Inventory of Traditional Green Leafy Vegetables, Consumption Patterns and Nutritional Contribution in Odeda Local Government Area, Ogun State, Nigeria

SODUNKE Taiwo Ganiyat, Ejoh Shirley Isi, Omolade O.E., Rukayat Odunola Lawal

University of Ibadan, Huddersfield, West Yorkshire, United Kingdom

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ABSTRACT

Vegetable intake constitutes a significant aspect of human diet and nutrition. This study aimed to inventory the types of traditional green leafy vegetables, identify consumption patterns, assess their nutritional contribution, and examine socio-demographic factors associated with consumption in Odeda Local Government Area, Ogun State, Nigeria.

A descriptive cross-sectional study was conducted among 100 adult respondents in Odeda Local Government Area. A pre-tested, semi-structured, interviewer-administered questionnaire was used for data collection, including a multi-pass 24-hour dietary recall. Data was analysed using descriptive statistics, an adapted Total Dietary Assessment (TDA) software package, independent-samples t-tests, and Pearson chi-square tests. Cramer's V and odds ratios were used to assess the strength and magnitude of associations, with statistical significance set at $p<0.05$.

The mean age was 42.23±14.68 years among males and 40.08±16.31 years among females. Approximately 99%, 85%, and 88% of respondents reported that they knew, had seen, and had eaten Ewedu (Corchorus olitorius), Efo-tete (Amaranthus hybridus), and Gbure (Talinum triangulare), respectively. Less than half of respondents knew Ebolo (Crassocephalus crepidioides), had seen it, and had eaten it. There was a statistically significant association between awareness/exposure and consumption frequency ($\chi^2=39.130$, $p<0.001$; Cramer's V=0.626; OR=3.571).

More than half (58%) of respondents consumed at least one traditional green leafy vegetable in the previous 24 hours. Ugwu (Telfairia occidentalis) was among the most frequently consumed leafy vegetables, with 44% reporting daily consumption. The study also found that the estimated contributions of traditional leafy vegetables to daily zinc, iron, and calcium requirements were low.

The findings indicate high awareness and regular consumption of several culturally familiar leafy vegetables, alongside limited awareness and use of some underutilized species. Targeted nutrition education, agricultural extension support, home-garden initiatives, and conservation measures could help improve dietary diversity and preserve indigenous vegetable resources.

Keywords: Traditional leafy vegetables; consumption frequency; awareness; nutritional contribution; dietary diversity; Nigeria

BACKGROUND INFORMATION

The triple burden of malnutrition, micronutrient deficiencies, and overweight or obesity is increasingly recognised as a major public health challenge in low- and middle-income countries. Changes in food systems and dietary patterns, including increased consumption of energy-dense and ultra-processed foods, can contribute to being overweight and obesity and may coexist with inadequate intake of essential micronutrients

(Li and Shi, 2022). Micronutrient deficiencies, sometimes described as hidden hunger, can adversely affect growth, cognitive function, immunity, work capacity, and overall health. Vegetables are important components of healthy diets because they provide vitamins, minerals, phytochemicals, antioxidants, and dietary fibre (Hari, 2019). Evidence has linked inadequate vegetable intake with several chronic health conditions, while global evidence continues to show that fruit and vegetable consumption remains below recommended levels in many populations (Davis et al., 2021; Mason-D'Croz et al., 2019).

In Nigeria, food insecurity and changing food environments continue to create challenges for achieving healthy and diverse diets (Amalu et al., 2022). Households obtain food through several pathways, including purchasing, harvesting wild foods, exchange, and sharing (Tatebayashi et al., 2019). The World Health Organization recommends a daily intake of at least 400 g of fruits and vegetables as part of a healthy diet (Adame et al., 2023). Inadequate fruit and vegetable consumption has been associated with an increased risk of non-communicable diseases and premature mortality (Yazew and Daba, 2020; Nepali et al., 2020). In Nigeria and other African settings, access, availability, affordability, cultural preferences, and the food environment can influence vegetable consumption (Chen & Antonelli, 2020).

Traditional green leafy vegetables are particularly important in rural food systemss because many are locally cultivated, gathered, or obtained from household gardens and may be relatively accessible. Their nutritional value, cultural relevance, and potential contribution to dietary diversity make them important resources for nutrition security. However, some indigenous vegetables are becoming less commonly known or consumed as dietary patterns change and traditional food knowledge is lost. Understanding which vegetables remain available and familiar, how frequently they are consumed, and their contribution to nutrient intake is therefore important for informing nutrition education, agricultural extension, and food-system interventions.

Despite the documented nutritional benefits of traditional green leafy vegetables and their historical importance in Nigerian diets, there is limited empirical evidence on the current inventory of these vegetables, their consumption patterns, and their nutritional contribution in rural communities. This knowledge gap is particularly relevant in the context of the triple burden of malnutrition and ongoing dietary transition towards processed and energy-dense foods. Understanding the status of traditional green leafy vegetable consumption in rural Nigeria can support interventions aimed at improving dietary diversity, reducing micronutrient deficiencies, and preserving indigenous food resources.

The study therefore aimed to: (1) inventory the types of traditional green leafy vegetables available and consumed in Odeda Local Government Area; (2) describe the consumption patterns and frequency of these vegetables; (3) estimate the nutritional contribution of these vegetables to daily micronutrient requirements; and (4) identify socio-demographic factors associated with consumption.

METHODS

Study Design

A descriptive cross-sectional design was used to assess the availability, awareness, consumption patterns, and nutritional contribution of traditional green leafy vegetables in the study area. The cross-sectional design was appropriate because data were collected from respondents at a defined period to describe existing dietary practices and patterns of vegetable consumption.

Study location

Odeda is a Local Government Area and town in Ogun State, Nigeria, with its headquarters in Odeda. The area is located approximately at 7°13′00″N and 3°31′00″E and has a land area of 1,547.29 km². The 2006 population was reported as 109,449 (NBS, 2006). The climate supports the cultivation of crops including rice, maize, cassava, yam, cocoyam, oil palm, vegetables, and fruit trees. Residents are predominantly farmers and traders, with some government workers attached to primary and secondary schools, the local government secretariat, and state health facilities. These characteristics make Odeda a relevant setting for examining the availability and consumption of traditional green leafy vegetables.

