An Ethnobotanical Study of Nutraceutical Plants in Kolokuma Local Government Area Bayelsa State, Nigeria

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ABSTRACT

Background: This study aimed to document the ethnobotanical knowledge of nutraceutical plants among residents of Kolokuma Local Government Area, Bayelsa State, Nigeria. It focused on traditional uses, nutritional and medicinal properties of these plants, and their potential integration into modern healthcare and nutrition systems.

Methods: Data were collected from 150 respondents across three communities using semi-structured questionnaires. The data were analyzed using descriptive statistics and frequency distributions to assess local knowledge, practices, and perceptions.

Results: The findings showed that 80% of respondents confirmed the use of nutraceutical plants in their locality. While 60% acknowledged the existence of documentation methods, 66.67% reported that traditional knowledge was primarily transmitted through oral traditions. Nutritional and medicinal benefits were affirmed by 86.67% and 73.33% of respondents, respectively. Although interest in integrating these plants into modern healthcare practices was high, only limited application in current nutritional practices was reported.

Conclusion: The study revealed a strong base of traditional knowledge and widespread use of nutraceutical plants in the study area. However, gaps in formal documentation, inconsistent knowledge transfer, and limited sustainable harvesting practices were identified. It is recommended that improved documentation systems be developed, sustainable harvesting be promoted, and traditional knowledge be integrated into healthcare education. Collaboration among traditional practitioners, researchers, and modern healthcare professionals is also advised.

Keywords: Biodiversity , Ethnobotany, Nutraceuticals, Plant-based remedies, Traditional knowledge

1. INTRODUCTION

Plants and their by-products have been used by a large proportion of the population living in rural and urban areas for various purposes since the existence of human civilization [1]. Nutraceutical plants are plants that provide food and health benefits [2]. Interest and demand in nutraceuticals continue to grow, with efforts to validate and harness the health-promoting properties of these plants [3][4]. The discovery of novel compounds with therapeutic properties from nutraceutical plants and their integration into modern healthcare and wellness practices is documented [5][6]. Ethnobotanical studies on nutraceutical plants are crucial for preserving traditional knowledge of plant-based remedies used across various cultures [7]. Moreover, threats to natural habitats and biodiversity not only endanger many plants, cultural heritage, and traditional knowledge of local communities but also deprive the global community of potential new sources of pharmaceuticals. The study, therefore, conducted an ethnobotanical survey of nutraceutical plants in Kolokuma Local Government Area, Bayelsa State.

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2. MATERIALS AND METHODS

2.1 Materials
Field notebook and interview guide, Semi-structured questionnaires, Digital phone camera, Taxonomic literature

2.2 Methods
2.2.1 Study Area
Kolokuma Local Government Area Bayelsa State located at 4°656" 92' N, 4°566" 45'E in Bayelsa State within the Niger Delta region of Nigeria, is known for its rich biodiversity and cultural heritage. Local communities depend heavily on the surrounding flora for their nutritional and medicinal needs. The diverse plant life in the region presents a unique opportunity to explore traditional ethnobotanical practices. The study area features a tropical climate, fertile land, and a variety of ecosystems, including forests, rivers, and wetlands.

2.2.2 Data Collection
Semi-structured interviews were conducted for 150 participants from 3 communities (Kaiama, Odi and Opukuma) based on their knowledge of the traditional uses and practices associated with the nutraceutical plants were used to obtain data from July 2022 – November 2022. Consent was obtained from all participants after clarifying the purpose, nature of participation and confidentiality of their information.

2.3 Statistical Analysis
Descriptive statistics (frequencies and percentages) were used to analyze data (Microsoft Excel), and summarized in tables.

