

Vegetable Intake, Home gardening practices and Socio-Demographic Determinants among Women of Reproductive Age (WRA) in Urban area, Abuja, Nigeria

Chiamaka Judith Ezenwa *, Florence Chinyere Cletus and Faustina Adaugo Onuoha

Department of Public Health, School of Health Technology, Federal University of Technology, Owerri, Imo state, Nigeria.

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Abstract

Inadequate vegetable intake was enlisted as one of the top risk factors of global mortality. Adequate vegetable intake is essential for preventing micronutrient deficiencies and non-communicable diseases among women of reproductive age. However, consumption remains suboptimal in Nigeria. The potentials of home gardening to improve vegetable intake is well known, however, the socio-demographic determinants of Vegetable Consumption among Women of Reproductive Age (WRA) in Urban Area of Abuja, Nigeria remains unclear. This study was designed to assess the home gardening practices, sociodemographic determinants and its association with vegetable intake among women of reproductive age in Abuja Municipal Area Council, F.C.T., Nigeria.

A descriptive cross-sectional study was conducted among 390 women selected using a multistage sampling technique. Data were collected using a structured interviewer administered questionnaire covering socio demographic characteristics, home gardening practices, vegetable intake and vegetable consumption pattern and dietary intake. Adequacy of vegetable intake was determined using recommended daily vegetable consumption guidelines. Data were analyzed using descriptive statistics and chi square tests at $p < 0.05$.

The mean age of home gardeners (HGs) and Non-Home gardeners (NHGs) respondents were $(34.85 \pm 8.83; 35.33 \pm 9.36)$ respectively. 33.8% of the respondents practised home gardening yet while 66.2% did not practise home gardening. Average vegetable intake were higher among HGs $(180.09 \pm 114.55\text{g})$ than NHG $(174.26 \pm 105.65\text{g})$. Only 11.8% attested that they consumed vegetables daily with a higher percentage of daily intake reported by HGs.

The study concludes that some sociodemographic factors and the intake of some vegetables were significantly associated with gardening practices among respondents. However, improved household level food production, nutrition education regarding diet quality will contribute to vegetable intake.

Keywords: Women of Reproductive Age; Urban Agriculture; Vegetable Intake; Home Gardening

1. Introduction

Adequate consumption of vegetables forms a crucial component of healthy diets and plays a critical role in the prevention of micronutrient deficiencies and diet related non communicable diseases. Fruits and vegetables have been shown to help reduce the risk of major chronic diseases such as cardiovascular diseases, type 2 diabetes, obesity and certain cancers [1]. Despite increased efforts, findings from national data further corroborates the persistent gaps in dietary diversity especially among Women of reproductive age (WRA) in many low- and middle- income countries (LMIC), including Nigeria [2]. WRA are particularly vulnerable to poor dietary quality due to increased physiological demands and socio-economic constraints [3], their dietary behaviours influence not only their own health outcomes

* Corresponding author: Chiamaka Judith Ezenwa

but also household food choices and the nutritional wellbeing of children.. Furthermore, urbanization, dietary transition and increasing reliance on market purchased foods have further contributed to declining consumption of traditional plant-based foods in many Nigerian cities further exacerbating the situation.

Evidence from low- and middle- income countries shows that women of reproductive age frequently consume less than the recommended amounts of fruits and vegetables, thereby increasing their risk of micronutrient deficiencies and diet related non communicable diseases [4]. In urban Nigeria, affordability, food preferences and access to fresh produce have been identified as key determinants of fruit and vegetable consumption among adults [5]. Socio demographic characteristics such as age, education, income, employment status and household size are also known to shape dietary behaviours.

In recent times, home gardening has emerged as a promising food-based strategy for improving household access to fresh vegetables. Urban home gardens, including container and small space gardening, have the potential to enhance dietary diversity, improve food security and reduce dependence on market purchases.

Although several studies have examined fruit and vegetable intake in Nigeria, there is limited evidence that simultaneously considers home gardening practices alongside socio demographic determinants of vegetable consumption among women of reproductive age in urban settings.

Understanding how these socio demographic factors and home gardening practices influence vegetable intake among urban women is essential for designing targeted and context appropriate nutrition interventions.

