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AWARENESS AND ADOPTION OF SOME COMMON FRUIT TREES FOR MEDICINAL PURPOSES AMONG RURAL FARMERS IN DELTA STATE, NIGERIA

Felix Uwazili Nweke [1], Raymond Chukwuka Onyemekonwu [2*], Friday Akasiri Ehiwario [3], Clifford Umeri [4] and Ufuoma Peace Egbe [5]

[1]Department of Crop Science, Dennis Osadebay University, Asaba, Nigeria
[2]Department of Agricultural Extension and Rural Development, Dennis Osadebay University, Asaba, Nigeria
[3]Department of Crop Science, University of Delta, Agbor, Nigeria.
[4]Department of Agronomy and Wildlife, Delta State, University, Abraka, Nigeria

Corresponding author: chukwukaraymond@gmail.com; raymond.onyemekonwu@dou.edu.ng

ABSTRACT

The Awareness and adoption of some common fruit trees for medicinal purposes among rural farmers in Delta State, Nigeria, were examined. Questionnaires were used to gather information from one hundred and fifty (150) respondents through a multi-state sampling procedure. Data were analyzed using frequency, percentage, mean, and Logit regression. The result showed that the respondents were mature (average age = 36 years), male (65%), married (70.7%), educated (95.3% had formal education), and had a mean household size of 5 persons. Twenty common fruit trees were identified in the area. The awareness index of 0.7693 indicated that 76.93% of respondents had a high level of awareness of fruit trees, while 31.20% used them for medicinal purposes. The respondent's age, gender, marital status, level of formal education, and cosmopolitanism significantly influence the adoption of fruit tree products for medicinal purposes. Inadequate knowledge (52.0%) was the major problem associated with the use of fruit trees for medicinal purposes. It was concluded that the common fruit trees in the area have several medicinal uses and show potential for further development into pharmaceuticals, as respondents are highly aware of their medicinal value. Hence, bioactive components of indigenous fruit trees need to be studied to support current therapeutic claims and to develop them into pharmaceutical drugs.

Keywords: Adoption, Awareness, Utilization, Medicinal uses, Fruit trees, Rural Farmers, Constraints.

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1. INTRODUCTION

The use of plants and plant products for diverse medicinal purposes by humans has long been a practice (Siddique et al., 2022). Reports have shown that some plants contain therapeutic substances useful for drug production; as such, they are called medicinal plants (Marrelli, 2021; Chaachoury & Zidane, 2024). Medicinal plants are plants that contain useful substances in any of their body parts that are used for therapeutic reasons or whose products are used for drug production (Bem et al., 2021; Bagheri et al., 2024; Karabacak et al., 2025; Ullah et al., 2025; Merdana et al., 2025). Reports indicate that medicinal plants contribute significantly to the livelihoods of rural residents in Africa (Daliar et al., 2025).

Many rural dwellers in Africa, and Nigeria in particular, still depend on plants and plant byproducts to treat various ailments (Okaiyeto & Oguntibeju, 2021). Traditional medicine is widely accepted among residents of developing countries, partly because conventional medicine is inaccessible (Sifuna, 2022; Sapsuha et al., 2025). However, major factors contributing to the use of traditional medicine are its closeness to people's culture and its availability. Reports indicate that about 80% of residents in developing countries rely on traditional medicine (primarily plant products) as a primary source of healthcare (Chali et al., 2021).

Indigenous fruits are rich in nutrients, antioxidants, and bioactive phytochemicals, making them useful for indigenous peoples in treating a variety of illnesses (Ullah, 2024; Dutta et al., 2025). Reports have shown that the consumption of indigenous fruits promotes self-help in the management of ill-health among rural residents (Osunu & Nwose, 2021), reduces the risk of contracting communicable disease (WHO, 2023), lowers hypertension risk (Madsen et al., 2023), is useful for the fight against cardiovascular diseases (Zuraini et al., 2023), low risk of most causes of mortality (Devirgiliis et al., 2024)

Although people in the study area practice traditional medicine to a limited extent, there is an urgent need to improve knowledge and raise awareness of the therapies and cures that abound in our rural communities.