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Study population

The study population comprised adults aged 18 years and above who were resident in the selected communities and had knowledge of local foods or were willing to participate. Community entry was conducted with the assistance of community leaders, including Baale and Balogun. Focus group discussions with community elders and other knowledgeable community members were used during the community-entry process to identify people with knowledge of indigenous foods, food preparation, and local food-gathering practices. A total of 100 respondents (52 males and 48 females) participated in the study.

Sample size determination

The minimum sample size was estimated using the Leslie Kish formula, $n = Z^2pq/d^2$, as described by Fisher et al. (1998).

Using Z=1.96, p=0.924, q=0.076, and d=0.05, the calculated minimum sample size was approximately 108 respondents.

d^2

Where:

n = sample size,

Zα = standardized normal deviation which is a constant (1.96) at 95% confidence interval.

P = 92.4% = 0.924 (Prevalence of adults who have the knowledge and practiced vegetable consumption (Banwat et al., 2012).

Q = 1 – P (1 – 0.924) = 0.076; D = 0.05 at 95% confidence interval

$n = \frac{Z^2pq}{d^2} = \frac{1.962 \times 0.924 \times 0.076}{0.052} = 108$

Allowing approximately 10% for non-response increased the target sample to approximately 120 respondents. However, the final sample achieved was 100 respondents because of practical field constraints, including the unavailability of some potential respondents. The final sample should therefore be regarded as the achieved study sample, and the limitation associated with the smaller-than-targeted sample is acknowledged below.

Sample technique

Maximum variation sampling was used to select participants representing variation in characteristics relevant to the study, including age, gender, occupation, and village of residence. Community leaders assisted in identifying eligible respondents across the selected communities. The selected locations included Odeda, Osiele, Oluga, Olugbo, Baale Ogun, Eweje farm settlement, Ilugun, Olodo, Okiri-Ojule, Apesin, Akonko, Olokomeji, Kugbajagbe, Obantoko, Adao, Alabata, Opeji, and Obete. This approach was intended to capture a range of experiences and perspectives concerning indigenous vegetables.

Inclusion criteria

Adults aged 18 years and above who were resident in the selected communities and willing to participate were eligible for inclusion.

Exclusion criteria

Individuals younger than 18 years and adults who did not provide informed consent were excluded from the study.

Instrument for data collection

A semi-structured, interviewer-administered questionnaire was developed in simple English and translated into Yoruba, the predominant local language in the study area. An in-depth interview guide was also developed. The questionnaire comprised six sections. Section A covered socio-demographic and socio-economic characteristics; Section B assessed the inventory, knowledge, and familiarity of traditional green leafy vegetables; Section C assessed consumption frequency using a food-frequency questionnaire adapted from Van Assema et al. (2002); Section D assessed uses of the vegetables; Section E assessed challenges associated with access to available vegetables; and Section F assessed recent food and nutrient intake using a multi-pass 24-hour dietary recall.

Section A: Sociodemographic characteristics of respondents

This section included the Age, Sex, and Date of birth, marital status, Religion, Occupation, Ethnicity, and Number of members of the household and information on socio-economic characteristics.

Section B: Inventory on types of traditional green leafy vegetables available in the communities and information on knowledge and familiarity with the indigenous vegetables.

Section C: Most frequently consumed traditional green leafy vegetables in the communities; a standardized food frequency questionnaire developed by Van Assema et al (2002) was used to obtain data.

Section D: Use of the traditional green leafy vegetables consumed in the communities to obtain information on uses of traditional green leafy vegetables.

Section E: Challenges associated with accessing traditional green leafy vegetables available in the communities.

Section F: To identify the consumption pattern and its nutritional contribution in the communities using multi-pass 24hr dietary recall.

Data collection procedure

Four experienced research assistants were recruited and trained in the study procedures. The training covered administration of the questionnaire and interview guide, the dietary recall procedure, obtaining informed consent, and checking complete questionnaires for completeness and consistency. The questionnaire was serially numbered. Data was collected through face-to-face interviews, and the research team checked completed instruments for errors before leaving the field.

Recruitment and training of Research assistants

Four (4) experienced research assistants were recruited and trained in the ways and methods of data collection. During the training, participatory approach was adopted in which everyone was involved in the training process. Demonstration and return demonstration (role play) was adopted.

Validity of the instrument

Content validity was supported by reviewing relevant literature and adapting items from questionnaires used in related studies. The draft instrument was scrutinised by the academic supervisor, and observations from the pre-test were used to revise ambiguous or inappropriate items before the main survey. The questionnaire was structured according to the study objectives and domains of measurement.

Reliability of the instruments

The questionnaire was pre-tested among adults aged 18 years and above in Abeokuta North Local Government Area, Ogun State, which was outside the study area. The pre-test involved approximately 10% of the intended

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study population, and the pre-test data were not included in the final analysis. The instrument was reviewed for clarity, consistency, and completeness, and identified ambiguities were corrected before the main data collection.

Data analysis and management

Data was cleaned using Microsoft Excel and analysed using SPSS version 23. Adapted Total Dietary Assessment (TDA) software was used to estimate micronutrient intake. Descriptive statistics were used to summarise the data, while independent-samples t-tests assessed differences in mean awareness/exposure scores by gender. Pearson chi-square tests assessed associations between consumption frequency and socio-demographic or awareness variables. Cramer's V was used to describe the strength of association, and odds ratios with 95% confidence intervals were used to describe the magnitude of the association where applicable. Statistical significance was set at $p<0.05$. Awareness/exposure was scored across 20 vegetables on a 0–60 scale, with response categories assigned scores according to level of familiarity. Consumption frequency was scored across 22 vegetables on a 0–88 scale, with frequency categories assigned increasing scores from never to everyday. The resulting scores were categorised into the study's reported awareness/exposure and consumption-frequency groups.

