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Assessment of people's perception on implications of charcoal production on medicinal plants and environment in Fakai Local Government, Kebbi State, Nigeria

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Abstract
Traditional medicine has been used since time immemorial and plays a crucial role in the health care needs of the people. The study assessed people's perception of the implication of charcoal production on medicinal plants and the environment in the Fakai local government area of Kebbi state. Questionnaires, Focus Group Discussions, and in-depth interviews were purposely adopted, where 100 samples were randomly selected and 82 questionnaires were returned and 3 different sessions of FGD were conducted among the charcoal producers and community members in Birnin Tudu and Bajida District with 8 participants each. An interview was conducted with the Village heads, Farmers, Traditional healers, and Charcoal producers. Data collected was tabulated using frequency counts, percentages, and charts, and information obtained from FGD was transcribed in the narrative format. The findings revealed that traditional medicine is widely accepted in the study community and has proven effective in treating some ailments. It also showed that the impacts of charcoal production are evident in the community where numerous plants are depleted and the environment is being deteriorated which affects both traditional medicinal usage and the environment. It further revealed that only a few people in the study community have little knowledge of the impacts posed by it. It is therefore recommended that alternative energy sources should be provided to reduce over-dependence on forest resources. There is also a need for aggressive awareness of the effect of charcoal production on the environment. Finally, trees should be planted through afforestation, and reforestation and ensure the maximum protection to it.

Keywords: Ailment, charcoal, deforestation, environment, medicinal, perception

Introduction

The relationship between plants and human beings has been from time immemorial. All through history, human dependence on plants for food, clothing, shelter, medicine, ornament, horticulture, furniture, wind-breaking, organic manure, soil stability, dyes, pesticides, gums, warmth, religious sacrifices, and food for other animals among others cannot be jettisoned. Some ecological services supplied by plants include providing support for energy flow and chemical recycling, air and water purification, soil erosion prevention, influencing local and regional climates, serving as a carbon sink, air balances, and providing habitats for other organisms (Miller, G. Tyler, *et al.,* 2013) [6].

Traditional medicine is the use of resources in diverse ways by a group of people influenced by their culture in seeking and maintaining good health care (WHO, 2014) [7]. There are two major forms of Traditional Medicine and these are the medical therapies and non-medical therapies (WHO, 2014) [7]. Medical therapies usually involve the use of herbal medicines, animal parts, and minerals. Non-medical therapies, on the other hand, include the use of manual and spiritual therapies (WHO, 2014) [7]. Traditional medicine is often referred to as "complementary", "alternative" or "non-conventional" medicine. (WHO, 2014) [7].

Plants and plant parts are frequently used due to their medicinal properties, flavor, or fragrance. The application of herbal medicines in the treatment/management of several diseases is as old as mankind. Nevertheless, the majority of the world's population solely depends on herbal medicines for the treatment and/or management of health-related issues. The use of herbal medicines in the future years appears to be in doubt, even though statistics have unveiled the wide acceptance of them (Chinedu *et al.,* 2017) [3].

Charcoal production hastens desertification by reducing the quantity of land available for cultivation or grazing, as well as driving inhabitants out of regions that have become uninhabitable after charcoal producers have cut down all the trees, and in urbanization, people can intentionally cut down trees for habitation, and desertification is accelerated (Adeniji *et al.,* 2015) [2].

These effects may not be visible now but may manifest themselves later in the form of environmental degradation such as flooding, soil erosion, destruction of wildlife habitat, and decrease in plant and animal diversity in the area. Against this backdrop, this study will assess the people's perception of the implications of charcoal production on traditional medicinal plants used and the environment in Fakai local government Kebbi State, Nigeria.