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Knowledge is fast vanishing due to a lack of knowledge about the ancient traditional health practitioner's methods (Davis, 2022). A study like this one that aimed at documenting the adoption of some fruit trees for medicinal purposes in Delta State of Nigeria can also open up a door for very paramount pharmaceutical research. Though several ethno-botanical surveys on medicinal plants have been conducted in different parts of the world (Asiimwe et al., 2021; Odebunmi et al., 2022; Dery et al., 2023; Masumbu et al., 2023; Beressa et al., 2024; Bashir et al., 2025) survey focusing on indigenous fruit trees have received less attention in pharmaceutical research. The fact that indigenous fruit trees are used in folk medicine to treat various ailments makes them a potential source of pharmaceuticals. There is thus a great need to understand the medicinal uses of fruit trees available to present and future generations. The general objective of this study is to determine the medicinal purposes of some fruit trees in Delta State, Nigeria.

The specific objectives of the study are to;

i. Examine the socio-economic characteristics of the respondents
ii. Identify the fruit trees in the study area
iii. Determine the extent of awareness of the use of fruit trees for medicinal purposes
iv. Ascertain the types and medicinal purposes of the fruit trees adopted in the study area
v. Determine the influence of respondent's socio-economic characteristics on the adoption of fruit trees for medicinal purposes

Identify the constraints/problems to the adoption of indigenous fruit trees for medicinal purposes in the study area.

2. MATERIALS AND METHODS

2.1. Study area

The cross-sectional survey study was done in Delta State, Nigeria. The rainfall regime of Delta State is humid to sub-humid, with distinct dry and hot seasons, and average rainfall of about 266.5cm in the coastal areas and 190.5cm in the northern areas, with daily temperatures ranging from 29 to 44°C (Nomadseason, 2025). This variation of temperature, especially in the northern upland, favors the growth and development of many fruit trees.

2.2. Sampling procedure

Multi-stage sampling was used for the study. This involved purposively selecting the Delta North Zone in the first stage. The reason is the abundance of fruit trees in the area. The second stage involved purposive selection of three Local Government Areas for their high involvement in traditional medicine practices. At the third stage, three communities were randomly selected from the 15 LGAs. At the fourth and final stage, ten (10) farming household heads were randomly sampled, for a total of 150 respondents.

2.3. Data collection

Data were collected through a questionnaire to understand the medicinal uses or value of fruit trees in the area. The questionnaire was structured in two sections: A and B. Section A dealt with socio-cultural characteristics (name, age, sex, occupation any other relevant information about the respondents) while Section B was sub-divided into four sub-sections that centers on the distribution of fruit trees, utilization of fruit trees for medicinal purposes, adoption of fruit trees for medicinal purposes and the constraint associated with the adoption of fruit trees for medicinal purposes.

2.4. Data Analysis

The data collected were analyzed using descriptive statistics (frequency distribution, tables, percentages and means); while Logit regression was used to test the hypothesis

2.5. Measurement of variables

2.5.1. Identification of fruit trees in the study area: Respondents were asked to identify the common fruit trees in the area, and these were equally noted.

2.5.2. Awareness of the use of fruit trees for medicinal purposes: This was actualized using a 4-point Likert scale of Strongly aware=4, Aware=3, Moderately aware=2, Not aware=1. The cut-off score is 2.50(≥2.50=aware; <2.50=not aware.)

2.5.3. Types and medicinal purposes of the fruit trees adopted: This was actualized using a 5-point Likert scale based on the adoption process, thus: Aware=1, Interest=2, Evaluation=3, Trial=4, Adoption = 5 was used. The adoption index was computed to assess the extent of fruit tree adoption for medicinal purposes. This was computed by first calculating the adoption grand mean (mean of means), and at the second stage, the adoption index was computed by dividing the grand mean by the 5 steps in the adoption table.

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2.5.4. Influence of respondents' socio-economic characteristics on the adoption of fruit trees: This was addressed by the hypothesis. The hypothesis was tested using a multiple regression model. The model is stated as

$Y=f(x_1+ x_2 + x_3 + x_4 + x_5 + x_{6+} x_7 +.....\mu)$

Where Y=adoption of fruit trees as medicines (no of fruits used as medicines)

x_1=Age(years)

X_2=Gender (male=1, female=0)

X_3=Level of formal education (number of years of schooling)

x_4=Religion (Christians=1., otherwise=0)

x_5=Household size (number of persons in a household)

x_6 = Access to forestry extension (number of contacts monthly)

X_7 =Membership of social groups (yes=1, No=0)

μ=Error term.