Ethical Considerations

Ethical approval was obtained from the University of Ibadan/University College Hospital Institutional Review Board (IRB) through the Institute for Advanced Medical Research and Training (IAMRAT), University of Ibadan, Nigeria. Written informed consent was obtained from respondents after the study purpose, procedures, potential benefits, possible risks, confidentiality, and voluntary nature of participation had been explained. Respondents were informed that they could decline participation or withdraw without penalty.

RESULTS

Socio-Demographic Characteristics of Respondents

Table 4.1 presents the socio-demographic characteristics of the respondents. The mean age was 42.23±14.68 years for males and 40.08±16.31 years for females. Most respondents were within the economically active age groups (20–50 years). The majority were married, and Yoruba respondents constituted the largest ethnic group. There was no statistically significant gender difference in the socio-demographic characteristics assessed ($p>0.05$).

Table 4.1: Socio-Demographic Characteristics of Respondents

Characteristics		**Male**	**Female**	**Total**	**p-value**
		N(%)	N(%)	N(%)	
Age (in Year)					0.752
	20-30	15(28.8)	18(37.5)	32(33.0)	
	31-40	17(32.7)	11(22.9)	28(28.0)	
	41-50	10(19.2)	10(20.8)	20(20.0)	
	51-60	4(7.7)	5(10.4)	9(9.0)	
	>60	6(11.5)	4(8.3)	10(10.0)	
	Mean ±SD	42.23±14.68	40.08±16.31	41.20±15.44	0.490
Zones					0.156
	Odeda	6(11.5)	14(29.2)	20(20.0)	
	Okiri-Ojule	9(17.3)	11(22.9)	20(20.0)	
	Olodo	12(23.1)	8(16.7)	20(20.0)	
	Osiele	13(25.0)	7(14.6)	20(20.0)	
	Opeji	12(23.1)	8(16.7)	20(20.0)	

Marital Status					0.995
	Single	14(26.9)	11(22.9)	25(25.0)	
	Married	32(61.5)	31(64.6)	63(63.0)	
	Cohabiting	1(1.9)	1(2.1)	2(2.0)	
	Divorce	3(5.8)	3(6.3)	6(6.0)	
	Widow	2(3.8)	2(4.2)	4(4.0)	
Ethnicity					0.054
	Hausa	2(3.8)	10(20.8)	12(12.0)	
	Igbo	8(15.4)	9(18.8)	12(12.0)	
	Yoruba	36(69.2)	25(52.1)	61(61.0)	
	Others	6(11.5)	4(8.3)	10(10.0)	
Religion					0.080
	Islam	19(36.5)	16(33.3)	35(35.0)	
	Christianity	26(50.0)	31(64.6)	57(57.0)	
	Traditional	7(13.5)	1(2.1)	8(8.0)	
Number of Children				0.509	
	None	2(3.8)	5(10.4)	7(7.0)	
	1-2	15(28.8)	15(13.3)	30(30.0)	
	3-4	25(48.1)	22(45.8)	47(47.0)	
	≥5	10(19.2)	6(12.5)	16(16.0)	
	Mean ±SD	3.17±1.62	2.73±1.61	2.96±1.62	0.172

Table 4.2 Socio-Economic Characteristics of Respondents

Table 4.2 presents the socio-economic characteristics of the respondents. About 14% had no formal education, 37% had primary education, 23% had junior secondary education, 8% had senior secondary education, and 18% had tertiary education. Farming and trading were the most common occupations. There was no statistically significant difference between males and females in the socio-economic characteristics assessed ($p>0.05$).

Among the occupational categories, 7.7% of males and 6.3% of females were engaged as artisans. Professionals constituted 5.8% of males and were absent among females. Students accounted for 1.9% of males and 8.3% of females. Farming was chosen by 38.5% of males and 25.0% of females. Trading was a popular occupation, with 28.8% of males and 50.0% of females engaged in it. Teaching roles were taken by 11.5% of males and 8.3% of females. Finally, other occupations were chosen by 5.8% of males and 2.1% of females.

There was no statistically significant difference between male and female respondents in socio-economic characteristics ($p>0.05$).

TABLE 4.2Socio-economic characteristics of respondents

Characteristics		**Male**	**Female**	**Total**	**p-value**
		N(%)	N(%)	N(%)	
Level of Education				0.616	
	No Formal	9(17.3)	5(10.4)	14(14.0)	
	Primary	17(32.7)	20(41.7)	37(37.0)	
	Junior Secondary Education	12(23.1)	11(22.9)	23(23.0)	
	Senior Secondary School Education	3(5.8)	5(10.4)	8(8.0)	
	Tertiary Education	11(21.2)	7(14.6)	18(18.0)	
Occupation					0.113
	Artisan	4(7.7)	3(6.3)	7(7.0)	
	Professional	3(5.8)	0(0.0)	3(3.0)	
	Student	1(1.9)	4(8.3)	5(5.0)	

	Farming	20(38.5)	12(25.0)	32(32.0)	
	Trading	15(28.8)	24(50.0)	39(39.0)	
	Teaching	6(11.5)	4(8.3)	10(10.0)	
	Others	3(5.8)	1(2.1)	4(4.0)	

Table 4.3 shows that 65% of respondents had a farm or garden and reported growing green leafy vegetables. Farmland was the major source of green leafy vegetables for 66% of respondents, while 32% obtained them from the market and 2% used both sources.