Material and methods

The study area

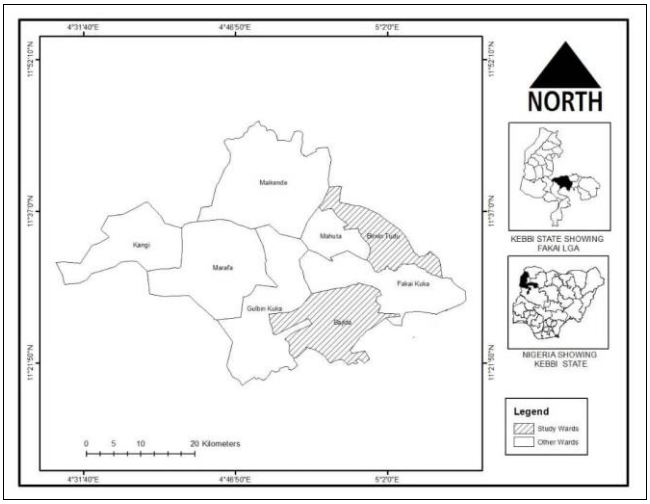
Fakai Local Government has a total land area of 2,247km2 and it is geographically located in the South-Eastern part of Kebbi State, between longitudes 4°30'E and 5°10'E of the prime meridian and latitudes 11°10'N and 11°40'N of the equator. It shares boundaries with Zuru and Danko Local Governments to the East, Koko and Shanga Local Governments to the West, while Kebbe Local Government Area of Sokoto State to the North, and the Rijau Local Government of Niger State to the South. Fakai has a population of about 121,212 in the 2006 census (National Population Commission, 2006). (KBSG, 2008).

Rainfall in the area lasts for about four to five months annually, mostly from May until October with the heaviest rainfall in August (Abubakar *et al.,* 2020) [1]. The length of the rainy season as well as the amount of rainfall are noted

to decrease, northwards from the southern part of Kebbi State. The soils are subject to stripping by erosion as a result of topographic characteristics typical of the area. Soil is rich in nutrients, making it suitable for agriculture (KBSG, 2008) [4].

The vegetation is Sudan savanna, consisting of an almost continuous grass cover of not less than one meter in height (Udu, 1991) [9], with abundant shrubs compared to the northern part of Kebbi State which has less vegetation cover. Trees appear green in the rainy season but shed their leaves in the dry season. While grasses turn brown, both the grasses and trees have many ways of adapting themselves to the environment. Examples of such trees are *Lannea acida, Dichrostachys cinera, Pilostigma reticulatum, Butyrospermum paradox, Diospyros mespiliformis, Daniella oliveri, Khaya senegalensis, Acacia senegalensis, Parkia biglobosa, Vitellaria paradoxa, Adansonia digitata and Balanites aegyptiaca* etc. (KBSG, 2008).

The major economic activities in Birnin Tudu and Bajida are farming and rearing of animals. The people of these communities are often referred to as "passionately devoted to soil and crop" farmers.



Source: Cartography lab department of geography buk (2024)

Fig 1: The map of Fakai Local government showing study areas.

Data collection and analysis

This research is a field survey that involved Questionnaire Administration, In-Depth Interviews, and Focus Group Discussion. The preliminary fieldwork of this research found out that the Fakai local government area constitutes four districts but only Birnin Tudu and Bajida were selected for this study. The sampling was drawn from the selected districts of the study. A total of hundred respondents was drawn, fifty from each district. A questionnaire was administered to 100 respondents in the study area and 82 were returned. The purposive sampling technique has been used in selecting the respondents. FGD was conducted among the charcoal Producers and community members. An interview was conducted with the Village heads, Farmers, Traditional healers, and Charcoal producers. They have provided adequate knowledge of their environment and detailed information on the effect of deforestation on traditionally used plants and also validated the information acquired from the use of a questionnaire.

The information generated using a questionnaire was tabulated and descriptive statistic such as frequency counts, and percentages was used to analyze variables of interest. The information gathered through interviews and FGD was transcribed in narrative format.

Results and discussion

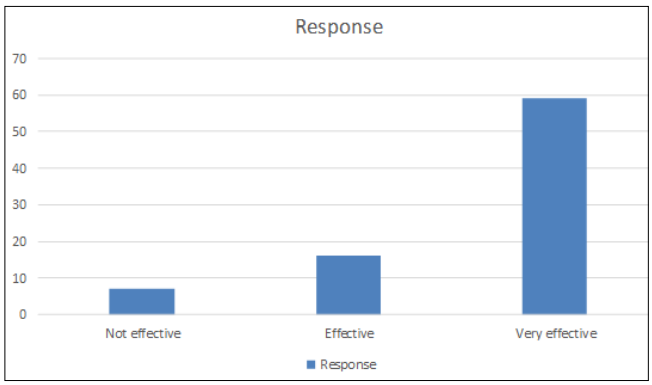


Fig 2: Effectiveness of traditional medicine

The chart indicates that only 7 respondents (8.6%) responded that traditional medicine is not effective in the treatment of some illnesses, 16 (19.5%) answered that it is effective while 59 (71.9%) said that it is very effective.