Therefore, this study was therefore conducted to assess home gardening practice and examine the socio demographic determinants of vegetable consumption among women of reproductive age in urban area of Abuja, Nigeria.

Specific Objectives

This study aimed to:

- Determine the socio demographic characteristics of WRA.
- Identify home gardening practices among WRA.
- Assess vegetable consumption pattern among the respondents.
- Determine the proportion of recommended vegetable intake the study population
- Examine the association between socio demographic factors, gardening practices and vegetable consumption among the respondents.

1.1. Research Hypothesis

- **H₀ (Null Hypothesis):** There is no significant association between sociodemographic determinants and vegetable intake among WRA in urban area of Abuja, Nigeria
- **H₁(Alternative Hypothesis):** There is an association between socio-demographic determinants and vegetable consumption among WRA in urban area of Auja, Nigeria

2. Methodology

A descriptive cross-sectional study was employed and a mixed method approach provided advantage of obtaining information that complement each other. This study was conducted at Wuse District, Abuja Municipal Area Council of Abuja, the capital city of Nigeria. It is one of the rapidly growing cities in Africa found in the North central geopolitical zone in Nigeria. The city is part of the Federal Capital Territory (FCT) whose land area is about 8000km². Abuja lies at latitude 9.07N and longitude 7.48E, and at an elevation of 840 m (2760 ft) above sea-level. This elevation and tropical location gives Abuja a mild weather which contrasts sharply. The Federal Capital Territory (FCT) lies between the latitude of 8°25' and longitude 6°45' and 7°45'E. It is bounded by Kaduna State (to the North), by Kogi State (to the south) by Niger State (to the West) and Nasarawa State (to the East).

Wuse I district was selected for the study and was considered based on the ethnic composition of the populations. A purposive sampling was used to select the study area because of its eligibility to provide information on the topic of research when compared to other urban areas in Abuja. First, the area is more centralized in the urban heart of the city and has no urban slum. Secondly, it has a higher number of residential buildings and ease of access from other parts of F.C.T.

The study population involved women-of-reproductive age resident in Wuse I district of Abuja Municipal Area Council. The study population comprised of study groups; those with home garden and those who did not have home gardens. The ownership of the home garden was not restricted to the study participants or their activeness in tending to the garden. As long as, the garden was owned by a member of the household and study participants had unlimited access to them.

2.1. Sample size determination

The sample size was determined using Fischer's formula: as shown below

$$N = \frac{z^2 pq}{d^2}$$

Where;

N= the minimum sample size;

Z =the standard normal variable for a 95% confidence level (CI);

p =the prevalence of home garden on the adequacy of vegetable intake =assumed 50% or 0.50

q = complementary probability(1-p) =1-0.50=0.50

d =degree of precision taken as 5% = (0.05).

$$n = \frac{1.96^2 \times 0.50 \times 0.50}{0.05^2} = 384.16$$

10% attrition = 38.416

However, 390 respondents were used in this study. This is as a result of the time frame of the study and hard-to-reach nature of the research location.

2.2. Sampling Technique

A three-stage sampling technique was employed in the selection of the respondents that were interviewed for this study.

First, purposive sampling was adopted to selected Abuja Municipal Area Local Government Area Council

Secondly, Wuse I district was purposively selected. The local Government area was selected because of its typical urban nature which was the target of the study. This information was provided at the urban and regional planning unit during the preliminary studies.

Finally, a random and purposive selection of the respondents was done across the seven zones of the study area and was stratified as non-home gardeners and home gardeners.

A random sample was used in selecting study participants. The following places were visited to recruit study participants.

2.3. Data Collection Instrument and Procedure

Quantitative data was collected using a semi-structured interviewer-administered questionnaire including a 24-hour dietary recall section to obtain information from the study participants. The questionnaire consisted of: Section A (Socio-demographic information of the respondents), Section B (Practice of home gardening), Section C (Influence of vegetable intake), Section D (24-hour dietary recall to measure food intake from which vegetable intake will be estimated). And Section E (Frequency of vegetable consumption adapted from the food frequency questionnaire).

Data was analyzed using Statistical Package for Social Science (SPSS) version 20.0. (SPSS v20.0). Descriptive statistics like frequency, percentages, mean and standard deviation were used to summarize the data. Chi-square test statistics was used to test for significant association between variables. Statistical significance was set at $p < 0.05$.

