Consumption Pattern of Neglected and Underutilised Vegetables among Rural Households in Akinyele Local Government Area, Ibadan, Nigeria

Oladejo Thomas Adepoju¹, Oluwatoni Motunrola Aka¹

¹Department of Human Nutrition, Faculty of Public health, College of Medicine, University of Ibadan, Ibadan, Nigeria

Abstract: Vegetables make up a major portion of human diet in many parts of the world and play significant role in human nutrition especially as sources of vitamins, minerals, dietary fibre and phytochemicals. In Nigeria, some indigenous vegetables have become neglected and underutilised despite their great potential in contributing to food security and nutrition. This study therefore aimed at determining the consumption pattern of neglected and underutilized vegetables among rural households in Akinyele Local Government Area (LGA), Ibadan, Nigeria. The descriptive cross-sectional study was carried out among 220 rural household women in Akinyele LGA. Information on socio-economic and demographic characteristics, respondent’s knowledge of and familiarity with the chosen indigenous vegetables, frequency of consumption and factors influencing consumption of these vegetables were obtained from respondents using pre-tested, semi-structured, interviewer-administered questionnaire with a section on multi-pass 24-hour diet recall. Data were analysed using descriptive statistics and Chi-square test at p<0.05. Mean age of respondents was 44.7±18.0 years. Only few (7.3%) of the respondents know, have seen and eat Ogunmo, while many (26.4%, 35.0%, 31.4%, 30.9% and 41.8%) know, have seen and eat Moringa leaf, Efo odu, Yanrin, Eboho, and Worowo respectively out of all the vegetables studied. Many respondents reportedly consume Worowo (42.7%), Eboho (53.6%), Ugwu (28.2%), Yanrin (40.5%), Efo odu (41.4%) and Igbaaqgba (27.7%) less than once in a month and 65.0%, 30.0%, and 59.1% has never consumed Ogunmo, Efrin, and Moringa leaf respectively in the last one month. Most (96.4%) respondents reported that the seasonal nature of the vegetables affects their consumption. There is need for consumers education on the benefits of inclusion of indigenous neglected and underutilised vegetables in their daily diets as they have been found to possess a high potential for improving nutrition and health in many areas around the world.

Keywords: Dietary Diversity, Neglected and Underutilized Vegetables, Vegetable Consumption Pattern, Rural Households

Introduction

Undernutrition and hunger are prevalent in sub-Saharan Africa which accounts for about 9% of the global population, with high prevalence of food and nutrition insecurity especially in rural areas (Bekunda et al., 2010). About 800 million people still suffer from food and nutrition insecurity, and more than 2 billion individuals suffer from micronutrient deficiencies (hidden hunger) (FAO, 2013). The effects of micronutrient deficiencies can be devastating, leading to mental impairment, poor health, low productivity and even death. In addition to affecting human health, hidden hunger can curtail socioeconomic development, particularly in low- and middle-income countries, of which Nigeria is one (GHI, 2014).

Neglected and underutilised plant species play important role in food security, enhancing better nutrition and fighting hidden hunger. Plant species such as vegetables, which are rich sources of micronutrients, play significant role in human nutrition, especially as sources of vitamins A, B, C, E, minerals, dietary fibre and phytochemicals. A daily consumption of vegetables has been strongly associated with overall good health, reduced risk of some forms of cancer, diabetes and a number of other chronic diseases (Janick, 2011).

Traditional or indigenous vegetables are vegetables of a locality which originated from an area and may or may not be confined to that particular region (Guarino, 1997; Nnamani et al. 2009). They sometimes belong to the group of world plants often...
regarded as weeds, some grow in the wild and do not require formal cultivation and many of them are resilient, adaptive and can tolerate adverse climates (Nnamani et al., 2009). However, despite their ability to be raised comparatively at lower management cost even on marginal lands, they have remained underutilised due to lack of awareness and popularisation of technologies for their proper utilisation (Chweya and Eyzauguirie, 1999; Odhav, 2007; Nnamani et al. 2009).

Traditional or indigenous vegetables have been used to meet nutritional needs from time immemorial. These vegetables are often grown by local farmers to serve as a means of protein, minerals, vitamins and a means of adding variety to the diet in various African countries, particularly in the South-western region of Nigeria (Amujoyegbe et al., 2015). These vegetables have the potential to greatly reduce the scourge of malnutrition especially micronutrient malnutrition by providing essential nutrients and some of these vegetables can be used to manage diseases like high blood pressure, diabetes, bronchitis diarrhea and others (Salami, 2001). Underutilised indigenous vegetables represent inexpensive, high quality nutritional resources which can make substantial contribution in meeting the nutritional needs of the population, especially the low income group and particularly in times of seasonal scarcity. They can as well serve as a means of food security and income generation; therefore, their erosion can have immediate consequences on the nutritional status and food security of the poor, and their enhanced use can bring about better nutrition and fight hidden hunger (Magbagbeola et al., 2010; Dansi et al., 2012). This study is therefore set out to determine the consumption pattern of neglected and underutilised vegetables among rural households in Akinyele Local Government Area, Ibadan, Oyo State, Nigeria.