Table 4.3: Availability of Green Leafy Vegetable

Questions		**Male**	**Female**	**Total**	**p-value**
	Response	N(%)	N(%)	N(%)	
Have farm or garden					0.677
	Yes	35(67.3)	30(62.5)	65(65.0)	
	No	17(32.7)	18(37.5)	35(35.0)	
Grow green leafy vegetable					0.677
	Yes	35(67.3)	30(62.5)	65(65.0)	
	No	17(32.7)	18(37.5)	35(35.0)	
Major source of green leafy vegetable					
	Farmland	35(67.3)	31(64.6)	66(66.0)	
	Market	16(30.8)	16(33.3)	32(32.0)	
	Both	1(1.9)	1(2.1)	2(2.0)	

TABLE 4.4 Awareness/Exposure of Respondents about Some Leafy Vegetables

Vegetable	**Know, seen and eaten it**	**Know, seen but never eaten it**	**Heard the name before but never seen nor eaten**	**Never heard, seen, or eaten**
Ewedu/ jute leaves (Corchorus olitorius)	99(99.0%)	1(1.0)	0(0.0)	0(0.0)
Efotete/green (Amaranthus hybridus)	85(85.0)	11(11.0)	4(4.0)	0(0.0)
Gbure/water leaf (Talinumtriangulare)	88(88.0)	6(6.0)	3(3.0)	3(3.0)
Soko/ Lagos spinach (Celosiaargentea)	78(78.0)	11(11.0)	11(11.0)	0(0.0)
Ugwu/ fluted pumpkin leaves (Telfairia occidentalis)	92(92.0)	6(6.0)	2(2.0)	0(0.0)
Okro leaves/ Ilasa	64(64.0)	25(25.0)	6(6.0)	5(5.0)
Gbagba/ igbo/African eggplant leaf (Solanum macrocarpon)	63(63.0)	10(10.0)	6(6.0)	21(21.0)
Ewuro/bitter leaf/ Onugbu (Vernonia amygdalina)	85(85.0)	12(12.0)	3(3.0)	0(0.0)
Ebolo (Crassocephalum crepidioides)	43(43.0)	40(40.0)	7(7.0)	10(10.0)

TABLE 4.4.1 Awareness/Exposure of Respondents about Some Leafy Vegetables

Vegetable	**Know, seen and eaten it**	**Know, seen but never eaten it**	**Heard the name before but never seen nor eaten**	**Never heard, seen, or eaten**
Yanrin (Launaea taraxacifolia)	29(29.0)	35(35.0)	4(4.0)	32(32.0)
Odu (Solanum americanum)	21(21.0)	48(48.0)	3(3.0)	28(28.0)
Worowo (Senecio biafrae)	45(45.0)	21(21.0)	6(6.0)	28(28.0)
Amunututu/ Indian spinach (Basella alba)	60(60.0)	26(26.0)	10(10.0)	4(4.0)
Iyana-ipaja/tree spinach/ Jerusalem leaf (Cnidoscolus aconitifolius)	43(43.0)	30(30.0)	24(24.0)	3(3.0)

Uziza/climbing pepper leaves/ false cubeb leaves (Piper guineense)	33(33.0)	10(10.0)	9(9.0)	48(48.0)
Oha leaves (Hageniaabyssinica)	33(33.0)	10(10.0)	17(17.0)	40(40.0)
Afang leaf/ okazi/ Ukazi (Gnetum africanum)	35(35.0)	8(8.0)	8(8.0)	49(49.0)

TABLE 4.4.2 Awareness/Exposure of Respondents about Some Leafy Vegetables

Vegetable	Know, seen and eaten it	Know, seen but never eaten it	Heard the name before but never seen nor eaten	Never heard, seen, or eaten
Moringa leaf/ drumstick leaf (Moringa oleifera)	68(68.0)	18(18.0)	6(6.0)	8(8.0)
Curry leaf/ Efinrinoso (Murraya koenigii)	66(66.0)	13(13.0)	3(3.0)	18(18.0)
Efirin/nchawu/scent leaf (Ocimum gratissimum)	88(88.0)	10(10.0)	2(2.0)	0(0.0)

Tables 4.4, 4.4.1, and 4.4.2 show generally high awareness and exposure to commonly consumed leafy vegetables, with substantial variation across species. Almost all respondents (99%) knew, had seen, and had eaten Ewedu (jute leaves). High exposure was also reported for Ugwu (92%), Gbure/waterleaf (88%), Efirin/scent leaf (88%), Ewuro/bitter leaf (85%), and Efo-tete/Amaranthus (85%). Moderate awareness and exposure were observed for Soko (78%), Moringa (68%), Curry leaf (66%), Okro leaves (64%), Gbagba/African eggplant leaves (63%), and Amunututu/Indian spinach (60%).

In contrast, relatively low awareness and exposure were recorded for several less commonly used vegetables, including Ebolo, Yanrin, Odu, Worowo, Iyana-ipaja, Uziza, Oha, and Afang. For some of these vegetables, substantial proportions of respondents reported that they had never heard of, seen, or eaten them.

Awareness and Exposure Scores of Selected Vegetables based on their Gender

Table 4.4.3 shows generally high awareness and exposure to several leafy vegetables among both genders. Ewedu had the highest mean awareness/exposure score in both males and females, followed by Efo-tete. Afang had the lowest score among males, while Uziza had the lowest among females. The overall mean awareness/exposure score was 45.23±9.11 for males and 44.54±9.20 for females, with no statistically significant overall gender difference (p=0.708). A statistically significant gender difference was observed for Efo-tete (p=0.011).

Table 4.4.3 Average Awareness/Exposure Scores for each Vegetable among Males and Females.

Vegetables	Male	Female	p-value
Ewedu/ jute leaves (Corchorus olitorius)	2.98±0.14	3.00±0.00	0.339
Efotete/green (Amaranthus hybridus)	2.94±0.61	2.93±0.24	0.011
Gbure/water leaf (Talinumtriangulare)	2.81±0.69	2.77±0.59	0.775
Soko/ Lagos spinach (Celosiaargentea)	2.73±0.60	2.60±0.74	0.346
Ugwu/ fluted pumpkin leaves (Telfairia occidentalis)	2.88±0.43	2.92±0.28	0.661
Okro leaves/ Ilasa	2.54±0.73	2.42±0.92	0.462
Gbagba/ igbo/African eggplant leaf (Solanum macrocarpon)	2.27±1.19	2.02±1.28	0.317
Ewuro/bitter leaf/ Onugbu (Vernonia amygdalina)	2.83±0.43	2.81±1.28	0.876
Ebolo (Crassocephalum crepidioides)	2.23±0.90	2.08±0.99	0.436
Yanrin (Launaea taraxacifolia)	1.46±1.26	1.77±1.15	0.204
Odu (Solanum americanum)	1.50±1.09	1.75±1.12	0.262
Worowo (Senecio biafrae)	1.87±1.30	1.79±1.25	0.774
Amunututu/ Indian spinach (Basella alba)	2.38±0.93	2.46±0.71	0.660
Iyana-ipaja/tree spinach/ Jerusalem leaf (Cnidoscolus aconitifolius)	2.27±0.79	1.98±0.96	0.101
Uziza/climbing pepper leaves/ false cubeb leaves (Piper guineense)	1.37±1.37	1.18±1.35	0.515