Table 1: Ailment to treat with the Traditional Medicine other than the Modern Medicine

Ailment	Plant Name
Malaria fever, Typhoid fever, Ulcer, Headache, convulsion	Guava, lemon, pawpaw, mango, *Cassia occidentalis, Gawo, Burji, Marike, Tulare*
Pile, dysentery, diarrhea, stomach ache, Fever	Mahogany, Neem tree, bitter leaf
Skin diseases, post-natal birth, cancer	*Guiera senegalensis, Tamarindus indica, Ziziphus abyssinica*
Menstrual disorder, miscarriage	*Leptadania hastata (yadiya), Cochlospermum planchorii (Rawaya)*
Charms/magic	*Tamarindus indica, Adansonia digitata, Dalbergia saxatilis, Fiscus polita spp.,*
Convulsion	*Securidaca longipedunculata, Mitragyna inermis, Parkia clappertonianna, Celtis integrifolia*
Snakebite	*Kukuki, Bombax ceiba, Moringa oleifera, Buchanania lanzan, Acorus calamus.*
Yellow fever	*Opilia celtidifolia,,, Balanites aegyptiaca*

Source: Fieldwork, 2024

The above table indicates that most of the respondents still believed that traditional medicine is the best in the treatment of some ailments. They claimed that certain ailments can only be arrested/curable with the use of traditional medicine while some are used as first aid before going to the hospital.

Table 2: Conditions that warrant the use of Traditional Medicine

S/N	Variable	Response	Percentage
1	If it is recommended by a medical doctor	6	7.3%
2	If you don't have any other option	11	13.4%
3	If you cannot afford medical drugs	14	17.1%
4	If you believe it is the best therapy	51	62.2%
Total		**82**	**100%**

Source: Fieldwork, 2024

The above table indicates that 51 respondents representing 62.2% believed that traditional medicine is the best therapy in the treatment of some ailments, and only 6 respondents representing 7.3% asserted that it is only when it is recommended by a doctor. 14 respondents representing 17.1% said that they can only use traditional medicine when they cannot afford medical drugs while 11 respondents (13.4%) claimed that they can use traditional medicine if they don't have any other option.

Table 3: Factors influencing the use of Traditional Medicine

S/N	Variable	Response	Percentage
1	From family	52	63.4%
2	From doctor	5	6.1
3	From radio	4	4.9%
4	From native doctor/herbalist	21	25.6%
	Total	**82**	**100%**

Source: Fieldwork, 2024

From the table above, a family has 52 (63.4%) mostly influenced by the use of traditional medicine by their members, doctor 5 (6.1%), radio 4 (4.9%), and native doctor/herbalist 21 (25.6%) influence.

Table 4: Side Effects Experienced while using Traditional Medicine

S/N	Variable	Response	Percentage
1	Vomiting	7	8.54%
2	Dizziness	9	10.97%
3	Headache	16	19.5%
4	Diarrhea	5	6.1%
5	Rashes	4	4.9%
6	Stomachache	30	36.6%
7	Other	11	13.4%
	Total	82	100%

Source: Fieldwork, 2024

It **is** indicated in the table above that most traditional medicine have their side effects same as it is experienced in some modern drugs. The side effects depend on the plants used and the ailment treated. Stomachache has the highest responses of 30 (36.6%) which is a result of intake of most of the traditional medicine and its reaction in the stomach. Vomiting has 7 (8.54%), Dizziness 9 (10.97%), Headache 16 (19.5%), Diarrhea 5 (6.1%), Rashes 4 (4.9%), while others have 11 (13.4%).

Table 5: Side Effects of the Medical Drugs Prescribed by Your Medical Doctor

S/N	Variable	Response	Percentage
1	Yes	27	32.9%
2	No	55	67.1%
	Total	**82**	**100%**

Source: Fieldwork, 2024

The table above presents that 55 (67.1%) believed that medical drugs don't have side effects while 27 (32.9%) indicated that even medical drugs have side effects.