**Methodology**

The descriptive cross-sectional study was carried out by purposively choosing Akinyele Local Government Area because of its rural nature and it hosts a number of these underutilised vegetables (Idowu, 2009). Two hundred and twenty (220) rural household women were randomly selected from three out of the twelve wards in the LGA because they are more available, have better access to household resources and are the primary decision-makers for food preparation (Boedecker et al., 2014). Using the Cochran’s formula \( n = \frac{Z^2pq}{d^2} \) and vegetable consumption prevalence rate of \( p=13.2\% \) (Maziya-Dixon et al., 2003) taking into account 10% attrition rate.

A pre-tested, semi-structured, interviewer-administered questionnaire was used to obtain information on socio-economic and demographic characteristics, respondent’s knowledge of and familiarity with the chosen indigenous vegetables, frequency of consumption, factors influencing consumption of these vegetables and interactive multi-pass 24-hour diet recall of the respondents. Data were analysed using descriptive statistics and Chi-square test and level of significance set at \( p<0.05 \).

**Results**

The socio-demographic characteristics of the respondents (n = 220) is shown in Table 1. Many (45.5%) of the households had a family size between 0-4 persons while 38.6% had 5-9 persons in the household. The mean age of the respondents was 44.7±18.0 years, 94.5% were Yoruba, 1.4% Igbo, 2.3% Cotonou, 70.5% were Christians, 67.3% married, 22.3% widowed and 7.7% separated (Table 1(a)). About one-third (34.5%) of respondents had no formal education, 30.5%, 29.1% and 5.9% had primary, secondary, and tertiary education respectively.

Well water constituted the major source of water supply of the respondents, while firewood was the major source of energy for cooking. Petty trading(50.9%) was their major occupation followed by artisan (14.5%), farming (12.7%) and business (9.1%), while 7.3% combined farming with petty trading (Table 1(b)). About half (50.5%) of respondents reportedly earned between 10,001 – 30,000 naira, 40.9% earned less than 10,000 naira, and 8.6% earned above 30,000 naira/month. Few (6.8%) of the households earned less than 10,000 naira per month, 44.5% earned between 10,000 and 30,000 naira per month, 30.5% earned between 30,001 and 50,000 per month, while 18.2% earned above 50,000/month on household basis. More than one-third (35.9%) respondents spent between ten and twenty thousand naira on food monthly, 32.3% spent less than ten thousand naira, while 20.9% spent over 20,000 naira per month on food.

A large percentage of the respondents knows, has seen and eats Ewedu (97.3%), Evuoro (81.8%), Gbure (88.6%) and Sokó (94.1%); 77.7%, 72.7%, 65.9%, 61.4% and 50.0% knows, has seen, and eats Efo green, Amunutatu, Igbaagba, Ugwu and Efriin respectively; while only few of the respondents knows, has seen and eats Ogummo (7.3%), Moringa (26.4%), Efo odu (35.0%), Yanrin (31.4%), Ebofo (30.9%), Worowo (41.8%) (Table 2).
Table 1(a): Socio-demographic characteristics of respondents (n = 220)

| Variable          | Frequency | Percentage (%) |
|-------------------|-----------|----------------|
| Household size    |           |                |
| 0-4               | 100       | 45.4           |
| 5-9               | 85        | 38.6           |
| 10-14             | 27        | 12.3           |
| 15-19             | 5         | 2.3            |
| 20-24             | 3         | 1.4            |
| Total             | 220       | 100.0          |
| Tribe             |           |                |
| Yoruba            | 208       | 94.5           |
| Igbo              | 3         | 1.4            |
| Cotonou           | 5         | 2.3            |
| Others            | 4         | 1.8            |
| Total             | 220       | 100.0          |
| Age (years)       |           |                |
| 15-39             | 97        | 44.1           |
| 40-64             | 82        | 37.3           |
| 65 and above      | 41        | 18.6           |
| Total             | 220       | 100.0          |
| Mean              | 44.7 ± 18.0 years |
| Range             | 15 – 84 years |
| Religion          |           |                |
| Christianity      | 155       | 70.5           |
| Islam             | 65        | 29.5           |
| Total             | 220       | 100.0          |
| Marital status    |           |                |
| Single            | 6         | 2.8            |
| Married           | 148       | 67.3           |
| Separated         | 17        | 7.7            |
| Widowed           | 49        | 22.2           |
| Total             | 220       | 100.0          |
| Level of education|           |                |
| No formal education| 76      | 34.5           |
| Primary           | 67        | 30.5           |
| Secondary         | 64        | 29.1           |
| Tertiary          | 13        | 5.9            |
| Total             | 220       | 100.0          |

