any time of the day, more (66.2%) of UI students drank beverages than their counterparts in UNN (57.2%) and in ABU (43.5%). More than half (52.8%) in ABU, (58.2%) in UI and (54.5%) in UNN consumed beverages with meals anytime of the day. A good proportion (25.6%) and (22.6%) of the respondents in ABU drank beverages alone in the afternoon and morning, respectively compared with (5.7%) and (20.7%) in UI and (17.2%) and (18.7%) of those in UNN. Whereas less than twenty percent (17.5%) in ABU and (18.7%) in UNN took their meals with beverages, more than twenty percent (25%) of those in UI did. Again, higher percentage of students in ABU (16.5%) and UNN (15.8%) ate their meals with beverages between breakfast and lunch than (6.1%) in UI and these proportions were above those that took meals with beverages between lunch and dinner (10.3% in ABU and 8.5% in UNN) as against (6.1%) in UI. Respondents in the three universities generally drank fewer beverages at night (5.3% for ABU, 2.5% for UI and 4.2% for UNN).

ABU=Ahmadu Bello University, Zaria, UI=University of Ibadan, UNN=University of Nigeria, Nsukka, NA = Not applicable

Beverage consumption pattern of the respondents was shown in Table 2a and 2b. More of the respondents (44.8%) in ABU, (61.3%) in UI and (47.3%) in UNN consumed milk and milk products as breakfast. Approximately 65% of respondents in ABU, 63% in UNN and 45% in UI took hot beverages (such as Milo, Bournvita, Green tea and others) as breakfast. Above average (58.9%) of respondents in ABU, (50.5%) in UI and (60.2%) in UNN consumed soft drink during lunch and very few (11.8%), (20.4%) and (9.1%) in ABU, UI and UNN, respectively drank them at breakfast. Among the three universities, respondents from ABU took more (48.1%) of fruit drink at lunch time, followed by those in UNN (40.9%) and lastly by UI (39.2%). Less than half (43.8%) of the respondents in ABU, (42.5%) in UI and (42.8%) in UNN took energy and sport drinks during lunch. Consumption of energy and sport drink was minimal in ABU (18.9%) and UNN (13.9%) during breakfast compared to those in UI (23.9%).

ABU=Ahmadu Bello University, Zaria, UI=University of Ibadan, UNN=University of Nigeria, Nsukka

X^2 = Chi-square, df = degree of freedom, p = level of significance, F = frequency, % =

Table 1: Socio-demographic characteristics of the respondents

Variable	ABU F (%)	UI F (%)	UNN F (%)	Total F (%)
Sex				
Male	534 (58.50)	659 (57.80)	631 (52.80)	1824 (56.20)
Female	379 (41.5)	481 (42.20)	564 (47.2)	1424 (43.80)
Total	913 (100)	1140 (100)	1195 (100)	3248 (100)
$\chi^2 = 8.735, df = 2, p = 0.013$				
Age (Years)				
16-19	302 (33.10)	470 (41.20)	334 (27.90)	1106 (34.10)
20-24	611 (66.90)	670 (58.80)	861 (72.10)	2142 (65.90)
Total	913 (100)	1140 (100)	1195 (100)	3248 (100)
$\chi^2 = 46.343, df = 2, p = 0.000$				
Place of residence				
Hostel	627 (68.70)	929 (81.50)	300	1856 (57.10)
Off-campus	286 (31.30)	211 (18.50)	895	1392 (42.90)
Total	913 (100)	1140 (100)	1195 (100)	3248 (100)
$\chi^2 = 826.411, df = 2, p = 0.000$				
Marital status				
Single	862 (94.40)	1088 (95.40)	1138 (95.20)	3088 (95.10)
Married	45 (4.90)	49 (4.30)	40 (3.30)	134 (4.10)
Divorced	1 (0.10)	1 (0.10)	12 (1.00)	14 (0.40)
Separated	2 (0.20)	2 (0.20)	4 (0.30)	8 (0.20)
Widowed	3 (0.30)	0 (0.00)	1 (0.10)	4 (0.10)
Total	913 (100)	1140 (100)	1195 (100)	3248 (100)
$\chi^2 = 23.063, df = 8, p = 0.003$				
Educational level				
100	350 (38.30)	230 (20.20)	332 (27.80)	912 (28.10)
200	129 (14.10)	451 (39.60)	194 (16.20)	774 (23.80)
300	298 (32.60)	292 (25.60)	266 (22.30)	856 (26.40)
400	108 (11.80)	104 (9.10)	280 (23.40)	492 (15.10)
500	26 (2.80)	41 (3.60)	106 (8.90)	173 (5.30)
600	2 (0.20)	22 (1.90)	17 (1.40)	41 (1.30)
Total	913 (100)	1140 (100)	1195 (100)	3248 (100)
$\chi^2 = 409.840, df = 10, p = 0.000$				