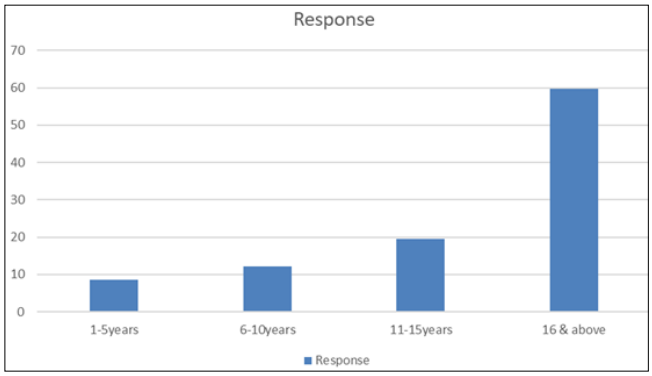


Fig 3: For how long have you been using Traditional Medicine

The above chart indicates that those with 49 (59.8%) as the highest percentage have been using the medicine for over 16 years. The least on the chart are those that used traditional medicine for less than 5 years which represents 7 (8.5%). 16 (19.5%) represent those that used traditional medicine for 11-15 years while 10 (12.2%) represent those who used the traditional medicine for 6- 10 years.

Medicinal plants that are affected by charcoal production: The FGD participants noted that countless traditional plants have been affected by charcoal production. Where it has been gathered that trees that have medicinal properties have been destroyed. Among them are: *Securidaca long pedunculate, Mitragyna inermis, Parkia clappertonianna, Celtis integrifolia, Bombax ceiba, Moringa oleifera, Buchanania lanzan, Acorus calamus, Opilia centifolia, Balanites aegyptiaca Guiera senegalensis, Tamarindus indica, Ziziphus abyssinica, Leptadania hastata (yadiya), Cochlospermum planchorii (Rawaya), Tamarindus indica, Adansonia digitata, Dalbergia saxatilis, Fiscus polita spp. Etc.*

There are trees that we used both their roots, barks, and leaves for treatment of various ailments but are nowhere to be found as the charcoal producers have cut down the trees for charcoal making. You have to travel far distance places before you can get a particular plant (Bagna, pers., com., May 2024).

Most of the participants narrated that they find it difficult to get some of the plants that have medicinal properties that were destroyed by charcoal producers. This conformed to the work of Chinedu *et al.* (2017) [3] that the use of herbal medicines in the future years appears to be in doubt, even though statistics have unveiled the wide acceptance of them.

Effect of charcoal production on the environment: The FGD participants noted that charcoal production has adversely affected their environment, where trees that provide soil cover and shade are being destroyed. Some of the participants believed that Charcoal production causes desertification, erosion, heat waves, flooding, and even extinction of some fauna that use those trees as their habitats. This conformed with the study conducted by Mfon *et al.* (2014) [5] which stressed that deforestation results from the removal of trees without sufficient replacement, which leads to reduction in habitat, biodiversity as well as wood and quality of life.

Before, you didn't have to go far for hunting, there were bush meats, fruits, and abundant tree cover close by, but now we are only left with scattered trees, and animal

habitats are being destroyed. No shades, heat everywhere (Dudu, pers., com., May, 2024).

Most of the FGD participants believed that a larger percent of their forest resources were destroyed by charcoal production. They indicated that the bush clearing for agriculture doesn't have adverse effects as of charcoal production which entails the falling of the entire tree.

Conclusion

Plants and plant parts are frequently used due to their medicinal properties, flavor, or fragrance. The application of herbal medicines in the treatment of several diseases is as old as mankind. The majority of the study population merely depends on traditional plants to treat health-related issues. The study revealed that Charcoal production is inimical to the environment. Humans often cut the entire trunk, and convert the trees to charcoal without due regard to the environment. Most of the charcoal producers don't know that they are altering the ecosystem and nature. All these human activities are threatening nature and in the end, we are to face the consequences and are to be blamed. In line with these findings, Nigerian leaders are the major culprits in the issue of charcoal production because they have failed to provide for the citizenry through the abundance of God-endowed natural resources. No wonder economists refer to Nigeria as being under what they call a 'resource curse'. The poor citizenry resorts to poverty-induced activities that lead to deforestation with all the adverse effects notwithstanding as a possible way out of their dilemma.

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