Table 1(b): Socio-economic characteristics of respondents

| Variables                          | Frequency | Percentage |
|------------------------------------|-----------|------------|
| Source of water for drinking       |           |            |
| Rainfall                           | 19        | 8.6        |
| Well                               | 127       | 57.7       |
| Borehole                           | 46        | 20.9       |
| Satchet water                      | 28        | 12.8       |
| Total                              | 220       | 100.0      |
| Source of cooking energy           |           |            |
| Firewood                           | 148       | 67.3       |
| Charcoal                           | 13        | 5.9        |
| kerosene stove                     | 54        | 24.5       |
| gas cooker                         | 5         | 2.3        |
| Total                              | 220       | 100.0      |
| Occupation                         |           |            |
| petty trader                       | 112       | 50.9       |
| Farmer                             | 28        | 12.7       |
Consumption Pattern of Neglected and Underutilised Vegetables among Rural Households in Akinyele Local Government Area, Ibadan, Nigeria

| Variable | I have never heard, seen nor eaten it (%) | I have heard the name but neither seen nor eaten it (%) | I know and I know and I know and I know, have seen and seen it before but have seen and seen it before but have not eaten it recently (%) | I know, seen and eaten it before but have not eaten it recently (%) | I know, never eaten it (%) |
|----------|------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------|
| Ewedu (Corchorus Olitorus) | 0.0 | 0.0 | 1.9 | 0.0 | 1.8 | 97.3 |
| Efo green (Amaranthus hybridus) | 0.5 | 0.0 | 6.4 | 5.5 | 10.0 | 77.7 |
| Worowo (Senecio biafrae) | 0.9 | 2.7 | 5.0 | 12.7 | 36.8 | 41.8 |
| Gbure (Talinum triangulare) | 0.0 | 0.0 | 0.9 | 2.3 | 8.2 | 88.6 |
| Ebolo (Crassocephalum rubens) | 2.7 | 1.8 | 11.8 | 12.3 | 40.5 | 30.9 |
| Ugwu (Telfaria occidentalis) | 1.4 | 2.3 | 10.5 | 4.1 | 20.5 | 61.4 |
| Ewuuro (Vernonia Amygdalina) | 0.0 | 0.0 | 2.7 | 2.3 | 13.2 | 81.8 |
| Soko (Celosia Argentia) | 0.0 | 0.0 | 0.5 | 1.8 | 3.6 | 94.1 |
| Amunututu (Basella alba) | 0.9 | 0.9 | 4.5 | 3.6 | 17.3 | 72.7 |
| Ogunmoo Solanum scarbrum) | 46.8 | 7.3 | 8.2 | 20.9 | 9.5 | 7.3 |
| Efirin (Occimum gratissimum) | 1.4 | 1.4 | 2.8 | 7.3 | 13.2 | 50.0 |
| Yanrin (Launea taraxacifolia) | 2.3 | 5.5 | 20.9 | 15.5 | 24.5 | 31.4 |
| Efo Odu (Solanum americanum) | 6.4 | 4.1 | 14.1 | 14.5 | 25.9 | 35.0 |
| Igbaagba Solanum macrocarpon) | 0.5 | 1.4 | 7.7 | 5.0 | 19.5 | 65.9 |
| Moringa leaves | 13.6 | 8.6 | 37.3 | 4.1 | 10.0 | 26.4 |

Table 2: Knowledge of commonly consumed and underutilized vegetables

Corchorus Olitorus was the most frequently consumed vegetable. Many (24.1%) of the respondents reportedly consumed it once a day, 25.9% consumed it 4 – 6 times per week, while 34.1% consumed it 2 – 3 times per week. Celosia Argentia was consumed 4 – 6 times/week by 12.7% of respondents, while Amaranthus hybridus, Celosia Argentia, Talinum triangulare, Vernonia Amygdalina and Basella alba were consumed by 54.1%, 40.4% and 34.1%, 22.7%, 20.5% respondents respectively 2-3 times/week. Vernonia Amygdalina (25.9%) was consumed once a week, Basella alba was consumed by 23.6% of respondents less than once a week; Senecio biafrae (42.7%), Crassocephalum rubens (53.6%), Telfaria occidentalis (28.2%), Launea taraxacifolia (40.5%), Solanum americanum (41.4%) and Solanum macrocarpon (27.7%) were consumed less than once a month; while 65.0%, 30.0%, and 59.1% respondents had never consumed Solanum scarbrum, Occimum gratissimum, and Moringa respectively in the last one month (Table 3).

In Table 4(a), majority (70.0%) of the respondents reportedly obtained their vegetables through

http://www.ijSciences.com Volume 8 – June 2019 (06)
farm/garden or gathering wild and purchase, 20.9% got them through purchase, while 9.1% obtained them wildly and through gift and purchase. Majority (79.1%) of the respondents reportedly got their vegetables on other days apart from market days and 43.6% reported that the vegetables are not readily available as they used to be; others (34.5%) mentioned that some were available while some were not. Most (97.3%) respondents mentioned that the soil conditions of their environment support the growth of the vegetables, and 89.5% of them like the vegetables, 26.8% reported having unpleasant experience eating some of the vegetables, while 12.7% has reduced consumption of these vegetables due to their rising cost.

More than one-third (36.8%) respondents reported taste or smell of some vegetables as deterrent to their consuming such vegetables, with Ebolo having highest percentage (12.7%), followed by Yanrin (7.3%). Most (96.4%) of the respondents reported that the seasonal nature of the vegetables affects their consumption, and 82.7% mentioned that the vegetables’ cooking was not complex. (Table 4(b)). Most (91.4%) of the respondents can afford the purchase of the vegetables. In Table 4(c), 10.5% of respondents reported some of the vegetables to be taboo for them, 94.5% mentioned that the vegetables were nutritious, 82.3% can prepared them, 91.8% can consume them if available, and 59.6% can consume Yanrin and Worowo in place of Ewedu and Gbure.