2. RESULTS AND DISCUSSION

3.1. Socio-Economic Characteristics of Respondents in the Study Area

As shown in Table 1, the respondents in the study area are mostly male (62.0%) and female (38.0%). This suggests that males are more likely to use fruit trees for medicine. This agrees with Awoke et al. (2024), who reported that men (83.3%) were more likely to practice traditional medicine in Guraferda District, Benchi-Sheko zone, Southwest Ethiopia. Their ages are between 20-29 (22.0%), 30-39 (51.3%), 40-49 (20.0%), 50-59 (4.7%), and 60-69 (2.0%). The mean age of the respondents was 35 years. This indicates that most of the respondents are in their active. This might positively impact the adoption of fruit trees for medicinal use in the study area. In a similar study. This result aligns with Negbenebor et al. (2017), who found that most people involved in traditional medicine are adults. The marital status of the respondents revealed that (22.0%) were single, (70.7%) were married, and (7.3%) were divorced. This indicates that most respondents who use fruit as medicine are married. The result is in line with Ibrahim et al. (2025), who reported that 90.8% of persons who used traditional medicine for birth control in Nigeria were married. Educational status of respondents: 2.7% no formal education, 4.7% primary education, 42.0% secondary education, 48.0% tertiary, and 2.7% adult education. Most (97.3) of the respondents who use fruit trees for medicine have no formal education. This justifies their high awareness of the importance of using fruit trees for medicine. In a similar study, Shai et al. (2020) found that 83% of respondents who sourced fruit trees locally for medicinal use had some form of formal education. The respondents have household sizes of 1-5 (44.7%), 6-10 (53.3%), and 11-15 (2.0%), with a mean household size of 5.8. The majority of respondents have a household size of 6 to 10 persons. It is expected that with the high cost of fruit trees, the use of fruit trees as medicine will reduce with the number of persons per household, but this is not the case in this study, where the use of fruit trees as medicine increases with a larger household size. A similar household size was reported by Onyemekonwu et al. (2021), who reported a mean household size of 5.0 for farmers in Delta State.

Table 1: Socio-economic characteristics of respondents in the study area (N=150)

Characteristics	Categories	Frequency	Percentage	Mean
Gender	Male	93	62.0	
	Female	57	38.0	
Age	20-29	33	22.0	
	30-39	77	51.3	
	40-49	30	20.0	
	50-59	7	4.7	35.88
	60-69	3	2.0	
Marital status	Single	33	22.0	
	Married	106	70.7	
	Divorced	11	7.3	
Education	No formal education	7	4.7	
	Primary school	63	42.0	
	Secondary school	72	48.0	
	Tertiary	4	2.7	
	Adult education	4	2.7	
Household size	1-5	67	44.7	
	6-10	80	53.3	5.8
	11-15	3	2.0	

3.2. Common Fruit Trees in the Study Area

Table 2 shows the common fruit trees found in the study area. Twenty fruit trees were identified. They include:

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cashew (*Anacardium occidentale*), pawpaw(*carica papaya*), African star apple (*Chrysophyllum albidum*), grape (*Psidium vinifera*) lime (*Citrus latifolia*), lemon (*Citrus limonium*), orange (*Citrusaurantuin*), coconut (*Cocos nucifera*) kolanut (*Cola acuminate*), Avocado pear (*PerseaAmericana*), oil palm fruit (*Elaeis guineensis*), bitter cola (Garcinia kola), guava (*Psidiumguava*), mango (*Mangnifera indica*), Native Pear (*Dacryodes edulis*), Bush Mango (*Irvingia gabonensis*), Sour Sop (*Annona senegalensis*), Pepper Fruit (*Dannettia tripetala*), Hugplum (*Spondias mombin*), and Indian almond (*Terminalia catappa*). In Nigeria, medicinal fruit trees and plants are considered by several researchers to be an important component of the country's natural wealth due to their diverse medicinal uses (Egharevba & Ikhetua, 2008; Ekanem & Udo, 2009; Ugboko et al., 2020; Rafiu et al., 2025). Rufus (2010) reported that many plant species grow in the Niger Delta and are important in the medical and pharmaceutical industries. The result is consistent with Agbogidi et al. (2022), who reported the presence of various fruit tree varieties in Delta State, Nigeria. In a similar study, Dutta et al. (2025) identified 59 fruit species used for traditional medicinal purposes in the Sikkim Himalayas, India.