Ethical approval was obtained for this study from the ethics committee of University of Ibadan and University College Hospital, Ibadan at the Institute of Advanced Medical Research and Advanced Training (IMRAT). Ethical approval was also obtained from the Health and Human Services, Federal Capital Territory Administration. Permission was obtained from the Abuja Municipal Local Government Area.

3. Results

The table below shows that majority (63.2%) of the respondents fell within age groups less than 40 years while about 36.9% were within 40 years above. However, the overall mean age was 35.02 ± 8.99 . Furthermore, 83.1% of the respondents were Christians with 16.4% and 1.5% Muslims and Traditionalist respectively. Only 3.1 percent of the respondent did not receive a formal education. Although majority (97.0%) received at least a level of formal education but respondents who received tertiary education was highest (82.1%) among others. As further shown in the table below, 13.3% of the respondents were housewives, 23.6% Civil servants while 12.3%, 33.35% and 17.4% were for self-employed, those employed in the private sector and others respectively. The average monthly income of the respondents was $\text{N}64,966.81 \pm \text{N}57,304.33$ with majority (53.7%) within the $\text{N}30,000$ - $\text{N}59,999$ category. Majority (70.3%) of the respondents were married with the remaining percentage 26.2% and 3.63% distributed among singles and widowed respectively. The ethnic groups of respondents ran across the three major ethnic groups; Igbo (39.5%), Hausa (12.8%) and Yoruba (19.0%) in Nigeria with other ethnic groups making up to 28.7%. According to the type of apartment lived, respondents who have home gardens were the majority (62.1%) of home owners as compared to 33.3% of non-home gardeners. The rest of the respondents lived in a rented apartment (39.5%), family house (12.3%) and Others (5.1%) which included pasturage and quarters. The major sources of vegetables for both home gardeners and non-home gardeners were through purchase (87.3%) followed by home garden (9.1%), however, the proportion were more among non-home gardeners (95.3%) than home gardeners (74.2%). Other sources of vegetables for the respondents were home gardens (8.3%), farms (4.1%), purchase (73.6%), gifts (2.5%) and others (0.5%)

Table 1 The socio-demographic characteristics of respondents

Characteristics	Practice of home garden			P-value
	Non-Home Gardeners N (%) N=258	Home Gardeners N (%) N=132	Total N (%) N=390	
AGE GROUP				
Below 20 years	2 (0.8)	8(6.1)	10(2.5)	0.106
20-29 years	78 (30.2)	40(30.3)	118(30.3)	
30-39 years	86(33.3)	32(24.4)	118(30.3)	
40-49years	92(35.7)	52(39.4)	144(36.9)	
Mean $\pm$ S.D	34.85 $\pm$ 8.83	35.33 $\pm$ 9.36	35.02 $\pm$ 8.99	
MARITAL STATUS				
Single	50 (21.7)	46 (34.8)	102 (26.2)	0.142
Married	190 (74.4)	82 (62.1)	274 (70.3)	
Widowed	10 (3.9)	4 (3.0)	14 (3.5)	
ETHNIC GROUP				
Yoruba	50 (19.4)	24 (18.2)	74 (19.0)	0.234
Igbo	104 (40.3)	50 (37.9)	154 (39.5)	
Hausa	40 (15.5)	10 (7.6)	50 (12.8)	
Others	64 (24.8)	48 (36.4)	112(28.7)	
RELIGION				
Christianity	200(77.5)	124(93.9)	324(83.1)	0.014
Islam	52(20.2)	8(6.1)	60(16.4)	
Traditional	6(2.3)	0(0)	6(1.5)	
EDUCATION				
No formal education	8(3.1)	4(3.0)	12(3.1)	0.548