Oha leaves (Hageniaabyssinica)	1.46±1.24	1.25±1.38	0.421
Afang leaf/ okazi/ Ukazi (Gnetum africanum)	1.38±1.37	1.19±1.39	0.478
Moringa leaf/ drumstick leaf (Moringa oleifera)	2.48±0.85	2.44±1.01	0.817
Curry leaf/ Efinrinoso (Murraya koenigii)	2.21±1.23	2.33±1.10	0.603
Efirin/nchawu/scent leaf (Ocimum gratissimum)	2.88±0.37	2.83±0.43	0.527
Overall Mean Awareness and Exposure Score	45.23±9.11	44.54±9.20	0.708

An independent samples t-test was used to assess gender differences; $p<0.05$ was considered statistically significant.

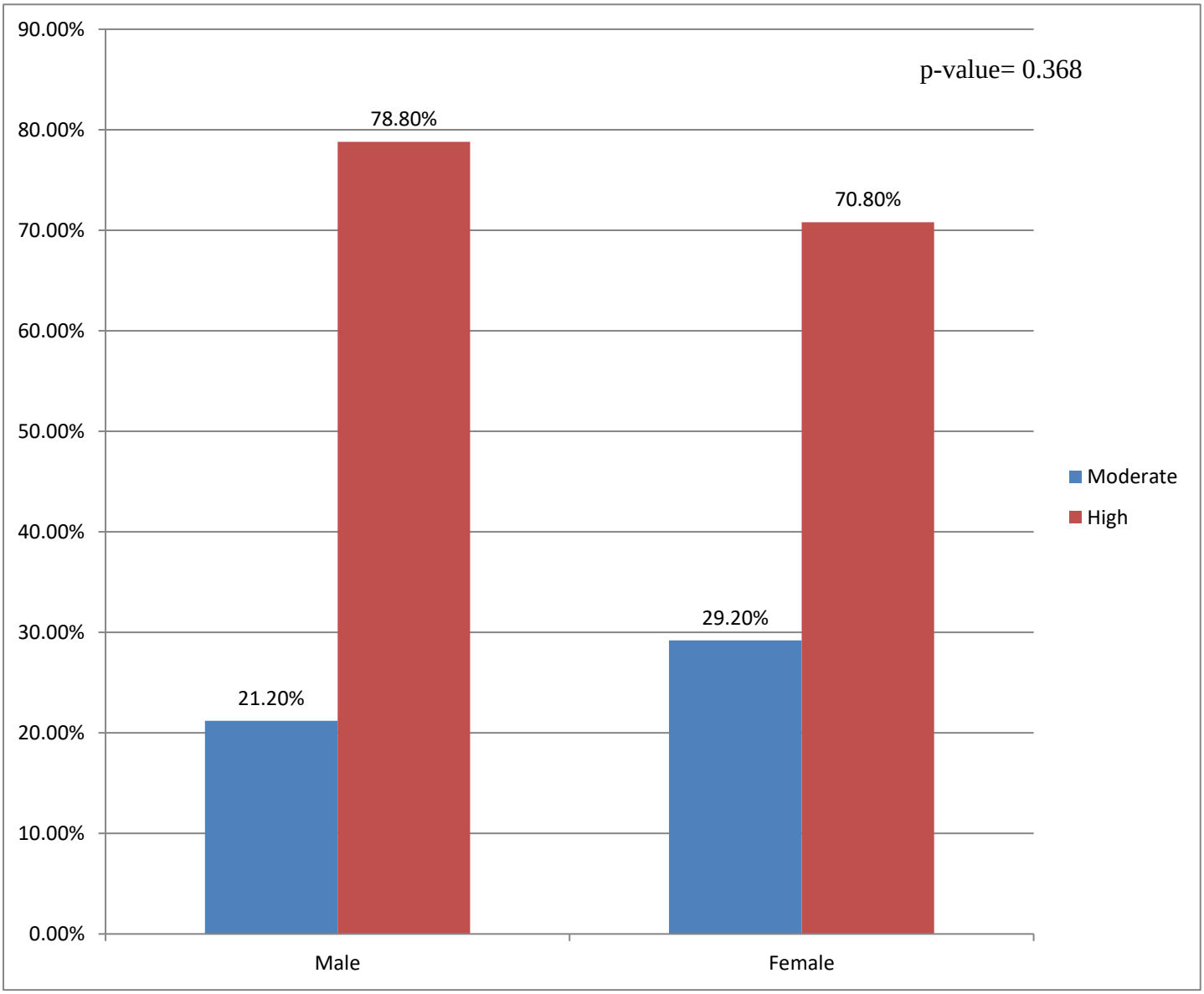

Figure 4.1: Level of Awareness/Exposure of Leafy Vegetable based on Gender

Table 4.5 presents the reported frequency of consumption of selected green leafy vegetables, ranging from never to everyday. Jute leaves were consumed daily by 12% of respondents and 4–6 days per week by 43%. Efo-tete was consumed 1–3 days per week by 42%, while waterleaf was consumed 1–3 days per week by 45%. Ugwu was consumed daily by 44% of respondents, and scent leaf was consumed daily by 47%.

A substantial 43% consume jute leaves daily, while 26% savor them 1-3 days a week, revealing their popularity and versatility in various culinary creations. About 42% of respondents consumeEfo-tete 1-3 days a week, while 28% consume it once a week. About 45% consume water leaf 1-3 days a week and 29% consume it once a week, while about 47% incorporate Lagos spinach into their meals 1-3 days a week.

Ugwu was consumed daily by 44% of respondents, while 33% consumed it once a week. Okro leaves were consumed once a week by 36%, while African eggplant leaves were consumed 1–3 days per week by 30%. Bitter leaf was consumed 1–3 days per week by 33%, and Ebolo was consumed once a week by 16%.