3. RESULTS

3.1 Demographic Characteristics of Respondents
The demographic features are presented in Table 1. The gender distribution of the population shows a slightly higher percentage of females (53.33%) compared to males (46.67%). Age distribution indicates a predominance of middle-aged (30-39 years) individuals (26.67%), followed by those aged 20-29 years (20%) and 40-49 (20%). The younger folks (Under 20) were 13.33%, 50-59 years (13.33%); and there were fewer aged respondents of 60+ years (6.67%). Most of the respondents had formal education with tertiary education (40.00%), secondary education 33.33%, primary education representing 20.00% and informal education being 6.67%. The study area has a diverse occupational structure; however, civil servants and farmers make up the largest groups (26.67%) within the study area. Traders, fishermen, and students each represent smaller portions of the sample at 20.00% and 13.33% respectively. Majority of respondents are married (46.67%), a significant proportions single (26.67%) while the widowed and divorced/separated individuals each constituted (13.33%) of the population.

Table 1: Socio-demographic Characteristics of Respondents

Variables	Frequency N= 150	Percentage
Gender		
Male	70	46.67%
Female	80	53.33%
Age Range		
< 20	20	13.33%
20-29	30	20.00%
30-39	40	26.67%
40-49	30	20.00%
50-59	20	13.33%
60+	10	6.67%
Educational Level		
No Formal Education	10	6.67%
Primary	30	20.00%

Secondary	50	33.33%
Tertiary	60	40.00%
Occupation		
Farming	40	26.67%
Trading	30	20.00%
Fishing	20	13.33%
Student	20	13.33%
Civil Servant	40	26.67%
Marital Status		
Single	40	26.67%
Married	70	46.67%
Widowed	20	13.33%
Divorced/ Separated	20	13.33%

Source: Field Survey, 2022

3.2 Diversity of Nutraceutical Plants, Related Indigenous Knowledge and Conservation

The different plant species inventoried are presented in Table 2. A total of 49 plant species were recorded from 29 families with varied plant parts used and applications.Majority of the respondents (80.00%) affirm the presence of specific nutraceutical plants commonly used in the study area, indicating strong local knowledge. However, while 60% report that there is a method for documenting these plants, 40% do not, implying inconsistency in documentation practices. Additionally, 53.33% feel that the documented uses are inaccessible to new generations. 66.67% of the respondents assert that the uses of these plants are recorded in local oral traditions, yet only 40% recognize a specific authority responsible for formal documentation, indicating gaps. The use of specific rituals or ceremonies pertaining to the plants is recognized by 60.00%, but 40.00% do not observe this, showing varied practices. Only 46.67% of respondents confirm knowledge community guidelines for sustainable harvesting.

Table 2: Nutraceutical Plants in Kolokuma Local Government Area, Bayelsa State

S/N	Scientific Name	Family	Common Name	Local Name	Part Used	Use
1	*Hekistocarpa minutiflora*	Rubiaceae	Tiny false daisy	kálákumú	Leaves, stem, and root	Treats fever and skin conditions.
2	*Paspalum conjugatum*	Poaceae	Buffalo grass	bérísónléí	Leaves	Treats pulmonary disease, fever, dysentery,.
3	*Talium triangulare*	Portulaceae	Water leaf	Toonkabein	Leaves	Used as vegetable for soups and stews
4	*Portulaca oleracea Linn*	Portulaceae	Purslane	obóríí mèé léí	Stem and leaves	Treats stomach ulcer, fever, insomnia, used treat infertility of women
5	*Nauclea vandergudii*	Rubiaceae	African Peach	Epe	Fruit, stem and leaves	Reduces pain, treats malaria, sexual dysfunctions,
6	*Cyathula prostrata*	Amaranthaceae	Pasture weed	obóríkórí ghá	Leaves	Used for treating minor wounds
7	*Glyphaea brevis*	Tiliaceae	Masquarade	itóló, itóló	Stems and	Hastens