Primary	8(3.1)	0(0)	8(2.1)	
Secondary	32(12.4)	18(13.6)	50(12.8)	
Tertiary	210(81.4)	110(83.3)	320(82.1)	
OCCUPATION				
Housewife	38(14.0)	14(12.1)	52(13.3)	0.754
socio-demographic characteristics of respondents.				
CHARACTERISTICS	PRACTICE OF HOME GARDEN			P-VALUE
Characteristics	Non-Home Gardeners	Home gardeners	Total	
Civil Servant	58(22.5)	34(25.8)	92(23.6)	
Artisans/Self employed	36(14.0)	12(9.1)	48(12.3)	
Employed in the private sector	82(31.8)	48(36.4)	130(33.3)	
Others	46(17.8)	22(16.7)	68(17.4)	
ESTIMATED MONTHLY INCOME (₦)				
Below 30,000	62(24.0)	36(27.3)	98(25.1)	0.112
30,000 – 59,999	68(26.4)	26(19.7)	94(53.7)	
60,000 – 89,999	58(22.5)	14(10.6)	72(18.5)	
90,000 – 119,999	38(14.7)	30(22.7)	68(17.4)	
120,000 &Above	32(12.4)	26(19.7)	58(14.4)	
Mean±SD	₦61,852.71±₦47,526.33	₦71,053.45±₦72,773.42	₦64,966.81±₦57,304.33	
Total	258(66.2)	132(33.8)	390(100)	

Numbers in bold indicates significant p-value

Table 2 showing home garden practice of respondents

Less than half of the respondents (33.8%) of the respondents practiced home gardening with 60.6% having small area of land for home gardening. The average duration of the practice of home gardening was 5.16 ± 4.92 years with 32.3% of the respondents who have practised for at least six (6) years and 67.7 who had practised for at most five (5) years. Majority (80.3%) of the respondents grew vegetables only, with 18.2% growing both vegetables and fruits and 1.5% growing other crops including herbs. Only 22.7% indicated that they had vegetable supplies all year round while others (77.3%) did not have vegetable supplies from the garden all year round except during the rainy seasons. 74.3% of home gardeners grew at least three (3) varieties of vegetables in their gardens with a mean number of vegetable variety of 3.32 ± 1.13 . Majority (92.4%) of HGs consumed produce from the garden. Although the percentage of NHGs were 66.2%, 49.2% indicated willingness to own a garden while only 16.9% were not willing to have a garden.

Table 2 Home Garden Practice of Respondents

	FREQUENCY (N)	PERCENTAGE (%)
Practice of home gardening		
Home gardeners	258	66.2
Non-home gardeners	132	33.8
Total	390	100.0
Duration of practice		
1-5 years	88	67.7
6-10 years	32	24.6
10 years & above	12	7.7
Total	132	100.0
Mean±SD	5.16±4.92	
Major crops grown		
Vegetables	106	80.3
Vegetables and fruits	24	18.2
Others	2	1.5
Total	132	100.0
All year vegetable supply from home garden		
Yes	30	22.7
No	102	77.3
Total	132	100.0
Number of vegetables varieties from garden		
1-2	34	25.6
3-4	76	57.6
5 & Above	22	16.7
Total	132	100
Mean±SD	3.32±1.13	

Table 3 below shows the consumption pattern and frequency of leafy and non-leafy vegetables consumed by the respondents over specified periods. The result shows that fluted pumpkin leaves were commonly consumed on a daily basis with 3.9% and 1.5% and across various periods among non-home gardeners and home gardeners with green amaranth next in value 1.6% and 4.5% NHG and HG. Green amaranth was frequently consumed by the majority of the respondents NHG and NHG 58.9% and 30.3% occasionally. Both NHGs (45.5%) and HGs (32.6%) consumed Ewedu more rarely while Waterleaf was consumed more occasionally by 51.9% and 42.4% of NHGs and HGs.

Table 3 also shows the frequency consumption of non-leafy vegetables. Onions was mostly consumed on a daily basis by 77.5% NHGs and 75.7% HGs. This is followed by tomatoes/pepper with 39.6% and 47.0%. Carrots were the most frequently consumed with 32.6% and 51.5% of the NHGs and HGs. None of the respondents indicated that they never consumed onions, tomatoes and carrots.