Overall, the findings demonstrate considerable variation in the frequency of consumption across leafy vegetable species, with culturally familiar vegetables generally consumed more frequently than less familiar species.

TABLE 4.5 Consumption Frequency of green leafy vegetables among respondents

Vegetables	Never	Once a week	1-3 days/ week	4-6 days/ week	Everyday
Ewedu/ jute leaves (Corchorus olitorius)	0(0.0)	19(19.0)	26(26.0)	43(43.0)	12(12.0)
Efotete/green (Amaranthus hybridus)	0(0.0)	28(28.0)	42(42.0)	6(6.0)	24(24.0)
Gbure/water leaf (Talinumtriangulare)	0(0.0)	29(29.0)	45(45.0)	15(15.0)	11(11.0)
Soko/ Lagos spinach (Celosiaargentea)	2(2.0)	27(27.0)	47(47.0)	17(17.0)	7(7.0)
Ugwu/ fluted pumpkin leaves (Telfairia occidentalis)	3(3.0)	33(33.0)	19(19.0)	11(11.0)	44(44.0)
Okro leaves/ Ilasa (Abelmoschus esculentus (L.) Moench)	33(33.0)	36(36.0)	19(19.0)	11(11.0)	1(1.0)
Gbagba/igbo/African egg plantleaf (Solanum macrocarpon)	35(35.0)	8(8.0)	30(30.0)	26(26.0)	1(1)
Efirin/ nchawu/ scent or mint leaf (Ocimum gratissimum)	3(3.0)	17(17.0)	27(27.0)	7(7)	47(47.0)
Ebolo (Crassocephalum crepidioides)	28(28.0)	16(16.0)	19(19.0)	10(10.0)	27(27.0)
Tomato leaves	75(75.0)	10(10.0)	4(4.0)	3(3.0)	8(8.0)
Yarin/ Wild lettuce (Taraxacumofficinale	51(51.0)	15(15.0)	17(17.0)	16(16.0)	1(1.0)
EfoAgunmaniye/ Everard (Gliricidia sepium)	43(43.0)	5(5.0)	41(41.0)	8(8.0)	3(3.0)
Efoteteabalaye/ African Spinach (Amaranthus hybridus)	12(12.0)	10(10.0)	34(34.0)	33(33.0)	11(11.0)
Efo-Ogunmo (Solanum scabrum)	54(54.0)	26(26)	16(16.0)	4(4.0)	0(0.0)
EfoOdu (Solanum nigrum)	69(69.0)	7(7.0)	21(21.0)	3(3.0)	0(0.0)
Efo Osun (Solanum macrocarpon)	54(54.0)	19(19.0)	12(12.0)	14(14.0)	1(1.0)
EfoDangunro/ Tete Popo (Amaranthus spinosus)	50(50.0)	11(11.0)	27(27.0)	12(12.0)	0(0.0)

Table 4.5.1 Consumption Frequency of Green Leafy Vegetable among Respondents

Vegetable	Never	Once a week	1-3 days/ week	4-6 days/ week	Everyday
Ekuku/ Sesame seed/ (Sesamum indicum)	60(60.0)	14(14.0)	9(9.0)	16(16.0)	1(1.0)
Kurere (Adenia lobata)	58(58.0)	11(11.0)	20(20.0)	10(10.0)	1(1.0)
Eguun (Sesamum radiatum)	59(59.0)	10(10.0)	18(18.0)	11(11.0)	2(2.0)
Orunla (DryOkro seed)	55(55.0)	12(12.0)	15(15.0)	9(9.0)	9(9.0)

Table 4.5 shows varied frequencies of leafy vegetable consumption among respondents. Jute leaves were the most frequently consumed, with many eating them daily, while others consumed them several times weekly. Efo-tete, waterleaf, Lagos spinach, African eggplant leaf, and bitter leaf were commonly consumed 1–3 days per week, indicating regular but moderate intake. Ugwu and scent leaf recorded relatively high daily consumption, whereas vegetables such as okro leaves and ebolo were mainly consumed once a week