Table 3: Frequency of Respondents’ consumption of vegetables in the last one month (%)

| Variable                     | Never < than once/month | Once/month | < once/week | Once/week | 2-3 times/week | 4-6 times/week | Once/day |
|------------------------------|-------------------------|------------|-------------|-----------|----------------|----------------|---------|
| Ewedu (Corchorus Olitorus)   | 0.9                     | 0.5        | 0.0         | 3.2       | 11.4           | 34.1           | 25.9    | 24.1 |
| Efo green (Amaranthus hybridus) | 5.9                    | 12.3       | 4.1         | 17.7      | 32.7           | 54.1           | 2.3     | 0.9  |
| Worowo (Senecio biafrae)     | 18.2                    | 42.7       | 13.6        | 16.8      | 8.6            | 9.1            | 0.5     | 0.5  |
| Gbure (Talinum triangulare)  | 0.5                     | 0.5        | 3.2         | 15.9      | 33.6           | 34.1           | 7.3     | 0.5  |
| Ebolo (Crassocephalum rubens)| 15.9                    | 53.6       | 8.6         | 6.8       | 9.5            | 5.5            | 0.0     | 0.0  |
| Ugwu (Telfaria occidentalis) | 10.0                    | 28.2       | 15.0        | 23.6      | 15.5           | 5.5            | 1.4     | 0.0  |
| Ewuro (Vernonia Amygdalina)  | 3.2                     | 11.4       | 10.9        | 18.6      | 25.9           | 22.7           | 5.5     | 1.8  |
| Soko (Celosia Argentia)      | 0.5                     | 4.1        | 3.2         | 8.2       | 25.0           | 46.4           | 12.7    | 0.0  |
| Amunututu (Basella alba)     | 6.8                     | 20.0       | 8.2         | 23.6      | 17.3           | 20.5           | 3.2     | 0.5  |
| Ogunmo Solanum scarbrum      | 65.0                    | 27.7       | 2.7         | 2.3       | 0.9            | 1.4            | 0.0     | 0.0  |
| Erfin (Occimum gratissimum)  | 30.0                    | 20.0       | 13.2        | 14.1      | 9.5            | 10.0           | 2.3     | 0.9  |
| Yanrin (Launea taraxacifolia)| 31.4                    | 40.5       | 10.0        | 10.0      | 5.9            | 2.3            | 0.0     | 0.0  |
| Efo Odu (Solanum americanum) | 26.4                    | 41.4       | 7.3         | 9.5       | 8.2            | 7.3            | 0.0     | 0.0  |
| Igbaagba Solanum macrocarpon | 9.5                     | 27.7       | 7.3         | 20.9      | 21.4           | 12.3           | 0.9     | 0.0  |
| Moringa leaves               | 59.1                    | 17.3       | 6.3         | 5.9       | 7.3            | 2.7            | 1.4     | 0.0  |

Table 4(a): Factors influencing the consumption of neglected and underutilised vegetables

| Variables                        | Frequencies | Percentages |
|----------------------------------|-------------|-------------|
| How do you obtain your vegetables|             |             |
| Farm/garden/wild and purchase    | 154         | 70.0        |
| Purchase                         | 46          | 20.9        |
| Wild/gift and purchase           | 20          | 9.1         |
| Total                            | 220         | 100.0       |
| Do you only get these vegetables on market days? |
| No                               | 174         | 79.1        |
| Yes                              | 46          | 20.9        |
| Total                            | 220         | 100.0       |
| Are these vegetables readily available in your environment? |
| No                               | 96          | 43.6        |
| Yes                              | 48          | 21.8        |
| some are, some are not           | 76          | 34.6        |

http://www.ijSciences.com  Volume 8 – June 2019 (06)
Consumption Pattern of Neglected and Underutilised Vegetables among Rural Households in Akinyele Local Government Area, Ibadan, Nigeria

| Total | 220 | 100.0 |
|-------|-----|-------|
| Does the soil in your environment support the growth of these vegetables? |
| No | 6 | 2.7 |
| Yes | 214 | 97.3 |
| Total | 220 | 100.0 |
| Do you like these vegetables? |
| No | 15 | 6.9 |
| not sure, I have never eaten them | 8 | 3.6 |
| Yes | 197 | 89.5 |
| Total | 220 | 100.0 |
| Do you have an unpleasant experience eating any of these vegetables? |
| No | 161 | 73.2 |
| Yes | 59 | 26.8 |
| Total | 220 | 100.0 |
| if yes, which one? |
| None | 161 | 73.2 |
| Ewuro | 5 | 2.3 |
| Ebolo | 19 | 8.6 |
| Yanrin | 15 | 6.8 |
| yanrin and ebolo | 8 | 3.6 |
| ebolo, yanrin and Odu | 4 | 1.8 |
| Others | 8 | 3.7 |
| Total | 220 | 100.0 |
| Have you reduced consumption due to rising prices? |
| No | 192 | 87.3 |
| Yes | 28 | 12.7 |
| Total | 220 | 100.0 |

