



DETERMINANTS OF FRUITS AND VEGETABLES CONSUMPTION AMONG CIVIL SERVANTS IN LAGOS, NIGERIA

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Abstract: Fruits and vegetables (F&V) are essential components of the human diet because of their nutritional and health benefits. They are rich in micronutrients (vitamins and minerals), dietary fiber, phytochemicals and antioxidants. This study assessed the determinants of F&V consumption among civil servants in Lagos State, Nigeria. Data were collected from 196 civil servants with the aid of a well-structured questionnaire through a multistage sampling procedure. These data were analyzed using descriptive statistics and the Ordinary Least Square (OLS) regression model. The gender distribution of the sampled civil servant was slightly balanced (51% male and 49% female) with an average age of 43 years. The average monthly income was ₦110,844.00, and the average monthly expenditure on fruit and vegetable was ₦5,387.91. The civil servants primarily consumed F&V because of its availability. The OLS regression analysis indicated that age, household size, monthly income, health benefit, availability and quick natural snack were the variables that significantly influenced F&V consumption among the civil servants. There should be more public advocacy about the health benefits of F&V consumption as well as improvement in monthly income of civil servants to enhance consumption of this group of food.

Keywords: Fruits and vegetables; consumers; civil servants; urban; Nigeria

Introduction

Fruits and vegetables (F&V) are essential components of the human diet because of their nutritional and health benefits. They are rich in micronutrients (vitamins and minerals), dietary fibre, phytochemicals and antioxidants (Slavin and Lloyd, 2012; Wallace *et al.*, 2020). Furthermore, given their low calories to volume consumed ratio, they help to guard against unhealthy weight gain (Obayelu, Ogunnaika and Omotoso, 2018). In addition to these physical health benefits, evidence is growing in the literature that F&V consumption positively influences psychological wellbeing, demonstrated by greater life satisfaction and lower occurrences of depression (Mujcic and Oswald, 2016; Conner *et al.*, 2017). F&V consumption has also been consistently linked with preventing non-communicable diseases, including cancer and cardiovascular diseases (Wang *et al.*, 2014; Morgan *et al.*, 2016).

However, despite these benefits, the global consumption of F&V is below recommended amounts, although this consumption gap is more acute in developing countries (Díaz-Garcés *et al.*, 2016). In Nigeria specifically, the average consumption of F&V is well below the daily per capita 400g recommended by the World Health Organization for a number of reasons (Agudo, 2005; Ashagidigbi, Adebayo and Salau, 2019). First, most households in Nigeria are poor and spend between 60 to 80% of their income on food (Obayelu, 2010; National Bureau of Statistics (NBS), 2020). Due to their low purchasing power, these households allocate their meagre income to high staple foods because of their relatively low cost and high energy content, excluding F&V, which are seen as luxuries. This increases the risk of micronutrient deficiencies, infant and maternal mortality, stunting and associated poor health outcomes ((Meerman and Aphane, 2012)). Furthermore, F&V are often costly due to inadequate processing and storage facilities, leading to relatively high prices, and reduction in consumers demand (Obayelu, Ogunnaika and Omotoso, 2018). Secondly, rapid urbanization and long working hours away from home are fuelling a shift in dietary patterns away from typical home-made Nigerian foods (a combination of a carbohydrate staple and a vegetable-based soup) towards convenient, low-quality fast foods that are characteristically low in dietary fibre and micronutrients but high in energy and saturated fat (Morgan *et al.*, 2016; Raaijmakers *et al.*, 2018).

This ongoing dietary pattern change has led to an increase in the prevalence of obesity and related diseases (Adegoke *et al.*, 2021; Adeloye *et al.*, 2021).

A nation's productivity is directly linked to the health of its workforce. This study was conducted among civil servants (government-employed workers) because they constitute a large percentage of the total workforce in Nigeria with a good number in Lagos (Oyawole, Akerele and Dipeolu, 2016). Furthermore, they are particularly at risk of non-communicable diseases (especially obesity) because of the sedentary nature of their job, relative affluence (which increases the use of motorized transport) and low-quality dietary behaviours due to urban nutrition transition (Sanusi, Holdbrooke and Ariyo, 2015; Aladeniyi *et al.*, 2017).

Given the significant public expenditure (which have competing alternative uses in a developing country like Nigeria) and rising diet-related non-communicable diseases, it is essential to understand consumer behaviour on F&V. Against this backdrop, this study was conducted to determine the factors that influence F&V consumption, and identify constraints limiting their consumption among civil servants in the study area. Understanding consumer behaviour on F&V and the role of socio-demographic and institutional factors will properly guide policies and strategies to promote F&V consumption towards a healthy food lifestyle.