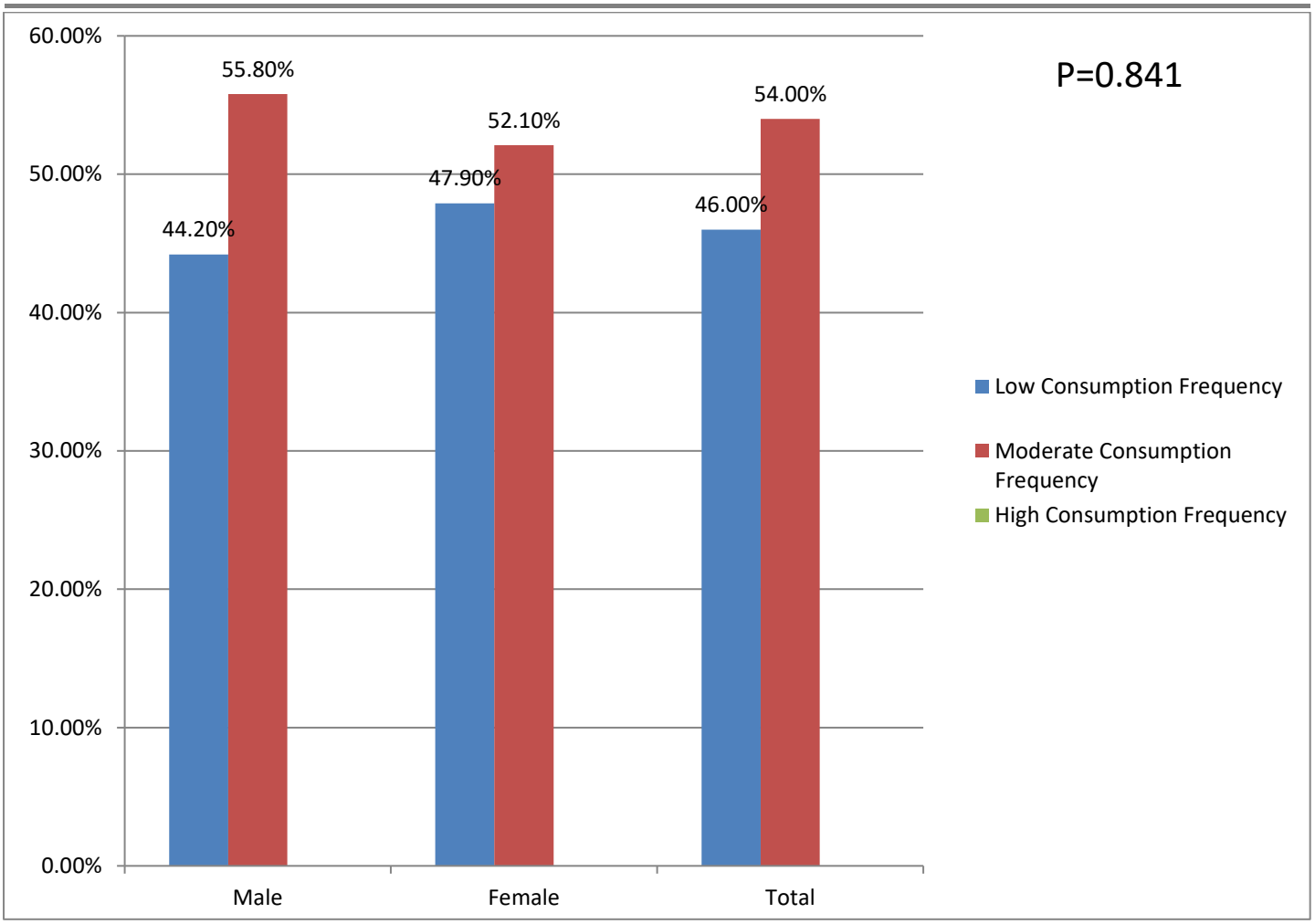

Figure 4.2: Categorized Consumption Frequency of Leafy Vegetable based on Gender

Association between Awareness/Exposure and Consumption Frequency of Leafy Vegetable

Table 4.7: Association between Awareness/Exposure to Indigenous Leafy Vegetable and the Consumption Frequency

Awareness/Exposure	**Consumption Frequency**		**OR**	**95% CI**		**X2**	**p-value**
	Low	Moderate		lower	Upper		
Average	25(54.3%)	0(0.0)	3.571	2.484	5.134	39.130	0.000
Good	21(45.7%)	54(100.0%)					

Cramer's V: 0.626

OR: Odd Ratio

CI: Confidence Interval

Significant at $p<0.05$

Table 4.7 presents the association between awareness/exposure to indigenous leafy vegetables and consumption frequency. The Pearson chi-square test showed a statistically significant association between awareness/exposure and consumption frequency ($\chi^2=39.130$, $p<0.001$). Among respondents with low consumption frequency, 54.3% had average awareness/exposure, whereas all respondents with moderate consumption frequency had good awareness/exposure. The odds ratio of 3.571 indicates that respondents with average awareness/exposure had approximately 3.6 times the odds of being in the low-consumption group compared with respondents with good awareness/exposure.

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Cramer's V was 0.626, indicating a strong association between awareness/exposure and consumption frequency. Cramer's V ranges from 0 to 1, with larger values indicating stronger associations. In this study, the observed value indicates a substantial association of practical importance. However, because the study was cross-sectional, the association should not be interpreted as evidence that increased awareness necessarily causes increased consumption.

Association between Socio-demographic Characteristics and The Consumption Frequency of Leafy Vegetable

Table 4.8 presents the association between selected socio-demographic characteristics and consumption frequency of leafy vegetables. Pearson chi-square tests showed no statistically significant association between the socio-demographic characteristics assessed and consumption frequency ($p>0.05$), although some differences in distribution were observed across categories.

Table 4.8: Association between Socio-demographic Characteristics and The Consumption Frequency of Leafy Vegetable

Characteristics		**Consumption Frequency**		**X2**	**p-value**
		Low	Moderate		
Age (in Year)				0.691	0.952
	20-30	15(32.6)	18(33.3)		
	31-40	13(29.3)	15(27.8)		
	41-50	8(17.4)	12(22.2)		
	51-60	5(10.9)	4(7.4)		
	>60	5(10.9)	5(9.3)		
Zones				1.369	0.850
	Odeda	10(21.7)	10(18.5)		
	Okiri-Ojule	10(21.7)	10(18.5)		
	Olodo	10(21.7)	10(18.50		
	Osiele	9(19.6)	11(20.4)		
	Opeji	7(15.2)	13(24.1)		
Marital Status				1.344	0.854
	Single	9(19.60	16(29.6)		
	Married	31(67.4)	32(59.3)		
	Cohabiting	1(2.2)	1(1.9)		
	Divorce	3(6.5)	3(5.6)		
	Widow	2(4.3)	2(3.7)		
Ethnicity				7.299	0.063
	Hausa	3(6.5)	9(16.7)		
	Igbo	12(26.1)	5(9.3)		
	Yoruba	28(60.9)	33(61.1)		
	Others	3(6.5)	7(13.0)		
Religion				3.518	0.172
	Islam	20(43.5)	15(27.8)		
	Christianity	24(52.2)	33(61.1)		
	Traditional	2(4.2)	6(11.1)		
Number of Children				0.549	0.908
	None	3(6.5)	4(7.4)		
	1-2	15(32.6)	15(27.8)		
	3-4	20(43.5)	27(50.0)		
	≥5	8(17.4)	8(14.8)		

Pearson Chi-square is significant at $p<0.05$

Table 4.8 (cont'd): Association between Socio-demographic Characteristics and The Consumption Frequency of Leafy Vegetable

