Bima Journal of Science and Technology, Vol. 8(4A) Dec, 2024 ISSN: 2536-6041

DOI: 10.56892/bima.v8i4.1158

Ethnobotanical Survey of Medicinal Flora Utilized for the Management of Dermatological Diseases by Indigenous Populations in Bauchi, Nigeria

Ismail Hassan[1]*, Huzaifa Muhammad, Uzaifa Adamu and Husaini Sulaiman Adam

Department of Biological Sciences, Faculty of Science, Bauchi State University, P.M.B. 65 Gadau, Nigeria

Corresponding Author: ihassan408@gmail.com

ABSTRACT

The objective of the study was to assess the ethnobotanical plants traditionally employed to treat skin ailments in Bauchi, the capital of Nigeria's Bauchi State. The research utilized structured questionnaires and oral interviews. Data were collected through oral interviews with practitioners of traditional medicine. An ethnobotanical study was conducted from February to July 2024 to collect relevant data on medicinal plants utilized for treating skin disorders. Participants were herbalists, traditional medicine practitioners, and elderly folks who had employed medicinal herbs. The collected data was documented as the plant employed, preparation guidelines, delivery method, and dosage. The oral interview was conducted in Hausa, their native language. The herbarium of the Department of Biological Sciences at Bauchi State University in Gadau, Nigeria, is the repository for collected and identified plant species specimens. A total of 24 species of medicinal plants from 18 families were identified as effective in the treatment of skin problems such as measles, rashes, boils, cuts, acne, eczema, and wounds. Although the other plants belong to a singular family, the *Myrtaceae, Fabaceae, Compositae, Rutaceae, Rhamnaceae,* and *Meliaceae* families each encompass two species. Decoction, infusion, and direct application were the predominant preparation methods, with leaves being the most often utilized plant part, followed by bark, root, and stem. Eczema is addressed using the bark of *Ziziphus spina* and the leaves of *Anogeisus leiocarpus*; ringworm is managed with the bark of *Jatropha gossypiifolia*; boils are treated using *Diospyros ebenum* and *Vernonia amygdalina*. Citrus leaves consumed orally are utilized to alleviate measles-related skin rashes, whereas bathing in *Khaya senegalensis* leaves aids in the treatment of chickenpox and urinary tract rashes. The leaves of *Calotropis procera* are employed to treat infections. The medicinal plants employed in this region represent a repository of traditional knowledge with potential therapeutic applications.

Keywords: Conventional medicine, Bauchi, Dermatological Diseases, Ethnobotany, Therapeutic flora.

INTRODUCTION

Plants have been utilized for medicinal purposes since prehistoric times. The primary objective of ethnobotanical surveys is to document medicinal plants utilized by indigenous populations for the treatment of various human illnesses. Ethnobotany and ethno-medical studies are today, recognised as the most viable methods of identifying new medicinal plants or refocusing on those earlier reported for bioactive constituents (Gabriel at el., 2017). Scientific investigations of ethnomedicinal plants have been initiated in many countries because of their contributions to health care.

In Nigeria, the populace utilizes herbal medicines for ailment treatment, with traditional healers retailing these herbs in shops and public spaces (Mowobi et al., 2016). Approximately 80% of the global population depends on traditional medicine for their daily healthcare requirements, as reported by the World Health Organization (WHO, 2002). Numerous rural people continue to depend significantly on phytotherapeutic solutions for their