Table 2: Common fruit trees in the study area

S/No	Family	Scientific name	Common name
1	*Anacardiaceae*	*Anacardium occidentale*	Cashew
2	*Anacardiaceae*	*Mangnifera indica*	Mango.
3	*Anacardianceae*	*Spondias mombin*	Hug plum
4	*Annonaceae*	*Annona senegalensis*	Sour sop
5	*Annonaceae*	*Dennettia tripetala*	Pepper Fruit
6	*Arecaceae*	*Cocos nucifera*	Coconut
7	*Burreraceae*	*Dacryodes edulis*	Native pear
8	*Caricaceae*	*Carica papaya*	Pawpaw
9	*Combretaceae*	*Terminnalia catappa*	Indian almond
10	*Guttifereae*	*Garcinia kola*	Bitter Kola
11	*Irvingiaceae*	*Irvingia gabonensis*	Bush Mango
12	*Lauraceae*	*Persea Americana*	Avocado pear
13	*Myrtaceae*	*Psidium guajava*	Guava
14	*Palmae*	*Elaeis guineensis*	Oil palm
15	*Rutaceae*	*Citrus paradise*	Grape
16	*Rutaceae*	*Citrus aurantifolia*	Lime
17	*Rutaceae*	*Citrus limon*	Lemon
18	*Rutaceae*	*Citrus sinensis*	Sweet Orange
19	*Sapotaceae*	*Chrysophyllum albidum*	African Star apple
20	*Sterculiaceae*	*Cola acuminate*	Kola nut

3.3. Level of Awareness of the Use of Fruit Trees for Medicinal Purposes in the Study Area

The results in Table 3 indicate that the respondents were highly aware of the medicinal uses of the fruit trees prevalent in their areas, with mean scores≥2.50. The awareness index of 0.7693 indicates that 76.93% of respondents had a high level of awareness of fruit trees. Since they had such awareness, it must have been transmitted to them by their forefathers. Ofuoku (2010) states that knowledge of the biological environment and its usefulness to humans is often transmitted to children by their forefathers and mothers, orally and practically. In a similar study, Zaidi et al. (2022) reported high levels of knowledge and awareness of herbal medicine in Western Saudi Arabia.

3.4. Traditionally Claimed Medicinal Purposes of the Indigenous Fruit Trees in the Study Area

Table 4 presents the types, parts, medicinal purposes, and methods of preparation of medicinal fruits found in the study area. These include: boiling of cashew (*Anacardium occidentale*) fruits and leaves for the treatment of malaria fever, boiling of unripe papaw (*carica papaya*) fruit and leaves for the treatment of malaria fever, boiling of grape (*Psidium vinifera*) fruit and leaves for the treatment of malaria, boiling and squeezing lime of (*Citrus latifolia*) fruit and leaves for the treatment of fever, boiling leaves and squeezing of fruit of lemon (*Citrus limonium*) for the control of fever, boiling of orange(*Citrus aurantuin*) fruit, leaves and seed for the control of malaria, drinking of coconut (*Cocos nucifera*) water for the control of dysentery, boiling of kolanut (*Colaa cuminate*) leaves for the control of cough and boiling of pear (*Persea Americana*) leaves to control fever. Others include squeezing of oil palm fruit (*Elaeis guineensis*) fruit to control poison, chewing of bitter cola (*Garcinia kola*) dry fruit to control cough, boiling of guava leaves (*Psidium guava*) to control dysentery, boil of the leaf and bark mango (*Mangnifera indica*) to control fever and cough and boil the leaves of pepper fruit for the control of fever. This result suggests that the farming household had developed several methods for preparing fruit trees to treat diverse forms of illness. The result aligns with the findings of Ani et al. (2024), who note that squeezing and boiling are among the methods

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used to prepare indigenous traditional medicine in Imo State, Nigeria. The study further agrees with Oyedeji-Amusa et al. (2024) that the fruits, stems, and leaves of medicinal plants are used for medicinal purposes in Nigeria.