ABU=Ahmadu Bello University, Zaria, UI= University of Ibadan, UNN=University of Nigeria, Nsukka, χ^2 = chi-square, df = degree of freedom, p = level of significance, F = frequency, % = percentage

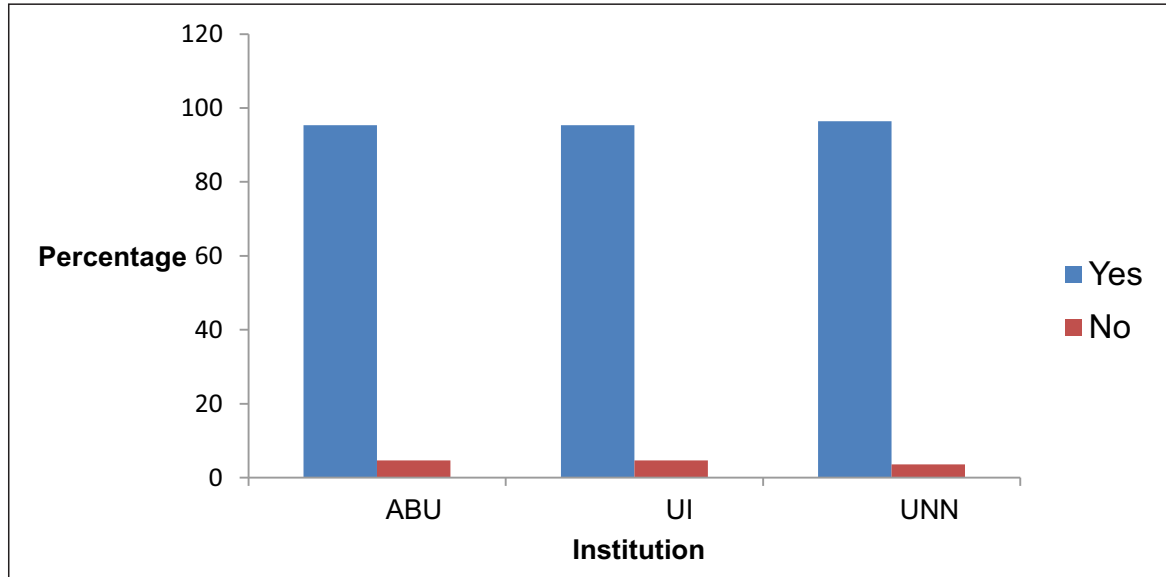
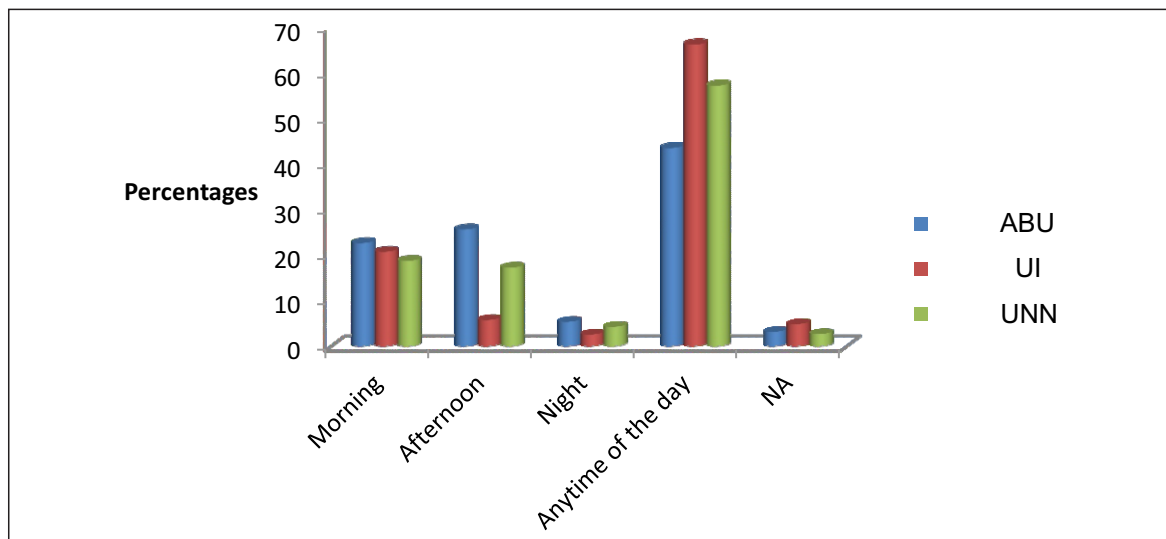
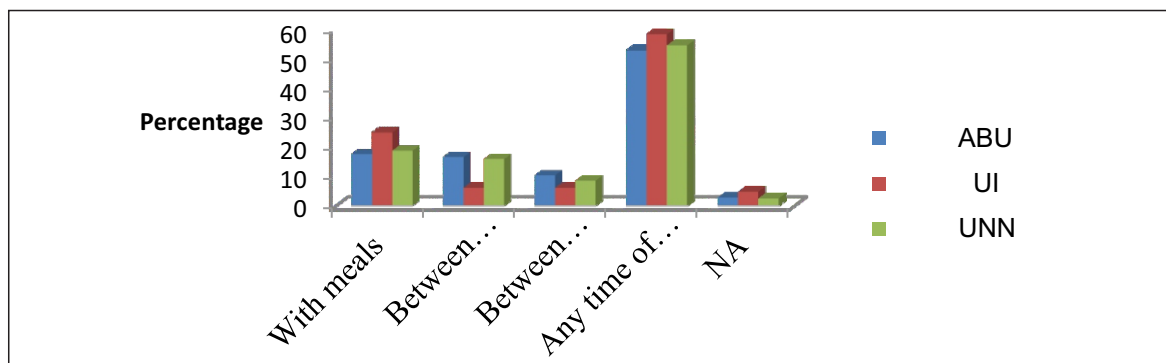


Figure 1: Beverage consumption of the respondents by institutions

ABU=Ahmadu Bello University, Zaria, UI= University of Ibadan, UNN=University of Nigeria, Nsukka



A



B

Figure 2: Time beverages are consumed alone A and B. with meals

ABU=Ahmadu Bello University, Zaria, UI= University of Ibadan, UNN=University of Nigeria, Nsukka, NA = Not applicable