			stick	gbasa	leaves	childbirth, improves constipation, also used as chewing stick.
8	*Pennisetum purpureum*	Poaceae	Elephant grass	Usii	Leaves and stems	Used to relief abdominal pains, treats fever and diabetes.
9	*Pistia stratiotes*	Araceae	Water lettuce	ekéréku, ekérégu	Leaves	Treats pile, ulcer, ringworm infections.
10	*Ocimum gratissimum*	Lamiaceae	Scent leaf	fúrúkáná	Leaves	Used as a spice for food, treats convulsions, whooping cough, headache., stops dysentery and vomiting
11	*Vernonia amygdalina*	Asteraceae	Bitter leaf	Kiriologbo	Leaves	Leaves are used to treat malaria, diarrhea, dysentery, Reduces inflammation, treats skin conditions e.g. eczema, acne, used for wound healing
12	*Corchorus olitorius*	Tiliaceae	White Jute	Ikirnerinirin	Leaves	Used as vegetable, Used to relieve menstrual cramps and constipation, treat gastrointestinal disorders, wounds, skin infections, reduce pain.
13	*Euphorbiahirta*	Euphorbiaceae	Snake weed	Obirima, indóú béní dírí	Leaves	Used to treat asthma, skin conditions, wounds, snake bites, diarrhea, fever, menstrual cramps. Breast-milk medicine
14	*Millettiaaboensis*	Fabaceae		Ofóní-tí bí - ghóbíé nghá	Leaves, bark, roots, seeds, stem	Treats fever, relieves pain and inflammation, aids digestion and worm infections.
15	*Rinoreabieviracemo*	Violaceae	Shiny leaf	Awaa	Leaves,	Treats wounds,

					roots and stem	skin infections, relieves pain, diarrhea, fevers
	sa					
16	*Anthocleistavogelii*	Loganiaceae	Cabbage tree	Osúo	Leaves and bark	Fever reduction, pain relief, diarrhea, treat wounds, antihistamine
17	*Setariamegaphylla*	Poaceae	Horse grass	akáráká	Leaves, roots and whole plant	Fever reduction, pain relief during childbirth , diarrhea
18	*Kyllingaereta*	Cyperaceae	Short leaf spikesege	angi	Whole plant	Malaria, diarrhea, inflammation, wound healing, UTI treatment, reliefs pain during childbirth, treat postpartum fever.
19	*Mallotusoppositifolius*	Euphorbiaceae	Lantern tree	fúrú í páí n	Leaves	Boosts fertility, regulates blood pressure, treated diabetes, pain relief, treats ringworm, toes & finger infections
20	*Sparganophorussparganophora*	Asteraceae	-	kírí-kurọmọ-ní -ị-kọrí, boukriologbo	Leaves	Soften womb, treat anemia arthritis & skin infections
21	*Solanumamericanum*	Solanaceae	-	Duwei-ikpikpi	Fruits and leaves	Used for treating digestive issues
22	*Solanumdasyphyllum*	Solanaceae	-	dụwéí í sụsú	Fruits and leaves	Used in soups and traditional remedies
23	*Momordicacissoides*	Cucurbitaceae	Bitter gourd	béínmọ́	Fruits	Used for treating diabetes and digestive problems
24	*Musaparadisiaca* var.*sapientum*	Musaceae	Banana	oyobá	Fruit	Consumed fresh, used for energy
25	*TreculiaAfricana*	Moraceae	Bush beans	Uyán	Seeds	Consumed as food, used for protein
26	*Caricapapaya*	Caricaceae		beké undu, popo	Fruit	Consumed fresh, used for digestion and skin health
27	*Ananascomosus*	Bromeliaceae	Pineapple	Painale	Fruit	Consumed fresh, used for digestive health
28	*Arachishypogaea*	Fabaceae	Groundnut	Apapa	Seeds	Consumed as food, used for energy