Materials and Methods

Study Area

This study was conducted in Lagos, the most urbanized state in Nigeria (Aliyu and Amadu, 2017). The state is among the six states in the southwestern part of Nigeria. The state lies approximately on longitude 3.3792° E and latitude 6.5244° N. It is bounded in the North and East by Ogun state, in the West by the Republic of Benin, and stretches over 180 kilometres along the Guinea Coast of the Bight of Benin on the Atlantic Ocean. The state has a total land area of 358,862 hectares or 3,577 sq. km, accounting for 0.4% of Nigeria's landmass and accommodating the largest population in Nigeria. Lagos is officially divided into five divisions (namely: Ikeja, Badagry, Ikorodu, Lagos (Eko) and Epe). The divisions are divided into 20 Local Governments Areas (LGAs) and 37 Local Council Development Areas. Agriculture contributes less than 2% to the

state economy. The state is divided by Lagos state Agricultural Development Authority (LSADA) into three blocks (eastern, western and far western blocks), each block comprising circles, cells and agricultural communities.

Study Data and Sampling

Primary data were collected for this study through a well-structured questionnaire aimed at civil servants in the study area. The study used a multistage sampling procedure; the first stage involves the random selection of four LGAs: Alimosho, Apapa, Ikeja, and Mushin LGAs. This helped to have a true representation of the civil servants in Lagos State. The second stage involves selecting wards from the selected LGAs using probability proportional to size (PPS) of the wards in each LGA. A total of 20 wards were selected using this method. The third stage entails randomly selecting 10 civil servants from each of the selected wards chosen using systematic random sampling. This was done by obtaining the total number of households in each ward, then divided by 5 to calculate the sampling interval (SI) to get a random start. This selection process resulted in 200 civil servants, of which information on 196 civil servants were considered usable for further analysis.

Analytical Techniques

The analytical tools used in this study are descriptive statistics and Ordinary Least Square (OLS). Descriptive statistics such as mean, frequency tables and percentages were used to describe the socioeconomics characteristics of civil servants

and the constraints associated with F&V consumption by civil servants in the study area. Ordinary least square (OLS) regression was used to analyze factors influencing civil servants' F&V consumption in the study area. This model has been widely used in literature (Akerele, 2011; Layade and Adeoye, 2014; Ergashev, 2018; Obayelu, Ogunnaike and Omotoso, 2018) for consumption studies across the globe. The OLS model is specified implicitly as:

$$C = f(X_1, X_2, X_3, \dots, X_{11}) \quad (1)$$

Following Layade and Adeoye (2014) and Obayelu et al. (2018), we explicitly specified the OLS model for this study as

$$C_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_{11} X_{11} + \varepsilon_i \quad (2)$$

C = Amount spent on FV (Naira/month) as a proxy for food consumption

β_0 = Constant, β_i = Coefficient of explanatory variables

$X_1 - X_{11}$,

X_1 = Gender, X_2 = Marital status, X_3 = Age, X_4 = Household size, X_5 = Years of schooling,

X_6 = Monthly income, X_7 = Health benefits, X_8 = Availability, X_9 = Recommended by friend,

X_{10} = Quick natural snack, X_{11} = Low-calorie and low fat,

ε = error term

Table 1: Summary Statistics of variables.

Variables	Description/Unit	Mean	Std. Dev.	Min	Max
<i>Dependent variable</i>					
Fruit & Vegetable Expenditure (₦) ^a	Total monthly amount of money spent to purchase F&V by the household (Naira)	5,387.91	4,075.01	400	26,240
<i>Independent variables</i>					
Gender	Sex of respondent, 1 if male and 0 otherwise	0.52	0.50	0	1
Age	Age of respondent in years	40.03	7.89	24	58
Marital Status	Marital status of respondent, 1 if married and 0 otherwise	0.69	0.46	0	1
Household size	Number of persons in the household	4.38	1.67	1	8
Years of schooling	Number of years spent in schooling by the respondent	18.92	2.44	14	25
Monthly Income (₦) ^a	Total amount of money derived by respondent in a month (Naira)	110,844	49,618	23,000	250,000
Health Reason	Health benefit being the reason for consuming F&V by the respondent, 1 if yes and 0 otherwise	0.74	0.44	0	1
Availability	Availability being the reason for consuming FV by the respondent, 1 if yes and 0 otherwise	0.93	0.26	0	1
Recommended by friends	Recommendation by friends being the reason for consuming F&V by the respondent, 1 if yes and 0 otherwise	0.30	0.46	0	1
Quick Snacks	Quick snacks being the reason for consuming F&V by the respondent, 1 if yes and 0 otherwise	0.64	0.48	0	1
Low calorie & fat	Low calorie and fat is the reason for consuming F&V by the respondent, 1 if yes and 0 otherwise	0.84	0.37	0	1

^a ₦ = Naira, Nigerian currency; Official exchange rate 1 US Dollar = 410 Naira.