Table 3 Consumption frequency of Leafy vegetables of NHG and HG

Consumption frequency of Leafy vegetables of the respondents											
	7x/week (Daily)		3-6x/week (Frequently)		1-2x/week (Occasionally)		1-2x/month (Rarely)		Never		P-value
Leafy vegetables	NHG (%)	HG (%)	NHG (%)	HG (%)	NHG (%)	HG (%)	NHG (%)	HG (%)	NHG (%)	HG (%)	
Fluted pumpkin	3.9	1.5	40.3	53	51.2	43.9	3.1	0	1.6	1.5	0.299
Green amaranth	1.6	4.5	15.5	33.3	58.9	30.3	17.8	28.8	6.2	3.0	0.001
Bitter leaf	0.8	6.1	6.2	16.7	41.9	42.4	39.5	31.8	11.6	3.0	0.007
Ewedu	0	1.5	7.8	1.5	14.0	10.6	45.7	45.5	32.6	40.9	0.184
Waterleaf	0	4.5	17.1	28.8	51.9	42.4	24.0	13.6	7.0	10.6	0.014
Oha	0.8	0	4.7	12.1	26.8	25.8	45.0	45.5	23.3	16.7	0.307
Scentleaf	1.6	0	4.7	16.7	27.1	45.5	56.6	34.8	10.1	3.0	0.001
Others	-	-	60.7	20	28.77	70.85	53.85	66.65	88.45	0	0.042

Others; Garden egg leaf, Soko leaves, Baobab leaves, Utazi, Uziza and Rama leaves.; Numbers in bold are significant p-value.

Table 4 Consumption frequency of non-leafy vegetables of NHG and HG

Consumption frequency of non-leafy vegetables of the respondents											
	7x/week (Daily) (%)		3-6x/week (Frequently) (%)		1-2x/week (Occasionally) (%)		1-2x/month (Rarely) (%)		Never (%)		P-value
Non-leafy vegetables	NHG	HG	NHG	HG	NHG	HG	NHG	HG	NHG	HG	
Okro	1.6	0	34.1	34.8	50.4	53.0	13.2	9.1	0.8	3.0	0.533
Cabbage	3.9	7.6	18.6	34.8	60.5	37.9	15.5	16.7	1.6	3.0	0.031
Cucumber	4.9	7.6	27.1	39.4	53.5	30.3	11.6	21.2	3.9	1.5	0.036
Garden egg	2.3	12.1	29.5	42.4	42.6	30.3	16.3	10.6	9.3	4.5	0.009
Carrots	13.2	9.1	32.6	51.5	48.8	39.4	5.4	0	0	0	0.028
Onions/Garlic	77.5	75.7	15.5	18.2	5.4	0	1.6	6.1	0	0	0.140
Tomatoes/pepper	39.6	47.0	45	43.9	12.4	4.5	3.1	4.5	0	0	0.442
Green peas/beans	9.3	10.6	20.9	30.3	39.5	37.9	28.7	21.2	1.6	0	0.455
Lettuce	0	3.0	7.0	6.1	19.4	19.7	33.3	42.4	40.3	28.8	0.162
Others	-	-	-	-	-	-	0.4	1.5	-	-	0.627

Others: celery, broccoli and beet root; Numbers in bold are significant p-value.

Table 5 Association between home garden practice and vegetable intake adequacy (using pearson chi square)

Practice of home garden				
	Non-home gardeners N(%)	Home gardeners N(%)	Total N(%)	P-value
Vegetable intake (g)				
Adequate (<200)	88 (34.1)	42 (31.8)	130 (33.3)	0.748
Inadequate (≥200)	170(65.9)	90 (68.2)	260 (66.7)	
Total	258 (100.0)	132(100.0)	390 (100.0)	

Table 6 Consumption frequency of non-leafy vegetables of NHG and HG

Consumption frequency of non-leafy vegetables of the respondents											
	7x/week (Daily) (%)		3-6x/week (Frequently) (%)		1-2x/week (Occasionally) (%)		1-2x/month (Rarely) (%)		Never (%)		P-value
Non-leafy vegetables	NHG	HG	NHG	HG	NHG	HG	NHG	HG	NHG	HG	
Okro	1.6	0	34.1	34.8	50.4	53.0	13.2	9.1	0.8	3.0	0.533
Cabbage	3.9	7.6	18.6	34.8	60.5	37.9	15.5	16.7	1.6	3.0	0.031
Cucumber	4.9	7.6	27.1	39.4	53.5	30.3	11.6	21.2	3.9	1.5	0.036
Garden egg	2.3	12.1	29.5	42.4	42.6	30.3	16.3	10.6	9.3	4.5	0.009
Carrots	13.2	9.1	32.6	51.5	48.8	39.4	5.4	0	0	0	0.028
Onions/Garlic	77.5	75.7	15.5	18.2	5.4	0	1.6	6.1	0	0	0.140
Tomatoes/pepper	39.6	47.0	45	43.9	12.4	4.5	3.1	4.5	0	0	0.442
Green peas/beans	9.3	10.6	20.9	30.3	39.5	37.9	28.7	21.2	1.6	0	0.455
Lettuce	0	3.0	7.0	6.1	19.4	19.7	33.3	42.4	40.3	28.8	0.162
Others	-	-	-	-	-	-	0.4	1.5	-	-	0.627

Others: celery, broccoli and beet root; Numbers in bold are significant p-value.