Table 3: Level of awareness of the use of fruit trees for medicinal purposes in the study area

Name of fruit tree	Strongly Aware aware=4	Moderately =3	NotScore aware=2	aware=1	Mean	
Cashew (Anacardium occidentale)	30(120)	82(246)	38(76)	-	442	2.95
Mango (Mangnifera indica)	50(200)	60(180)	40(80)	-	460	3.07
Hug plum(Spondias mombin)	22(88)	121(363)	7(14)	-	465	3.1
Sour sop (Annona senegalensis)	20(80)	120(360)	10(20)	-	460	3.07
Pepper fruit (Dennettia tripetala)	35(140)	75(225)	35(70)	5(5)	440	2.93
Coconut (Cocos nucifera)	25(100)	120(360)	5(10)	-	470	3.13
Native pear (Dacryodes edulis)	45(180)	100(300)	5(10)	-	490	3.27
Pawpaw(Carica papaya)	80(320)	30(90)	40(80)	-	490	3.27
India almond (Terminnalia catappa)	40(160)	70(210)	35(70)	5(5)	445	2.97
Bitter kola (Garcinia kola)	80(320)	30(90)	40(80)	-	490	3.27
Bush mango(Irvingia gabonensis)	30(120)	80(240)	40(80)	-	440	2.93
Avocado pear (Persea Americana)	40(160)	90(270)	20(40)	-	470	3.13
Guava (Psidium guajava)	90(360)	40(120)	20(40)	-	520	3.47
Oil palm (Elaeis guineensis)	20(80)	120(360)	10(20)	-	460	3.07
Grape(Citrus paradise)	30(120)	80(240)	40(80)	-	440	2.93
Lime(Citrus aurantifolia)	20(80)	100(300)	28(56)	2(2)	438	2.92
Lemon(Citrus limon)	22(88)	98(294)	30(60)	-	442	2.95
Sweet orange (Citrus sinensis)	20(80)	120(360)	10(20)	-	460	3.07
African star apple (Chrysophyllum albidum)	40(160)	70(210)	35(70)	5(5)	445	2.97
Kolanut (Cola acuminate)	50(200)	60(180)	40(80)		460	3.07
						61.34

Grand awareness mean=3.077; Awareness index=0.7693(76.93%); Values in parenthesis=awareness scores.

Table 4: Traditionally claimed medicinal purposes of indigenous fruit trees in the study area

S/No	Tree Species	Parts used	Medicinal purposes	Method of preparation
1	Cashew	Leaf, fruits	Fever, malaria	Boil the leaf
2	Pawpaw	Leaf, unripe fruit	Fever, malaria	Boil the leaf and fruit
3	Grape	Leaf, fruits	Malaria	Boil the leaves and fruits
4	Lime	Leaf, fruits	Fever	Boil the leaf, squeeze the fruits
5	Lemon	Leaf, fruits	Fever	Boil the leaf, squeeze the fruits
6	Orange	Leaf, seed, fruits	Malaria	Boil the leaf, seed, and fruit
7	Coconut	Fruit	Dysentery	Coconut water
8	Kola nut	Leaf, fruits	Cough	Boil the leaf
9	Pear	Bark	Fever	Boil the leaf
10	Oil palm	Fruit	Poison	Squeeze the fruits
11	Bitter cola	Fruit	Cough	Dry the fruit
12	Guava	Leaf	Fever, dysentery	Boil the leaf
13	Mango	Leaf, bark	Fever, cough	Boil the leaf and bark
14	Sour sop	Leaf	Malaria	Boil the leaf
15	Pepper fruit	Seed, bark	Dysentery	Dry the seed
16	Hug plum	Bark, leaf	Cough, fever	Boil the leaf
17	Bush mango	Leaf	Cough	Boil the leaf
18	Native pear	Bark, leaf	Spleen infection	Dry the leaf
19	Indian almond	Bark, kernel	Ulcer, gonorrhea	Chewed, boiling
20	African star apple	Bark	Stomach ache	Boil the bark

3.5. Adoption of Fruit trees for Medicinal Purposes in the Study area

The results in Table 5 show that none of the means exceeded 3.00. They were all <3.0, while the mean adoption rate was 0.312, indicating that 31.20% of respondents adopted fruit trees for medicinal purposes. Awareness of the medicinal uses of these fruit trees is high, but adoption is low. Given the high level of awareness, adoption is expected to be high. However, this situation is due to a lack of knowledge about the appropriate doses of fruit tree parts for medicinal use. As some of them said during the narratives, “We do not use them to treat ailments often because we do not know the dosage to take at a time".