Table 4(b): Factors influencing the consumption of neglected and underutilised vegetables
(continued)

| Variables | Frequencies | Percentages |
|-----------|-------------|-------------|
| Is the taste or smell a deterrent to consumption? |
| No | 139 | 63.2 |
| Yes | 81 | 36.8 |
| Total | 220 | 100.0 |
| If yes, which one of them? |
| None | 135 | 61.4 |
| Yanrin | 16 | 7.3 |
| Ebolo | 28 | 12.7 |
| ebolo and yanrin | 14 | 6.4 |
| Efirin | 7 | 3.2 |
| Others | 20 | 9.0 |
| Total | 220 | 100.0 |
| Do your household members like it? |
| living alone | 12 | 5.5 |
| No | 67 | 30.5 |
| Yes | 141 | 64.0 |
| Total | 220 | 100.0 |
| How has this affected your consumption? |
| living alone | 12 | 5.5 |
| reduced it | 54 | 24.5 |
| has no effect | 53 | 24.1 |
| increased it | 101 | 45.9 |
| Total | 220 | 100.0 |
| Does the seasonal nature of these vegetables affect its consumption? |
| No | 8 | 3.6 |
## Consumption Pattern of Neglected and Underutilised Vegetables among Rural Households in Akinyele Local Government Area, Ibadan, Nigeria

In Table 5, more than half (51.4%) of respondents reportedly consumed 2 – 3 serving spoons of Corchorus Olitorus, 31.8% consumed one-half serving spoons, Corchorus Olitorus (15.5%), Talinum triangulare (5.5%), Celosia Argentia (5.0%), Senecio biafrae (4.1%), Amaranthus hybrida (2.7%), Basella alba (3.6%), Telfaria occidentalis (2.3%), and Vernonia Amygdalina (2.3%) were the vegetables the respondents had consumed in quantities up to 3 serving spoons or more; while Solanum scarbrum, Moringa leaf, Launea taraxacifolia, Solanum americanum, Crassocephalum rubens and Ocimum gratissimum, had either not been eaten at all in the last one month by 90.5%, 68.6%, 65.5%, 65.5%, 63.6% and 46.4% of respondents respectively.

### Table 4(c): Factors influencing the consumption of neglected and underutilised vegetables (continued)

| Variables                                      | Frequency | Percentage |
|------------------------------------------------|-----------|------------|
| **Is any of the vegetables a taboo for you?**  |           |            |
| No                                             | 197       | 89.5       |
| Yes                                            | 23        | 10.5       |
| Total                                          | 220       | 100.0      |
| **If yes, which one?**                         |           |            |
| None                                           | 194       | 88.2       |
| Efo-Odu                                        | 12        | 5.5        |
| Others                                         | 14        | 6.3        |
| Total                                          | 220       | 100.0      |
| **Are these underutilized vegetables nutritious or not?** |           |            |
| I dont know                                    | 12        | 5.5        |
| Yes                                            | 208       | 94.5       |
| Total                                          | 220       | 100.0      |
| **Which of the neglected and underutilised vegetables can you prepare?** |           |            |
| None                                           | 8         | 3.6        |
| All                                            | 181       | 82.3       |
| Some                                           | 31        | 14.1       |
| Total                                          | 220       | 100.0      |
| **Would you consume more of these vegetables if it was readily available?** |           |            |
| No                                             | 15        | 6.8        |
| Yes                                            | 202       | 91.8       |
| Not sure                                       | 3         | 1.4        |
| Total                                          | 220       | 100.0      |
| **Would you readily eat vegetables like Yanrin and Worowo in place of well-known vegetables like Ewedu and Gbure?** |           |            |
| No                                             | 43        | 19.5       |
| not sure                                       | 46        | 20.9       |
| Yes                                            | 131       | 59.6       |
| Total                                          | 220       | 100.0      |
There was no significant relationship (p>0.05) between the frequency of vegetable consumption and age, estimated household income, educational level and occupation of the respondents (Tables 6(a) & (b)). However, *Ewedu* consumption was significantly associated with occupation of respondents (p<0.05).

All the respondents reportedly consumed starchy staples the previous day before the study, 77.3% of them consumed from pulses, legumes and nuts group, 79.5% from meat or fish group, 7.7% ate eggs, 95.9% consumed other vitamin A-rich fruits and vegetables, 23.2% consumed milk or milk products, 1.4% consumed organ meat, and 69.5% consumed dark green leafy vegetables (Table 7).