30	*Ipomoeabatatas*	Convolvulaceae	Sweet potato	Kukuinduku	Tubers	Eaten cooked, used for energy
31	*Elaeisguineensis*	Arecaecae	Palm tree	Laii	Fruit and oil	Used for food and oil production
32	*Citrusaurantiifolia*	Rubiaceae	Lime	Ongu	Fruit	Used in cooking and for digestive health
33	*Cocosnucifera*	Arecaecae	Coconut	Okokodia	Fruit and oil	Used for food and oil production
34	*Mangiferaindica*	Anacardiaceae	Mango	Ogboin	Fruit	Consumed fresh, used for various health benefits
35	*Sacoglottisgabonensis*	Sapotaceae	Palm wine	Tálá	Sap	Consumed as a beverage, used in traditional rituals
36	*Nephrolepisbiserrata*	Oleandraceae	Fern	Pere-imemereke	Leaves	Used for ornamental purposes
37	*Musaparadisiacal*	Musaceae	Plantain	Biribaac	Fruit	Consumed as food, used for energy
38	*Ageratumconyzoides*	Asteraceae	Goat weed	Furutwo	Leaves	Used as antidote to charm or poison Cures goitre and tumour. For divination for
39	*Acanthusmontanus*	Acanthaceae	False thistle	ẹdụlẹ imémein	Leaves	Used for treating liver issues
40	*Chromolaenaodorata*	Asteraceae	Siam	fúrú túá/sei tuá, ininikagha	Leaves	Used in traditional medicine
41	*Hyptislanceolata*	Lamiaceae		Amaseediri	Leaves	Used in traditional medicine
42	*Hexalobuscrispiflorus*	Annonaceae		tawáín	Leaves	Used for medicinal purposes
43	*Marantochloaleucantha*	Marantaceae		abélébéí	Leaves	Used to wrap food
44	*Symphoniaglobulifera*	Olacaceae		Agbalala, ọkọlọ lọ,	Fruit and leaves	Sap used for gum
45	*Piptadeniastrumafricanum*	Fabaceae		Apaupau	Fruit and seeds	Used for flavoring
46	*Dennettiatripetala*	Annonaceae	Pepper-fruit	Ulumaá	Fruit	Fruit eaten
47	*Monodoramyristica*	Annonaceae	African Nutmeg	Árígó	Seeds	Spice for soups, used with other spices to treat broken leg or dislocation
48	*Xylopiaaethiopica*	Annonaceae	Ethiopian Pepper	ẹngé	Fruit and seeds	Spice. Medicine for cough and sore throat
49	*Aframomummelegueta*	Zingiberaceae	Alligator pepper	fíí sání	Seeds	Food, rituals

4. DISCUSSION

The findings in the study indicated that a significant majority of respondents (80%) affirmed the presence of specific nutraceutical plants commonly used in Kolokuma Local Government Area. About 66.67% of respondents confirmed that the uses of these plants were recorded in local oral traditions, while 40% recognized a specific authority responsible for formal documentation. A significant number of respondents (53.33%) felt that the documented uses were inaccessible to new generations, highlighting the need for improved knowledge transfer. This reflected a substantial awareness of nutraceutical plants but also revealed gaps in knowledge transmission and underscored the need for better documentation and accessibility. Berkes [8] posited that the lack of formal documentation could hinder the transmission of traditional knowledge. Furthermore, 86.67% of respondents affirmed the existence of traditional knowledge regarding the preparation of identified nutraceutical plants and their known nutritional benefits, thereby highlighting their recognized value. However, only 60% indicated knowledge about correct dosage or preparation methods, which corroborated the observations by Vandebroek et al. [9] regarding gaps in the formalization of traditional medicine. The overall mean percentage of affirmative responses on the recognition and use of specific rituals or ceremonies, as well as community guidelines for sustainable harvesting, was 68.13%, indicating a generally high level of traditional knowledge and practices, and emphasizing the need for enhanced guidelines to ensure long-term resource management. A majority of the respondents (73.33%) supported the integration of these plants into modern healthcare practices, although 60.00% acknowledged existing modern applications in nutrition. This suggested a positive outlook toward their potential inclusion and the development of practical applications.

5. CONCLUSION

The study investigated the utilization of nutraceutical plants by communities in Kolokuma Local Government Area Bayelsa State with a focus on documenting these plants, their associated traditional knowledge and practices, as well their potential integration into modern healthcare and nutrition. A total of 49 plant species from 29 families were recorded. High local knowledge and use of the nutraceutical plants was indicated, though there were inconsistencies in documentation methods. Also, revealed was a strong support and positive outlook on their potential inclusion into modern healthcare practices. The formalization of knowledge, especially pertaining to correct dosages, and the need for sustainable harvesting practices and further development is recommended.

Conflict of Interest
The Author declares no conflict of interest

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