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Table 5: Adoption of Fruit trees for Medicinal Purposes in the Study area

Name of fruit tree	Awareness	Interest	Evaluation	Trial Adoption		Score	Mean
		1	2	3		4	5
Cashew (Anacardium occidentale)	75(75)	30(60)	30(90)	5(20)	10(50)	295	1.97
Mango (Mangnifera indica)	95(95)	25(50)	12(36)	15(60)	3(15)	256	1.71
Hug plum (Spondias mombin)	90(90)	25(50)	20(60)	8(32)	7(35)	267	1.78
Sour sop (Annona senegalensis)	97(97)	35(70)	5(15)	10(40)	3(15)	237	1.58
Pepper fruit(Dennettia tripetala)	130(130)	15(30)	-	5(20)	-	180	1.20
Coconut (Cocos nucifera)	97(97)	35(70)	5(15)	10(40)	3(15)	237	1.58
Native pear (Dacrodes edulis)	120(120)	10(20)	10(30)	7(28)	3(15)	213	1.42
Pawpaw (Carica papaya)	90(90)	25(50)	20(60)	8(32)	7(35)	267	1.78
India almond(Terminnalia catappa)	75(75)	30(60)	30(90)	5(20)	10(50)	295	1.97
Bitter kola (Garcinia kola)	100(100)	15(30)	15(45)	15(60)	5(25)	260	1.73
Bush mango (Irvingia gabonensis)	85(85)	20(40)	10(30)	20(80)	15(75)	310	2.07
Avocado pear(Persea Americana)	143(143)	3(6)	-	3(12)	1(5)	166	1.11
Guava (Psidium guajava)	140(140)	10(20)	-	-	-	160	1.07
Oil palm (Elaeis guineensis)	100(100)	20(40)	20(60)	8(32)	2(10)	242	1.61
Grape (Citrus paradise)	120(120)	10(20)	10(30)	7(28)	3(15)	213	1.42
Lime(Citrus aurantifolia)	131(131)	0(20)	4(12)	5(20)	-	183	1.09
Lemon (Citrus limon)	85(85)	20(40)	10(30)	20(80)	15(75)	310	2.07
Sweet orange (Citrus sinensis)	140(140)	10(20)	-	-	-	160	1.07
African star apple (Chrysophyllum albidum)	100(100)	15(30)	15(45)	15(60)	5(25)	260	1.73
Kolanut(Cola acuminate)	131(131)	10(20)	4(12)	5(20)	-	183	1.22
							31.18

Grand adoption mean= 1.56; Adoption index=0.312(31.20%); Values in parenthesis = number of responses of the various stages.

3.6. Logistic Regression on Socio-Economic Characteristics that Influence the Adoption of Fruit Trees for Medicinal Purposes in the Study Area

Table 6 indicates that age, gender, marital status, level of formal education, occupation, and cosmos politeness significantly influence the adoption of fruit tree products for medicinal purposes. The respondent's age (X1) had a negative, statistically significant effect (P=0.050). It means the younger ones are more likely to use fruit tree parts for medicinal purposes than the older ones. This is attributed to the lack of knowledge about the dosage of the fruit tea-based medicine; older people, being risk-averse, are discouraged from using it. The younger ones who like taking risks are more disposed to using them for medicinal purposes. Apata and Shitu (2012) suggest that age is one of the socioeconomic variables that influence the behavior of rural dwellers. A previous study (Onyemekonwu et al., 2021) has established a relationship between age and adoption

Gender (X_2) had a negative and significant influence on the use of fruit tree parts for medicinal purposes (P = 0.001). This implies that women are more likely to use these tree parts for medicinal purposes. This points to the fact that women are more involved in gathering plants for various purposes. This confirms Howard (2001) assertion that, worldwide, women predominate as wild plant gatherers, home gardeners, plant domesticators, herbalists, and seed custodians.