**Table 5: Portion size of vegetable consumption by respondents**

| Variables                  | Not eaten in the last one month (%) | Half - one/half serving spoon (%) | Two - three serving spoons (%) | >3 serving spoons (%) |
|----------------------------|-------------------------------------|-----------------------------------|--------------------------------|-----------------------|
| Ewedu (*Corchorus Olitorus*) | 1.4                                 | 31.8                              | 51.4                           | 15.5                  |
| Efo green (*Amaranthus hybridus*) | 20.5                                | 43.2                              | 33.7                           | 2.7                   |
| Worowo (*Senecio biafrae*) | 44.5                                 | 25.0                              | 26.4                           | 4.1                   |
| Gbure (*Talinum triangulare*) | 5.0                                 | 41.4                              | 48.2                           | 5.5                   |
| Ebolo (*Crassocephalum rubens*) | 63.6                                | 29.5                              | 5.9                            | 0.9                   |
| Ugwu (*Telfaria occidentalis*) | 30.9                                | 40.0                              | 26.8                           | 2.3                   |
| Ewuro (*Vernonia Amygdalina*) | 11.8                                | 60.9                              | 25.0                           | 2.3                   |
| Soko (*Celosia Argentia*) | 4.1                                 | 39.1                              | 51.8                           | 5.0                   |
| Amunututu (*Basella alba*) | 25.0                                | 36.4                              | 35.0                           | 3.6                   |
| Ogunmo (*Solanium scarbrum*) | 90.5                                | 6.8                               | 2.7                            | 0.0                   |
| Efrin (*Occimum gratissimum*) | 46.4                                | 42.7                              | 10.5                           | 0.5                   |
| Yanrin (*Launea taraxacifolia*) | 65.5                                | 27.7                              | 6.8                            | 0.0                   |
| Efo Odu (*Solanium americanum*) | 65.5                                | 25.5                              | 9.1                            | 0.0                   |
| Igbagba (*Solanium macrocarpon*) | 31.8                                | 41.8                              | 25.9                           | 0.5                   |
| Moringa leaf | 68.6                                 | 25.5                              | 5.5                            | 0.5                   |

Figure 1: Reasons for non-consumption of NUILVs
Table 6(a): Association between frequency of consumption and socio-economic characteristics of respondents

| Variable  | Consumption | Age | Occupation | X² | P value | X² | P value |
|-----------|-------------|-----|------------|----|---------|----|---------|
|           | ≤ 40        | > 40| Farmer     | Non-farmer |       |       |       |
| Igbaagba  | Frequent    | 2   | 0          | 87 | 1.320   | 0.251| 0.294  | 0.587 |
|           | Infrequent  | 131 | 80         | 20 |         | 0.621|         |       |
| Ewedu     | Freq        | 67  | 43         | 44 | 0.019   | 0.890| 8      | 102   | 5.893 | 0.015 |
|           | Infreq      | 66  | 43         | 20 |         | 0.294| 90     |       |
| Ewuro     | Freq        | 8   | 8          | 8  | 0.789   | 0.374| 0      | 16    | 2.516 | 0.113 |
|           | Infreq      | 28  | 176        | 28 |         | 0.108| 176    |       |
| Ugwu      | Freq        | 3   | 0          | 87 | 1.990   | 0.158| 0      | 3     | 0.444 | 0.505 |
|           | Infreq      | 130 | 87         | 28 |         | 0.621| 189    |       |
| Soko      | Freq        | 19  | 9          | 18 | 0.735   | 0.391| 4      | 24    | 0.070 | 0.791 |
|           | Infreq      | 114 | 78         | 24 |         | 0.323| 168    |       |
| Moringa   | Freq        | 3   | 0          | 87 | 1.990   | 0.158| 0      | 3     | 0.444 | 0.505 |
|           | Infreq      | 130 | 87         | 28 |         | 0.621| 189    |       |
| Gbure     | Freq        | 13  | 4          | 83 | 1.977   | 0.160| 1      | 16    | 0.777 | 0.378 |
|           | Infreq      | 120 | 83         | 27 |         | 0.223| 176    |       |
| Efo-Green | Freq        | 6   | 1          | 86 | 1.930   | 0.165| 1      | 6     | 0.016 | 0.900 |
|           | Infreq      | 127 | 86         | 27 |         | 0.621| 186    |       |
| Efirin    | Freq        | 4   | 3          | 84 | 0.033   | 0.855| 0      | 7     | 1.054 | 0.305 |
|           | Infreq      | 129 | 84         | 28 |         | 0.323| 125    |       |
| Amunututu | Freq        | 7   | 1          | 86 | 2.540   | 0.111| 1      | 7     | 0.000 | 0.984 |
|           | Infreq      | 126 | 86         | 27 |         | 0.223| 185    |       |

Table 6(b): Association between frequency of consumption and socio-economic characteristics of respondents

| Variable  | Consumption | Household income | Education | X² | P value | X² | P value |
|-----------|-------------|------------------|-----------|----|---------|----|---------|
|           | ≤20,000     | >20,000 | Educated | Not-educated |       |       |
| Igbaagba  | Frequent    | 1     | 1       | 1   | 0.002   | 0.969| 1      | 1     | 0.213  | 0.644 |
|           | Infrequent  | 112   | 106     | 75  | 143     | 0.752|         |       |       |
| Ewedu     | Freq use    | 57    | 53      | 36  | 0.018   | 0.893| 36     | 74    | 0.322  | 0.571 |
|           | Infreq      | 130   | 87      | 28  |         | 0.621| 189    |       |       |

http://www.ijSciences.com Volume 8 – June 2019 (06)
Table 7: Food groups consumed by respondents in the 24-hour recall

| Variable                                | Frequency | Percentage |
|-----------------------------------------|-----------|------------|
| Starchy staples                          | Yes       | 220        | 100        |
|                                         | No        | 0          | 0          |
| Pulses, legumes and nuts                 | Yes       | 170        | 77.3       |
|                                         | No        | 50         | 22.7       |
| Milk and milk products                   | Yes       | 51         | 23.2       |
|                                         | No        | 169        | 76.8       |
| Eggs                                    | Yes       | 17         | 7.7        |
|                                         | No        | 203        | 92.3       |
| Meat and fish                           | Yes       | 175        | 79.5       |
|                                         | No        | 45         | 20.5       |
| Other Vit A rich fruits & vegetables    | Yes       | 211        | 95.9       |
|                                         | No        | 9          | 4.1        |
| Other fruits and Vegetables             | Yes       | 201        | 91.4       |
|                                         | No        | 19         | 8.6        |
| Organ meat                              | Yes       | 3          | 1.4        |
|                                         | No        | 217        | 98.6       |
| Dark green leafy vegetables             | Yes       | 153        | 69.5       |
|                                         | No        | 67         | 30.5       |
Consumption Pattern of Neglected and Underutilised Vegetables among Rural Households in Akinyele Local Government Area, Ibadan, Nigeria