4. Discussions

This study examined the socio-demographic characteristics, home gardening practices, vegetable intake patterns, and the relationship between socio-demographic factors and vegetable consumption among women of reproductive age (WRA). The findings provide important evidence on dietary behaviour among a WRA in Nigeria and contribute to the growing body of literature on food environment and nutrition in low- and middle-income countries (LMICs)

This study showed that the practice of home gardening was low with only 33.8% of the respondents involved. Similar finding has been reported in other urban part of Nigerian and other parts of Africa (5,6) as observed the more you get into the inner city, the more common it is for producer households to live in rented accommodation, with correspondingly higher levels of instability and greater likelihood of limited cultivation of fewer, shorter duration crops due to limited land use (7). Home garden practices was highest in the oldest age group of the respondents. Previous studies on vegetable intake have shown higher consumption among older people (8) due to increased health consciousness and interest in fresh and home-grown foods. Also, majority of the respondents were very willing to own a garden but are constrained mainly by space which may be due to land planning laws that have obviously restricted the maximization of urban space (7) and favoured more home owners who are in more control of the use of their land. Vegetables constituted a larger part of the crop type grown in the gardens with over 80.3% reported as the major crop grown. This is consistent with findings that vegetables are commonly grown in urban home gardens due to their ability to yield more within a smaller space when compared to staple crops as well as their short life cycle to mature before harvest (6,9). The average duration of home garden practice was 5.16±4.92 years with substantial proportion practicing for at most 5 years, a period which coincides with high food prices in Nigeria due to economic recession and rapid

increase in urban population. This confirms the report that the implication of obvious growth in the population of urban resident are seen in the cultivation of crops (including vegetables) on a small piece of land in order to meet vegetable demands as well as other foods in the household (10,11). Only few (22.7%) of the respondents attested that their home garden supplied vegetable all year round showing that the traditional home garden type was very prominent in the study area and may account for the reason home garden has not been maximized to achieve adequate vegetable intake. However, it is certain that home garden provides varieties of food crops, stable and sustainable food supply at the household level when improved planting stocks as well as improved garden type are adopted (12).

Very few of the respondents consumed vegetables on a daily basis although daily consumption of vegetables was observed more among home gardeners. This asserts that home garden can improve the frequency of vegetable intake (7,13) due to increase in availability and the average quantity consumed by the majority of the home gardeners was also higher. This indicates higher potentials to attain the recommended daily intake (8).

The result documented in this study showed higher educational level of the majority of the respondents. It is expected that increase in educational level will positively be associated with vegetable intake, However, this was not so, higher level of work engagement and time demand are associated with irregular eating patterns and reduce food intake (14). since the majority of the respondents were employed which increases their tendencies that food consumption most times happens outside home (14, 15). Christians constituted the majority of the respondents who practised home garden as well those who consumed adequate vegetable. This is not surprising as Christians dominates the South eastern and South-southern part of Nigeria whose traditional foods requires mainly vegetables as substantial components (16). Religion and culture are important determinants of food choices, dietary diversity and inclusion of vegetables in diet (16) Also, findings revealed that the major source of vegetables for the respondents was through purchase which was common with the previous study in urban areas even among home gardeners.