Table 2a: Pattern of beverage consumption of the respondents by institutions

ABU Types beverage	Breakfast					Lunch					Dinner					NA					Total																																																
	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)																																														
Milk and milk product	289 (44.8)	289 (44.8)	289 (44.8)	289 (44.8)	289 (44.8)	135 (14.8)	135 (14.8)	135 (14.8)	135 (14.8)	135 (14.8)	80 (8.8)	80 (8.8)	80 (8.8)	80 (8.8)	80 (8.8)	913 (100)	913 (100)	913 (100)	913 (100)	913 (100)	699 (61.3)	699 (61.3)	699 (61.3)	699 (61.3)	699 (61.3)	289 (19.0)	289 (19.0)	289 (19.0)	289 (19.0)	289 (19.0)	107 (9.4)	107 (9.4)	107 (9.4)	107 (9.4)	107 (9.4)	117 (10.3)	117 (10.3)	117 (10.3)	117 (10.3)	117 (10.3)	913 (100)	913 (100)	913 (100)	913 (100)	565 (47.3)	565 (47.3)	565 (47.3)	565 (47.3)	565 (47.3)	336 (28.1)	336 (28.1)	336 (28.1)	336 (28.1)	336 (28.1)	109 (9.1)	109 (9.1)	109 (9.1)	109 (9.1)	109 (9.1)	185 (15.1)	185 (15.1)	185 (15.1)	185 (15.1)	185 (15.1)	1195 (100)	1195 (100)	1195 (100)	1195 (100)	1195 (100)
Hot beverages	589 (64.5)	589 (64.5)	589 (64.5)	589 (64.5)	589 (64.5)	166 (18.2)	166 (18.2)	166 (18.2)	166 (18.2)	166 (18.2)	56 (6.1)	56 (6.1)	56 (6.1)	56 (6.1)	56 (6.1)	913 (100)	913 (100)	913 (100)	913 (100)	913 (100)	511 (44.8)	511 (44.8)	511 (44.8)	511 (44.8)	511 (44.8)	379 (33.2)	379 (33.2)	379 (33.2)	379 (33.2)	379 (33.2)	137 (12.0)	137 (12.0)	137 (12.0)	137 (12.0)	137 (12.0)	113 (9.9)	113 (9.9)	113 (9.9)	113 (9.9)	113 (9.9)	1140 (100)	1140 (100)	1140 (100)	1140 (100)	749 (62.7)	749 (62.7)	749 (62.7)	749 (62.7)	749 (62.7)	177 (14.8)	177 (14.8)	177 (14.8)	177 (14.8)	177 (14.8)	124 (10.4)	124 (10.4)	124 (10.4)	124 (10.4)	124 (10.4)	145 (12.1)	145 (12.1)	145 (12.1)	145 (12.1)	145 (12.1)	1195 (100)	1195 (100)	1195 (100)	1195 (100)	1195 (100)
100% fruit juice	119 (13.0)	119 (13.0)	119 (13.0)	119 (13.0)	119 (13.0)	446 (48.8)	446 (48.8)	446 (48.8)	446 (48.8)	446 (48.8)	88 (9.6)	88 (9.6)	88 (9.6)	88 (9.6)	88 (9.6)	913 (100)	913 (100)	913 (100)	913 (100)	913 (100)	307 (26.9)	307 (26.9)	307 (26.9)	307 (26.9)	307 (26.9)	453 (39.7)	453 (39.7)	453 (39.7)	453 (39.7)	453 (39.7)	253 (22.2)	253 (22.2)	253 (22.2)	253 (22.2)	253 (22.2)	127 (11.1)	127 (11.1)	127 (11.1)	127 (11.1)	127 (11.1)	1140 (100)	1140 (100)	1140 (100)	1140 (100)	135 (11.3)	135 (11.3)	135 (11.3)	135 (11.3)	135 (11.3)	574 (48.0)	574 (48.0)	574 (48.0)	574 (48.0)	574 (48.0)	272 (22.8)	272 (22.8)	272 (22.8)	272 (22.8)	272 (22.8)	214 (17.9)	214 (17.9)	214 (17.9)	214 (17.9)	214 (17.9)	1195 (100)	1195 (100)	1195 (100)	1195 (100)	1195 (100)