Consumption of Neglected and Underutilised Leafy Vegetables (NULVs) from 24-Hour recall

| Frequency | Percentage |
|-----------|------------|
| 151       | did not consume |
| 69        |            |
| 68.6      |            |
| 31.4      |            |

Figure 2: Consumption of NULVS in recall

Discussion

Socio-demographic characteristics of Respondents

The number of people that constituted the households size in this study is a reflection of both nuclear and extended family types in which relations live and eat together, and these types of households are typical of Yoruba culture and family set up (………), and they constituted majority of the respondents. Majority of the respondents had low level of education (65.0% for both no formal and primary level of education). This low literacy level is however lower than what was found by Ayinde et al., (2013) in the Nican-veg project aimed to revitalize farming and consumption of ten underutilized vegetables where 70.3% of the female respondents had no formal education. Idowu, (2009) also noticed high illiteracy level and opined that this could affect their exposure to strategies for promoting conservation and use of neglected and underutilized, while Boedecker et al., (2014) reported respondents without formal education amounting to 93.3%. the improved reduction in the level of literacy in this study compared to other studies mentioned above is believed to be due to the fact that the LGA is more of peri-urban with movement of people from the urban to this LGA as their place of residence.

Knowledge of Commonly Consumed and Neglected/underutilised Vegetables

Corchorus Olitorus, Amaranthus hybridus, Talinum triangulare, Vernonio Amygdalina, Celosia Argentia, Basella alba, Telfaria occidentalis and Solanum macrocarpon were the commonly known and consumed green leafy vegetables in the study area, while Senecio biafrae, Cressocephalum rubens, Solanum scarabrum, Ocimum gratissimum, Launaea taraxacifolia, Solanum americanum and Solanum macrocarpon have fallen into disuse, as most respondents had never eaten them or no longer eat them, and some had never even heard their names. The findings here show that these vegetables were not consumed at all in the space of a month or had been consumed only once or twice. This is similar to the report of Termote et al., (2012). The non-frequent consumption of these vegetables portrays that there is tendency that these important vegetables which can add variety to diversity and improve micronutrient intake of consumers may go into extinction through ignorance and modern farming methods which involve use of herbicides, as many of them grow wild and are treated as weeds.

Frequency and Factors influencing Respondents’ consumption of vegetables

A decline in consumption of traditional green leafy vegetables has led to a loss of indigenous knowledge of production methods, thus vegetables such as Ajefawo, Molangaran, Efo-Igo, Yanrin-Odo have completely disappeared from the consumers’ table, and others like Ogunmo, Worowo, Yanrin, Ebolo, Igbaagba, Amunututu, Efo-Odu are gradually disappearing (………), thus narrowing the options of consumers to fewer and fewer crops. This is most likely the reason for the noticed high awareness and frequency of consumption of well-known commonly consumed vegetables. Usually, the most frequently given reasons for reduction in the use of traditional food species include over harvesting, local perceptions of these food as food for the poor, loss of traditional knowledge, the complexity of cooking methods and integration into market economies and globalization (Barucha and Pretty, 2010; Boedecker et al., 2014). However, other reasons noticed in this study include food preferences (both personal and household), religious and cultural taboos, taste and smell of some of the vegetables, unpleasant eating

http://www.ijSciences.com

Volume 8 – June 2019 (06)
consumption and large production of these important vegetables is also recommended.