Characteristics		**Consumption Frequency**		**X2**	**p-value**
		Low	Moderate		
Level of Education				4.543	0.337
	No Formal	7(15.2)	7(13.0)		
	Primary	20(43.5)	17(31.50		
	Junior Secondary	7(15.2)	16(29.6)		
	Secondary School	5(10.9)	3(5.6)		
	Tertiary Education	7(15.2)	11(20.4)		
Occupation				6.252	0.396
	Artisan	5(10.9)	2(3.7)		
	Professional	0(0.0)	3(5.6)		
	Student	2(4.30	3(5.6)		
	Farming	17(37.0)	15(27.8)		
	Trading	17(37.0)	22(40.7)		
	Teaching	3(6.5)	7(13.0)		
	Others	2(4.3)	2(3.7)		
Owned a farm				0.002	1.000
	Yes	30(65.2)	35(64.8)		
	No	16(34.8)	19(35.2)		
Source of Leafy vegetable				0.031	0.985
	Farmland	30(65.2)	36(66.7)		
	Market	15(32.6)	17(31.5)		
	Both	1(2.2)	1(1.9)		

Pearson Chi-square is significant at $p<0.05$

DISCUSSION

This study examined awareness, exposure, and consumption frequency of traditional green leafy vegetables and assessed their association with socio-demographic characteristics among adults in Odeda Local Government Area. The findings demonstrate a mixed pattern: several culturally familiar vegetables were widely known and regularly consumed, whereas a few less commonly used indigenous vegetables had limited awareness and exposure. Ewedu, Ugwu, Efo-tete, Gbure, Ewuro, and Efirin were among the vegetables with high levels of familiarity. The finding that 65% of respondents had a farm or garden and that 66% sourced vegetables from farmland is consistent with the predominantly agricultural context of the study area and may help explain the continued availability of familiar vegetables.

In contrast, awareness and exposure were lower for several less commonly used vegetables, including Ebolo, Yanrin, Odu, Worowo, Iyana-ipaja, Uziza, Oha, and Afang. This pattern is consistent with concerns about dietary transition and erosion of traditional food knowledge. However, the present cross-sectional data cannot establish that these factors caused lower awareness or consumption. The observed pattern may also reflect differences in seasonal availability, accessibility, affordability, taste preferences, food preparation practices, and cultural familiarity. These factors should be investigated in future studies.

The statistically significant association between awareness/exposure and consumption frequency is an important finding. Respondents with good awareness/exposure were more likely to be in the moderate-consumption group, while respondents with average awareness/exposure were more likely to have low consumption frequency. This finding supports the potential importance of nutrition knowledge and familiarity in shaping food choices, although the cross-sectional design prevents causal inference. The strong association

observed (Cramer's V=0.626) suggests that awareness and exposure deserve attention in future nutrition interventions. Practical education that includes identification, preparation, storage, and culturally appropriate uses of underutilized vegetables may be more useful than information-only approaches.

The nutritional relevance of the findings should also be interpreted cautiously. The study used a multi-pass 24-hour dietary recall and adapted Total Dietary Assessment software to estimate micronutrient intake, which provides an estimate of dietary contribution rather than a direct measure of nutritional status. The available findings indicate that contributions to daily zinc, iron, and calcium requirements were low; therefore, the manuscript should avoid implying that the vegetables alone meet a substantial proportion of micronutrient requirements. Their value is better understood as part of a diverse diet, particularly because several indigenous vegetables may provide useful micronutrients, dietary fibre, and other bioactive compounds.

The absence of statistically significant associations between the socio-demographic characteristics assessed and consumption frequency differs from findings in some settings where education, income, or sex have been reported as determinants of vegetable intake. In this study, the relatively high proportion of respondents engaged in farming or gardening and the high reliance on farmland as a vegetable source may have reduced differences in access between socio-demographic groups. Nevertheless, affordability, market access, household preferences, seasonality, and food preparation practices were not examined in sufficient depth and could account for variation that was not captured by socio-demographic analyses.

LIMITATIONS OF THE STUDY

Several limitations should be acknowledged. First, the cross-sectional design captures dietary practices at one point in time and therefore cannot establish causal relationships or adequately assess seasonal variation in vegetable availability and consumption. Second, the achieved sample size of 100 respondents was smaller than the calculated target sample, which may limit the generalisability of the findings to other rural communities in Ogun State and Nigeria. Third, the study relied partly on self-reported information, including a 24-hour dietary recall, which is subject to recall and social-desirability bias. The use of a multi-pass recall method and trained interviewers was intended to reduce these biases, but they cannot be eliminated completely. Fourth, the study estimated dietary micronutrient intake but did not include biochemical assessment of micronutrient status; therefore, dietary contribution should not be interpreted as evidence of physiological nutritional status. Fifth, the study was conducted in one local government area, limiting the transferability of the findings to other settings. Future studies should use larger samples, including multiple communities and seasons, and consider biochemical assessment where appropriate.

CONCLUSION

This study documented a range of traditional green leafy vegetables consumed or known in Odeda Local Government Area. Commonly consumed vegetables such as Ewedu, Ugwu, Efo-tete, Gbure, Ewuro, and Efirin showed high levels of awareness and regular consumption, whereas several less commonly used vegetables had limited awareness and exposure. Awareness/exposure was significantly associated with consumption frequency, while the socio-demographic characteristics assessed were not significantly associated with consumption frequency. The findings highlight the potential importance of cultural familiarity, local availability, and nutrition knowledge in supporting dietary diversity. Because the study was cross-sectional and based on self-reported dietary information, the findings should be interpreted as describing patterns rather than establishing causal relationships.

RECOMMENDATIONS

Based on the findings, the following recommendations are made:

1. Community-based nutrition education should be strengthened, with emphasis on the identification, nutritional value, preparation, safe storage, and practical incorporation of underutilized traditional green leafy vegetables into everyday meals.
2. Nutrition education should target households, community leaders, farmers, food vendors, and other

people involved in food production and preparation, using locally appropriate channels such as community meetings, demonstrations, and extension activities.

3. Agricultural extension programmes should promote the cultivation, sustainable harvesting, seed preservation, and conservation of underutilized indigenous vegetables, including support for household and community gardens.
4. Local food and nutrition programmes should consider incorporating culturally appropriate indigenous vegetables into school and community feeding initiatives where feasible, while ensuring food safety and acceptability.
5. Future research should examine affordability, accessibility, seasonality, preparation practices, and cultural preferences, and should use larger and more representative samples to determine the factors that influence consumption of traditional green leafy vegetables.

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