Respondents were found to averagely consume vegetables up to half of the week. This result is similar to the average consumption of rural and urban dwellers in Bangladesh (18). Interestingly, at the lower end, zero consumption was revealed among non-home gardeners but not in home gardeners. Also, home gardeners consumed vegetables more frequently per week than non-home gardeners. This finding is consistent with earlier studies (19) that individuals with home gardens provides more protective role against zero consumption of vegetables while non-home gardeners rely entirely on market purchases (13). Surprisingly, more non-home gardeners consumed vegetables at recommended level than home gardeners with greater proportion of home gardeners also consuming below recommended level. Generally, the proportion of respondents who consumed vegetables on a daily basis was very low among home gardeners and non-home gardeners (15) although this was observed more in the consumption of leafy vegetables than non-leafy vegetables. There may be reasons associated with higher perishability in leafy vegetables than non-leafy vegetables. This study showed that the most consumed leafy vegetable on a daily basis was fluted pumpkin, this is similar in other parts of Nigeria and in some parts of Asia (19). Also, onion and tomatoes/ pepper was mostly consumed as non-leafy vegetables consumed more on daily and frequent basis. The use of onion in meal preparation both as vegetables and condiment is common. Tomatoes are commonly consumed as tomato/pepper mix forms major components or accompaniment to staples in sauce and stews like rice and tuber crops including yam (19).

The practice of home gardening was associated with the consumption frequency of green amaranth, bitter leaves, water leaves, scent leaf and others (Garden egg leaf, Soko leaves, Baobab leaves, Utazi, Uziza and Rama leaves). This is similar to that commonly grown vegetables in home gardens include mainly African Indigenous vegetables confirming the benefits of home as a repository of traditional plants that may not be commonly found in urban markets (10,8). Portion sizes of vegetables served in foods of most (62%) of the respondents were very low as indicated by the study although food portions were indicated in unstandardized sizes which had tendencies of being underestimated or overestimated. Again, this may be so since vegetables are mostly consumed as a mixed dish in Nigeria and most women consumed meals together with their households making it more difficult to actual estimate these quantities.

5. Conclusion

Home garden practices in the study area is not a common practice and is considered low; however, willingness to own and practise it is high, this may suggest strong concerns for food safety and healthy eating in urban areas. Traditional home garden type is practised and this limits all year round supply of vegetables. Also, the consumption pattern of vegetables among women of reproductive age in this study showed varied intake levels. Intake were described in weight equivalent of serving sizes and current vegetable consumption is below recommendations. Furthermore, this study found no significant association between home garden and adequate vegetable intake, although there was a higher average intake among home gardeners when compared to their counterparts. This is quite promising and indicates huge potentials to achieve adequacy if garden type and practices are improved. Similarly, household food security was greater

among home gardeners however, this was not statistically significant. Only seasonal variations and duration of working hours was significantly associated as factors that affected the consumption of vegetables among the respondents in the study area.

5.1. Recommendations

More nutritional awareness campaigns that is geared towards promoting the knowledge of recommended vegetable intake is needed. This will enhance the adoption of strategies that will improve home garden type and practices in the study area. The scope of this nutrition education should be broader than just educating about nutrition in relation to personal health but also should cover a wide range of issues and topics such as an increase in quantity and quality of foods.

It is important that the information gathered in this study be shared widely with all relevant stakeholders; urban and regional planning, nutrition and agricultural sectors and used as a basis for further discussion. This will enable all stakeholders to jointly adopt multi-sectoral approaches to improve vegetable consumption can be improved in this community. Findings of this study will be useful to governmental and non-governmental bodies involved in promoting vegetable consumption in urban households.

5.2. Limitations of the study

There is room for recall bias due to the usage of 24-hour dietary recall since some respondents will tend to recall better than the others. Secondly, the short time period for the study did not capture seasonal variation which have been reported to have huge impact on vegetable production and intake. Reporting portion sizes of vegetable consumed was a difficult cognitive task for participants and the measurement of vegetable intake from mixed dishes did not have same estimate across the respondents since the vegetable content of these foods varies greatly. There was difficulty in accessing all the gardens for the study, this seems to be a major challenge in carrying out studies on urban home garden.

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest to be disclosed

Statement of ethical approval

Ethical approval was obtained for this study from the ethics committee of University of Ibadan and University College Hospital, Ibadan at the Institute of Advanced Medical Research and Advanced Training (IMRAT). Ethical approval was also obtained from the Health and Human Services, Federal Capital Territory Administration. Permission was obtained from the Abuja Municipal Local Government Area.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study The purpose of the study was explained to the respondents and written informed consent was obtained before inclusion into the study/ Anonymity of response was ensured and confidentiality was maintained throughout the study.

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