Marital Status (X_3) has a positive and significant influence on the use of fruit tree parts for medicines (P=0.034). This is indicative of the fact that married people are more likely to use or adopt fruit tree parts as medicines. Marriage means added responsibilities to cater for the welfare of household members by household heads. Given the current economic situation, married individuals who are taking care of their family's health needs are more likely to seek fruit tree parts at little or no cost than to spend a lot of money on Western medicines. This is consistent with Ajani's (2008) observation.

The level of formal education (X_4) of rural household heads negatively and significantly influences their use of traditional medicines (P=0.035). This suggests that the less formally educated are more likely to use parts of fruit trees as medicine. Most people with little or no formal education live in rural areas and are closer to these plants. In a study, Abraham et al. (2024) reported that average fruit consumption was higher in rural areas than in urban areas. This is probably because they easily have access to these fruits. From observations, the reasonably well-educated do not so much believe in traditional medicines as in Western medicines. This is a pointer to the fact that formal education has led them to stop depending on herbal medicines, especially since these have no standard dosage.

Cosmopolitanism (X6) among respondents has a negative, significant influence on their decision to use herbal medicines (P = 0.023). This indicates that less cosmopolitan people are more likely to use parts of fruit trees for medicinal purposes. This set of people are rural dwellers and are known to be tradition-bound. Being tradition-

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bound, they depend more on the plant parts for medicinal purposes. Rural dwellers, mostly farmers, are tradition-bound and closer to nature. This set of people is closer to nature and appreciates it more than those who are highly cosmopolitan. Being close to nature, they have easy access to cultivated and naturally growing fruit trees (Kimbrough, 2025).

Table 6: Logit estimation of the influence of Socio-economic Characteristics and adoption of fruit trees for medicinal purposes in the Study Area

Variable	Coefficients (β)	S.B	Wald	Level of significance
Age(X_1)	-19.860	111363.125	3.953	0.050
Gender (X_2)	0.128	0.158	12.876	0.001**
Marital status (X_3)	0.617	1.470	5.147	0.034*
Educational level (X_4)	-0.034	0.161	5.130	0.035*
Cosmopoliteness (X_6)	-0.079	0.120	3.677	0.023*
Constant	19.126	11399.399	0.000	0.999

**= Significant at 0.01, *= significant at 0.05 level.

3.7. Problems Associated with the Adoption of Fruit Trees for Medicinal Purposes in the Study Area

The constraints/problems associated with the adoption of fruit trees for medicinal purposes in the study area include safety concerns, modernization, required medication dosages, and limited knowledge. According to Table 7, respondents identify inadequate knowledge (52.0%) as the major problem associated with using fruit trees for medicine. Other problems associated with the adoption of fruit trees for medicinal purposes include dosage (20.7%), modernization and safety (12.0%), and the cost of preparation (3.3%). This implies that most respondents lack adequate knowledge of how to use and care for the fruit trees used for medicinal purposes in the study area. This result agrees with Omotayo and Aremu (2020), who reported a lack of knowledge and coordinated basic information on the nutritional and biochemical composition of fruit trees.

Table 7: Problems Associated with the Adoption of Fruit Trees for Medicinal Purposes in the Study Area

Problems	Frequency	Percentage
Safety	18	12.0
Modernization	18	12.0
Dosage	31	20.7
Inadequate knowledge	78	52.0
Cost of preparation	5	3.3

4. CONCLUSION

The findings represented here indicate that indigenous fruit trees in Delta State, Nigeria, have several medicinal purposes with potential for further development into pharmaceutical drugs. The respondents are highly aware of the use of fruit trees as medicine. The major problem with adopting fruit trees for medicinal purposes is inadequate knowledge.

Recommendation

From the result of this study, it was recommended that;

(i) The government and research institute should organize a seminar to further improve the knowledge of fruit trees in the study area

(ii) Land owners should be encouraged to plant fruit trees as home gardens around their homes, as they play a vital role in family health.

(iii) Bioactive components need to be studied on the indigenous fruit trees in order to justify the current therapeutic claims about the indigenous fruit trees and to develop them into pharmaceutical drugs.

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