DOI: 10.56892/bima.v8i4.1158

fundamental healthcare, although there was prevalent adoption of Western medicine in developing countries (Farnsworth, 1994; Kochhar, 2016). Practitioners include herbalists, bone-setters, traditional birth attendants (TBAs), village midwives, traditional psychiatrists, herb dealers, and other specialists (Sofowora, 1996). Traditionally, generations transmit their knowledge of medicinal herbs orally. Nigerian flora has been identified as a promising source of pharmaceuticals and other medical substances (Aluko, 2019). Herbal plants are a vital forest resource for the overall well-being of Nigeria's rural population. They are acknowledged to possess few or no adverse effects and serve as a reservoir of therapeutic resources (Aluko, 2019). Literature acknowledges that traditional healers frequently obscure the identities of the herbs they utilize for treating ailments due to apprehension regarding prospective self-sufficiency of patients in healing. Obute and Osuji (2002) endorsed this assertion by contending that, as all plant collecting occurs in the wild, it is inadvisable for herbal practitioners to nurture plants to enhance the mystique of their profession. This technique is unsustainable and represents a significant loss, as these practitioners die along with their extensive knowledge. Moreover, disseminating this crucial information to immediate family members without any vested interest is grossly inadequate due to its lack of continuity. Despite the existence of written documentation for certain regions, the knowledge regarding the utilization of medicinal plants is predominantly transmitted orally and remains inadequately recorded (Nwaeze and Abariku, 2006; Gurib-Fakim, 2006), thereby jeopardizing the preservation of traditional medicinal practices involving plants in Africa. In comparison to modern medicine, herbal skin care treatments are more economical and exhibit fewer adverse effects, among other advantageous attributes. Marks et al. (2006) and Madison (2003) assert that most herbs utilized for skin ailments possess anti-inflammatory, antimicrobial, antiviral, hemostatic, and analgesic properties. The abundant information on medicinal plants is in danger of disappearing since it is often kept secret until the last minutes of the death of the traditional healer when they eventually call on somebody to inherit the information. This knowledge continues to decline over time as there are only few indigenous people with the traditional knowledge (Abdulsalami at el., 2020). In addition, the loss of valuable medicinal plants due to population pressure, agricultural expansion and deforestation is widely reported by different workers (Igoli at el., 2005; Mathias at el., 2012). The documentation of the traditional medicinal plants used by the Bauchi people is scanty in literature, this trend might affect the medicinal plants conserved and administered by the local people in future, therefore the assessment and documentation of the knowledge of these indigenous people on the use and management of medicinal plants would fill the gap of indigenous knowledge on medicinal plants. Moreover, the presence of natural and anthropogenic factors affecting the losses of valuable medicinal plants calls for the need to document the eroding medicinal plants and the associated knowledge (Abdulsalami at el., 2020). Therefore, this ethnobotanical study was conducted for evaluation of the medicinal plants employed in Bauchi city for the treatment of skin ailments.

MATERIALS AND METHODS

Study Area

This study was conducted in the city of Bauchi, located in Bauchi State, Nigeria, at an elevation of 616 meters, with coordinates of latitude 10.637109 and longitude 10.080730, corresponding to 10°38'13.59243" N and 10°4'50.628" E, on the northern periphery of the Jos Plateau. It has a population of 493,810 and covers an area of 3,687 km² (NPC, 2006). The historic

DOI: 10.56892/bima.v8i4.1158

town is the origin of the state's name. The flora and climate of Bauchi resemble those of the Sudan Savannah, which shifts to semi-arid conditions (Obute and Osuji, 2002). The Hausa and Fulani are the two predominant tribes, with agriculture and commerce serving as the primary sources of revenue for the population.

Research Design

An ethnobotanical study was conducted from February to July 2024 to collect relevant data on medicinal plants utilized for treating skin disorders. A structured questionnaire and oral interviews with traditional medicine vendors and practitioners who utilized medicinal herbs were applied to gather ethnomedical data. Individuals with literacy skills received the questionnaire directly, utilizing the same terminology as the respondents, whilst those lacking such skills were provided with an interpreter to assist in completing it after an oral interview conducted in Hausa, their native language. One interview was performed with each herbal practitioner (Abdulsalami at el., 2020). Data collected from herbal practitioners includes responder gender, age, nationality, information source, vernacular plant names, plant applications, preparation techniques, administration methods, dosage, and other relevant details (Abdulsalami at el., 2020).

Data Collection

Respondents' common plant names, descriptions, local nomenclature, and applications were documented using a pen and field notebook. The oral interview consisted of three components. The initial section documented the sociodemographic characteristics of the respondents, including sex, age, practice, specification, nationality, educational background, and duration of practice (Abdulsalami at el., 2020). The second section addressed the plant components utilized for treating prevalent skin ailments, their arrangement, the preparation of dried or freshly harvested herbs, the use of traditional solvents (such as gruel, water, or milk), and the application of conventional extraction methods (such as infusion, boiling, and grinding). The third section, which centers on professional experience in disease treatment, includes inquiries regarding the diseases addressed, treatment frequency, sources of knowledge (training, inheritance, or both), local nomenclature of utilized plants, availability of plant components, and potential side effects (e.g., headache, dizziness, vomiting, etc.). Only plants identified by a minimum of three responders as capable of treating the same disease were recorded (Mowobi, et. al., 2016; Ahn, 2017; Adebayo, et al. 2010). Specimens of reported plants were collected from gardens and the wild using a guide selected from the respondents. The specimens were classified in the Herbarium of the Department of Biological Sciences at Bauchi State University in Gadau, Nigeria.

Data Analysis

Data was summarized using means, tables, and charts, and analyzed by descriptive statistics.

RESULTS

The socio-demographic data of respondents in Bauchi metropolitan indicated that 23 were male and only 2 were female. Approximately 15 respondents were primarily herb vendors, 10 were practitioners of traditional medicine, and their educational attainment was predominantly elementary. Their ages ranged from 32 to 70 years, and all were Nigerian (Table 1).

Table 1: Socio-demographic information of the respondents.