Results and Discussion

Description of households by socioeconomic characteristics and the perceived reasons for F&V consumption

The socioeconomics characteristics of the household heads in the study area are presented in Table 2. The results revealed that out of the 196 civil servants sampled, 52% are male, while 48% are female. Most (40%) of the respondents are between the ages of 41 and 50 years, with an average age of 40.03 years. This suggests that they are in their productive age bracket and could work to meet their ends. Most of the respondents have a household size between 4 and 6 persons, with a mean

household size of 4 persons. A majority (69.39%) of the respondents are married, while the remaining (30.61%) are either single, divorced or widowed. All the respondents had formal education with an average of 18.92 years of formal education. This could be attributed to the requirement to be recruited into the civil service. About half (49%) of the respondents earn between ₦50,000 and ₦100,000 monthly, with an average of 11.33 years of working experience.

Table 2: Distribution of respondents (N = 196) by socioeconomic characteristics

Variable	Frequency	Percent
<i>Gender</i>		
Female	94	48
Male	102	52
<i>Age</i>		
< 30	34	17
31 - 40	70	36
41 - 50	78	40
51 - 60	14	7
<i>Household size</i>		
1 - 3	56	29
4 - 6	124	63
> 6	16	8
<i>Marital status</i>		
Married	136	69
Others	60	31
<i>Years of schooling</i>		
≤14	2	1
15 - 21	166	85
>21	28	14
<i>Years in service</i>		
1 - 10	100	51
11 - 20	84	43
> 20	12	6
<i>Monthly income (₦)^a</i>		
< 50,000	8	4
50,001 - 100,000	94	48
100,001 - 150,000	62	32
150,001 - 200,000	24	12
>200,000	8	4

^a ₦ = Naira, Nigerian currency; Official exchange rate 1 US Dollar = 410 Naira.

Table 3 presents the respondents' perceived reasons for F&V consumption in the study area. The result shows that most of the respondents attribute their consumption of F&V to their availability (93%), low calorie and fat content (83%) and their knowledge of health benefits (72%). Furthermore, 64% of the respondents considered F&V as a quick natural snack, while 29% of them consume F&V based on their friends' recommendation.

Table 3: Distribution of respondents (N = 196) by perceived reasons for F&V consumption

Variable	Frequency	Percent
<i>Availability of fruits and vegetables</i>		
No	14	7
Yes	182	93
<i>Recommended by friends</i>		
No	138	71
Yes	58	29
<i>Quick Natural snack</i>		
No	70	36
Yes	126	64
<i>Low calorie and fat</i>		
No	32	17
Yes	164	83
<i>Knowledge of health benefit</i>		
No	52	28
Yes	144	72

Constraints in Fruits and Vegetables Consumption

Table 4 presents information about the constraints experienced by respondents in consuming F&V in the study area. It was revealed that inaccessibility of some F&V (92%), high perishability (88%), lack of storage facilities (84%), contamination of F&V (85%), and unavailability all year round (83%) were the major barriers hindering the consumption of F&V among the respondents in the study area

Table 4: Constraints in FV consumption

Constraint	Yes		No	
	Frequency	(%)	Frequency	(%)
Contamination of fruits and vegetables	166	85	30	15
Poor income	68	35	128	65
Lack of storage facilities	164	84	32	16
High price	94	48	102	52
Stomach sensitivity	66	34	130	66
Unavailability all year round	162	83	34	17
Inaccessibility of some fruits or vegetables	180	92	16	8
High perishability	172	88	24	12

Determinants of Fruits and Vegetables consumption

The result of the OLS model used in determining the factors influencing F&V consumption among respondents in the study area is presented in Table 5. Three functional forms (linear, semi-log and double-log) were estimated, but the semi-log was selected as the best model based on the signs and statistical significance of the variables, coefficient of determination (R^2) value, and the F-statistic. The F-value (3.12) is statistically

significant at ($p<0.001$) α -level, implying the independent variables were jointly significant in influencing F&V consumption. Out of the eleven explanatory variables included in the OLS model, six (age, household size, monthly income, health benefit, availability and quick natural snack) had a significant influence on the F&V consumption of respondents in the study area.