References
1. Amajoyebege, D. J., Oyedele, M. K., Idowu, J. O., Ayinge, O. C. (2015). Journal of Agricultural Extension and Rural Development, Vol.7(9), pp. 283-289, September, 2015 Barucha, Z., & Pretty, J. (2010). The roles of wild foods in agricultural systems. Philosophical Transactions of the Royal Society B, 365, 2913–2926
2. Bekunda, M.; Sanginga, N.; Woomer, P.L. (2010). Restoring soil fertility in sub-Saharan Africa: In: Advances in Agronomy, Donald, L., S. (Ed.), pp.183-236.
3. Boedecker, J., Termate, C., Assogbadjo A.D., Lachat, C. and Van Damme P. (2014) Food Security. Volume 6 (6), 833– 849. doi:10.1007/s12571-014-0396-7
4. Chweya J.A, and Ezyzaguirre P.B (1999). The biodiversity of traditional leafy vegetables. IPGRI Rome, Italy. Vol 12, pp182-187. consumption of traditional vegetables in Tanzania from the farmers point of view.
5. Dansi, A., Vodouhè, R., Azokpotè, P., Yedomonhan, H., Assogba, P., Adjoumani, L., Adeyemo, A., Amanon, K., and Akpaganj, K. (2012) Diversity of the Neglected and Underutilized Crop Species of Importance in Benin. Scientific World Journal. Vol 9
6. FAO (2013). Linkages between biodiversity, food and nutrition. Commission on Genetic Resources for Food and Agriculture, Fourteenth Regular Session. Rome, Food and Agriculture Organization of the United Nations. http://www.fao.org/docrep/meeting/0927/mf561e.pdf
7. Global Hunger Index (2014). The Challenge of Hidden Hunger. Pg 4-7
8. Guarno, L. (1997), Traditional Africa vegetables. Promoting the conservation and use of underutilized and neglected crops. JIPGR International symposium on underutilized plants for food security, Nutrition, Income and Sustainable Development. ISHS (International Society for Horticultural Science); Leuven, Belgium: 2009. Contribution of neglected and underutilized crops to household food security and health among rural dwellers in Oyo State, Nigeria.
9. Janck J. (2011). Horticultural review. John and Willey and Co. vol 38, pp 305
10. Keding, G., Muya, J. M., Maas, B. L., & Krawinkel, M. B. (2012), Relating dietary diversity and food variety scores to vegetable production and Socioeconomic status of women in rural Tanzania. Food Security, 4, 129–140
11. Magbagbeola, JAO. Adetosoye, JA and Owolabi, OA. (2010) Neglected and underutilized species (NUS): a panacea for community focused development to poverty alleviation/poverty reduction in Nigeria. Journal of Economics and International Finance, 2010:208 - 211
12. Maziya-Dixon B, Akinuye IO, Oguntemi EB, Nokoe S, Samusi RA and E Harris (2003), Nigeria food Consumption and Nutrition Survey (2001-2003). International Institute for Tropical Agriculture, Ibadan Nigeria.
13. Nnamani, C. V., Oselebe, H. O. and Agbatuta, A. (2009). Ethnobotany of Indigenous Leafy Vegetables of Izi Clan, in Eboh State, Nigeria. In: Proceeding of 20th Annual National Conference of Biotechnology Society of Nigeria. Abakaliki, November 14th -17th, pp. 111-114.
14. Odhav, B., Beerkrum, S., Akula and Baiparth, H. (2007). Preliminary assessment of nutritional value of traditional leafy vegetables in Kwazulu-Natal, South Africa. Journal of Food Composition and Analysis, 20(5), pp. 430– 435.
15. Salami TR (2011). Survey and identification of some under exploited indigenous vegetables in some parts of Osun State, Nigeria. University of Aboakuta, Horticulture M.Sc. Thesis, P89.
16. Terróte, C., Bwama Meyi, M., Ghèda Djiallo, B., Huyrèrgts, L., Lachat, C., Kolsteven, K., & Van Damme, P. (2012). A biodiverse rich environment does not contribute to a better diet: a case study from DR Congo. PLoS ONE, 7(1), e30533.

Consumption Pattern of Neglected and Underutilised Vegetables among Rural Households in Akinyele Local Government Area, Ibadan, Nigeria

experiences in times past or that of a family member, means of obtaining the vegetables among others. Most of the respondents appreciated the vegetables and would readily consume more of them if readily available. However, an appreciable number of respondents revealed that they would not consume the neglected/underutilised ones in place of well-known vegetables due to their unavailability, confirming the fact that unavailability of these vegetables in both formal and informal markets at rural and urban areas has added to the downward trend in their consumption.

Vegetables consumption in sub-Saharan Africa is lower than WHO/FAO recommendation of 200g/day/person. This fact is reflected in the portion sizes consumed by the respondents in this study. Vegetables are mostly consumed as an addendum to staples, and the more preferred and frequently consumed ones are eaten in larger quantities than the less preferred ones.

There was no significant relationship between age, occupation, household income and educational level of respondents and frequency of vegetable consumption, neither was there any significant association between vegetable consumption and level of dietary diversity. This finding is contrary to that of Boedecker et al., (2014) in their study of wild edible plants, and this observed difference could be due to the number of food groups from wild edible plants considered in the study other than green leafy vegetables, which could have improved the diversity of the diet.

Conclusion
Wildly grown vegetables like Ogunno, Worowo, Yunrin, Ebolo, Amunututa, Efo-Odu including the cultivated Igbagbha, have been revealed by this study to be neglected/underutilized, and are gradually disappearing from farms. Knowledge and consumption of these vegetables have greatly declined even in rural areas where they are thought to be popular, well cherished and readily available. Lack of knowledge about the neglected vegetables, seasonality, unavailability and erosion of biodiversity through agricultural practices have led to the disappearance of many of them, thereby losing their place on the consumers table, and thus, narrowing the options of consumers to fewer and fewer crops. This situation therefore calls for consumer education on the benefits of including wildly grown indigenous vegetables in their daily diets as good source of essential vitamins and minerals in addition to their dietary fibre, thereby improving their dietary diversity, meeting nutritional needs, improve health and prevent nutrition-related non-communicable diseases such as cancers, cardiovascular diseases and coronary heart disease. Farmers’ awareness as to the

http://www.ijSciences.com