Soft drink	108 (11.8)	108 (11.8)	108 (11.8)	108 (11.8)	108 (11.8)	538 (58.9)	538 (58.9)	538 (58.9)	538 (58.9)	538 (58.9)	75 (8.2)	75 (8.2)	75 (8.2)	75 (8.2)	75 (8.2)	913 (100)	913 (100)	913 (100)	913 (100)	913 (100)	233 (20.4)	233 (20.4)	233 (20.4)	233 (20.4)	233 (20.4)	576 (50.5)	576 (50.5)	576 (50.5)	576 (50.5)	576 (50.5)	214 (18.8)	214 (18.8)	214 (18.8)	214 (18.8)	214 (18.8)	117 (10.3)	117 (10.3)	117 (10.3)	117 (10.3)	117 (10.3)	1140 (100)	1140 (100)	1140 (100)	1140 (100)	109 (9.1)	109 (9.1)	109 (9.1)	109 (9.1)	109 (9.1)	719 (60.2)	719 (60.2)	719 (60.2)	719 (60.2)	719 (60.2)	219 (18.3)	219 (18.3)	219 (18.3)	219 (18.3)	219 (18.3)	148 (12.4)	148 (12.4)	148 (12.4)	148 (12.4)	148 (12.4)	1195 (100)	1195 (100)	1195 (100)	1195 (100)	1195 (100)
Fruit drink	140 (15.3)	140 (15.3)	140 (15.3)	140 (15.3)	140 (15.3)	439 (48.1)	439 (48.1)	439 (48.1)	439 (48.1)	439 (48.1)	97 (10.6)	97 (10.6)	97 (10.6)	97 (10.6)	97 (10.6)	913 (100)	913 (100)	913 (100)	913 (100)	913 (100)	313 (27.5)	313 (27.5)	313 (27.5)	313 (27.5)	313 (27.5)	447 (39.2)	447 (39.2)	447 (39.2)	447 (39.2)	447 (39.2)	242 (21.2)	242 (21.2)	242 (21.2)	242 (21.2)	242 (21.2)	138 (12.1)	138 (12.1)	138 (12.1)	138 (12.1)	138 (12.1)	1140 (100)	1140 (100)	1140 (100)	1140 (100)	174 (14.6)	174 (14.6)	174 (14.6)	174 (14.6)	174 (14.6)	489 (40.9)	489 (40.9)	489 (40.9)	489 (40.9)	489 (40.9)	311 (26.0)	311 (26.0)	311 (26.0)	311 (26.0)	311 (26.0)	221 (18.5)	221 (18.5)	221 (18.5)	221 (18.5)	221 (18.5)	1195 (100)	1195 (100)	1195 (100)	1195 (100)	1195 (100)
Energy and sport drink	173 (18.9)	173 (18.9)	173 (18.9)	173 (18.9)	173 (18.9)	400 (43.8)	400 (43.8)	400 (43.8)	400 (43.8)	400 (43.8)	121 (13.3)	121 (13.3)	121 (13.3)	121 (13.3)	121 (13.3)	913 (100)	913 (100)	913 (100)	913 (100)	913 (100)	272 (23.9)	272 (23.9)	272 (23.9)	272 (23.9)	272 (23.9)	484 (42.5)	484 (42.5)	484 (42.5)	484 (42.5)	484 (42.5)	218 (19.1)	218 (19.1)	218 (19.1)	218 (19.1)	218 (19.1)	166 (14.6)	166 (14.6)	166 (14.6)	166 (14.6)	166 (14.6)	1140 (100)	1140 (100)	1140 (100)	1140 (100)	166 (13.9)	166 (13.9)	166 (13.9)	166 (13.9)	166 (13.9)	511 (42.8)	511 (42.8)	511 (42.8)	511 (42.8)	511 (42.8)	244 (20.4)	244 (20.4)	244 (20.4)	244 (20.4)	244 (20.4)	274 (22.9)	274 (22.9)	274 (22.9)	274 (22.9)	274 (22.9)	1195 (100)	1195 (100)	1195 (100)	1195 (100)	1195 (100)