Table 5: OLS Results on determinants of F&V consumption.

Variable	Coefficient	Standard Error	T-value	P-Value
Gender	-0.056	0.044	-1.26	0.208
Age	-0.013***	0.004	-2.90	0.004
Marital status	-0.007	0.055	-0.12	0.902
Household size	0.072***	0.019	3.71	0.000
Year of schooling	-0.012	0.009	-1.25	0.213
Income	1.72E-06***	6.43E-07	2.68	0.008
Knowledge of health benefits	0.230***	0.086	2.67	0.008
Availability	0.259***	0.051	5.04	0.000
Recommended by friends	-0.020	0.048	-0.41	0.682
Quick snack	0.141***	0.046	3.03	0.003
low-calorie and low fat	-0.074	0.061	-1.21	0.227
Constant	3.442	0.227	15.15	0
F-Value	6.67			0.000
R ²	0.285			
Adjusted R ²	0.242			
No of observation	196			

**** Significance at 1%

Monthly income is significant ($p<0.001$) and positively affect the amount of spending on F&V. This indicates that a rise in monthly income increases will increase F&V consumption by 0.43%. A household that receives a pay rise could efficiently allocate more share of their expenditure for F&V consumption. This result corroborates the findings of Layade and Adeoye (2014), who reported that an increase in parents' income would increase their children's F&V consumption. Interestingly, the age of the respondent is significant ($p<0.001$) and negatively affects the amount spent on F&V. This is an interesting result, given that other studies (Yen, Tan and Nayga, 2011; Ogundari, 2013) find that older persons increase their consumption of F&V. However, this result can be attributed to intra-household consumption behaviour where adults place premium attention on the wellbeing of their children, by ensuring that their children consume healthier and more quality food (such as F&V) at their own expense. This conforms with Ergashev (2018), who also observed a negative relationship between the age of the household head and F&V consumption in Uzbekistan.

The availability of F&V is significant ($p<0.001$) and positively influenced the consumption of F&V. This implies that as respondents have more access to F&V, they tend to consume and spend more F&V. The seasonality of F&V has a greater

impact on its availability. Many F&V are not usually available all year round due to weather conditions and perishability, especially in Sub-Saharan Africa (Nigeria inclusive), where storage facilities are limited. This finding supports Layade and Adeoye (2014), Obayelu *et al.* (2018) who found that availability and seasonality are key drivers of F&V consumption among households in Nigeria. Knowledge of the health benefits of F&V is statistically significant ($p<0.001$) and positively associated with F&V consumption. This implies that additional knowledge about the health benefits of F&V will increase the consumption of F&V by 23%. Fruit and vegetable contain essential nutrients such as vitamins, fibre, minerals and other substances, which help the body system at reducing the risk of obesity, diabetes, cancer, and other cardiovascular diseases (Okop *et al.*, 2019). The finding is corroborated by previous findings of Grunert *et al.* (2010) and Ergashev (2018). Similarly, respondents' perception of F&V as a quick snack positively influenced its consumption at 1% significance level. F&V can easily be consumed without much process and serves as a natural energy boost, and at the same time, provides nutrients required to maximize the overall health condition. Furthermore, household size had a positive coefficient and significantly ($p<0.001$) influenced the amount of money spent on F&V. This implied that adding one person to the household

will increase the amount spent on F&V. This corroborates earlier findings in the literature such as Ergashev (2018), Oppong-Kyeremeh and Bannor 2021.

Conclusion and Recommendations

This study assessed the determinants of F&V consumption among civil servants in Lagos State, Nigeria. We employed descriptive statistics to identify perceived reasons for and constraints of F&V consumption and an OLS regression model to determine the factors affecting F&V consumption among civil servants in Lagos State, Nigeria. Based on the study's findings, we concluded that socioeconomics and behavioural factors affect F&V consumption among civil servants. Age, household size, monthly income, knowledge of health benefits, availability, and quick snack are the significant drivers of F&V consumption among the civil servants in Lagos State, Nigeria. Furthermore, the consumption of F&V is hindered by the inaccessibility of some F&V, high perishability, lack of storage facilities, and other reasons. Therefore, there should be more public advocacy about the health benefits of F&V consumption as well as improvement in monthly income of civil servants to enhance consumption of this group of food.

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