$\chi^2 = 150.375, df = 6, p = 0.000$

$\chi^2 = 72.583, 066, df = 6, p = 0.000$

$\chi^2 = 109.936, df = 6, p = 0.000$

$\chi^2 = 164.836, df = 6, p = 0.000$

$\chi^2 = 150.356, df = 6, p = 0.000$

$\chi^2 = 79.539, df = 6, p = 0.000$

percentage

ABU=Ahmadu Bello University, Zaria, UI= University of Ibadan, UNN=University of Nigeria, Nsukka

χ^2 = Chi-square, df = degree of freedom, p = level of significance, F = frequency, % = percentage

Discussion

The aim of this cross sectional study was to assess the consumption pattern of beverages among Nigerian undergraduates in some selected federal universities. The result indicated that most of the students consumed beverages. This is in line with the previous studies by Bipasha et al. (18) who reported that 95.4% of students in Bangladesh consumed sugar sweetened beverages. There was high prevalence of consumption of beverages in this study across the three universities, although very few indicated that they do not take beverages. Consumption of beverages in these universities was comparable with none of the respondents in any of the institution taking more beverage than their counterpart.

This has many implications. First, the respondents may be tempted to replace water with beverages at one point or the other. Secondly, quite a significant number of them may be predisposed to some non-communicable diseases including being overweight, obesity, diabetes, high blood pressure that correlates with beverage consumption especially those who are already prone to genetic characteristics to these health conditions. Furthermore, high intake of beverage by the students might be attributable to many things as follows: (1) it has been known that students frequently consume fast food restaurants and this has been found to be associated with increased consumption of beverages. Ahmed et al (20) reported that 89.3% of students consumed sugar sweetened beverages (SSB) at least once on daily basis and that frequent intake of fast food was one of the major factors responsible for this high prevalence of SSB intake; (2) non-alcoholic beverage (NABs) is cheap and being recognized as healthier drinks have formed part of peoples' meal.

According to Flake et al. [21] most Nigerians are now aware of the nutritional value of NABs and incorporate them in their usual diets. This study is in line with the study of Bipasha et al. (18) in which a greater number (95.4%) agreed to drink sugared sweetened beverages. Studies within and outside Nigeria have demonstrated that a greater proportion of students consume non-

alcoholic beverages [22, 23]. More than fifty percent of the respondents in the three institutions took beverages alone or with meals any time of the day. This suggests that time was not considered as a factor that can affect their intake of beverages. However, respondents in ABU drank more beverages alone in the morning and afternoon compared to those in UI and UNN. Meanwhile students in UI consumed beverages with meals than respondents in ABU and UNN.

The pattern of consumption of beverage including soft drink, 100% fruit juice, fruit drink, energy drink, malt drink, flavoured water, zobo and kunu occurred mainly during lunch across the three universities. In contrast, milk and milk products and hot beverages were mostly taken as breakfast from the three universities. This might be attributed to the fact that students may not have ample time to prepare other kinds of food that will require more time since most lectures starts early in the morning. Therefore, they choose to take beverages, which are convenience. One notable practice among these respondents is that those who consumed higher percentage of milk consumed less of other beverages such as soft drink, hot beverages, fruit drink, energy and sport drinks and zobo.

The present study agreed with several studies done in the past which evaluated the relationship between soft drink consumption and milk intake and reported that soft drink consumption was associated with lower intakes of milk and dairy products [24, 25, and 26]. However, the consumption of alcoholic beverages did not follow this trend across the universities. Whereas the respondents from ABU and UNN students took them during dinner, those in UI preferred taking them during lunch.

Conclusion

There was high consumption of beverages by the respondents and time did not affect the consumption of various beverages whether taken alone or with meals. Across the three institutions, students in UI consumed more nutritious beverage including milk and its products than their counterparts in ABU and UNN and as such, respondents in these two universities need to be encouraged to consume healthier beverages to avoid potential health risk accompanied with high consumption of carbonated beverages. Moreover, since a significant number of the respondents consumed beverages with meals, they may replace the drinking of plain water with unhealthy beverages.

Recommendation

University authorities and parents should encourage undergraduate students in Nigeria to consume their meals with water rather than other beverages.

Acknowledgement

The authors were grateful to all those who contributed in one way or the other to make the work meaningful to a logical conclusion.

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