Parameter	Specification	Number of Respondent
Sex	Male	23
	Female	2
Age (years)	20-30	0
	31-40	4

DOI: 10.56892/bima.v8i4.1158

	41-50	6
	51-60	10
	61-70	5
Occupation and Practices specification	Traditional medicine practitioner	10
	Herb vendor	15
Education	Basic	18
	Secondary	5
	Tertiary	2
	None	0
Nationality	Nigerian	25
	Non-Nigerian	0

The professional experience of respondents (table 2) indicated that 15 acquired this information from their ancestors, 7 through training, and 3 through ancestral training. The findings indicated that the majority of the medicinal plants utilized were sourced from the wild, while others were procured from home gardens. The duration of therapy varied from 2 days to 6 weeks, which may be consistent or inconsistent. Nevertheless, the majority of therapies shown no indications of negative effects, and only a minority of responders experienced dizziness after utilizing these plants.

Table 2: Professional experience on source of knowledge; source of plant; treatment pattern; duration and side effects.

PARAMETER	SPECIFICATION	NUMBER OF RESPONDENT
Knowledge source	Ancestral	15
	Training	7
	Ancestral-Training	3
Plant part source	Wild	16
	Market	0
	Not available	0
	Garden	9
Treatment pattern	Regular	22
	Irregular	3
Treatment duration	1day	1
	2-3days	2
	4-5days	3
	6-12days	6
	2 weeks	11
	4-6weeks	2
Side effects	Dizziness	3
	Nausea	3
	None	19

The data collected from all respondents indicated that around 24 plant species, classified under 18 families, were utilized in Bauchi metropolis for the treatment of skin problems (Table 3). The families *Myrtaceae, Fabaceae, Compositae, Rutaceae, Rhamnaceae,* and *Meliaceae* each have two species, whereas the remaining plants are classified under individual families. The result of ethnobotanical study showed that tress were the most commonly used plant where 18 of the plants species were trees (75%) followed by 4 shrubs (16.7%) and 2 herbs (8.3%) (Figure 1).

DOI: 10.56892/bima.v8i4.1158

Table 3: Samples of plant parts used for the Treatment of Skin diseases.

SN	BOTANICAL NAME	FAMILY	LOCAL NAME	COMMON NAME	PARTS OF PLANT USED	LIFE FORM
1.	*Jatropha gossypifolia*	*Euphobiaceae*	Binda zugu	Physic nut	Bark	Shrub
2.	*Tamarindus indica*	*Fabaceae*	Tsamiya	Tamarind	Leaves and bark	Tree
3.	*Moringa oliefera*	*Moringaceae*	Zogale	Moringa	Leaves and bark	Tree
4.	*Citrus Aurantifolia*	*Rutaceae*	Lemon tsami	Lemon	Leaves	Tree
5.	*Khaya senegalensis*	*Meliaceae*	Madachi	Mahogany	Bark and leaves	Tree
6.	*Carica papaya*	*Caricaceae*	Gwanda	Pawpaw	Bark	Tree
7.	*Parkia Biglobosa*	*Mimosaceae*	Dorawa	Locust beans	Bark and leaves	Tree
8.	*Diospyros ebenum*	*Ebanaceae*	Kanya	Ebony tree	Leaves, root, fruit and bark	Tree
9.	*Detarium microcarpum*	*Fabaceae*	Taura	Sweet detar	Bark	Tree
10.	*Balanite aegyptiaca*	*Zygophyllaceae*	Aduwa	Desert tree	Bark	Tree
11.	*Tridax procumbe*	*Compositae*	Kalgo	Tridax	Leaves and root	Herb
12.	*Citrus sinensis*	*Rutaceae*	Lemon zaki	Sweet orange	Leaves	Tree
13.	*Aloe barbadensis*	*Liliaceae*	Aloe	Aloe vera	Leaves/juice	Herb
14.	*Azadirachta Indica*	*Meliaceae*	Dogon yaro	Neem plant	Bark	Tree
15.	*Calotropis procera*	*Asclepidaceae*	Tumfafiya	Sodom Apple	Leaves	Shrub
16.	*Anogeissus leiocarpus*	*Combrataceae*	Marke	African birch	Leaves and bark	Tree
17.	*Ziziphus spina*	*Rhamnaceae*	Kurna	Ziziphus	Leaves	Tree
18.	*Vernonia amygdalina*	*Compositae*	Shuwaka	Bitter leaf	Leaves	Shrub
19.	*Ficus sycomorus*	*Moraceae*	Baure	Sycomore fig	Leaves and bark	Tree
20.	*Sclerocarya birrea*	*Anacardiaceae*	Danya	Marula	Bark, leaves and root.	Tree
21.	*Vitellaria paradoxa*	*Sapotaceae*	Kadanya	Shea butter	Bark, leaves and stem	Tree
22.	*Ziziphus mauritiana*	*Rhamnaceae*	Magarya	Jujube	Leaves and bark	Shrub
23.	*Psidium guajava*	*Myrtaceae*	Guiva	Guava	Leaves	Tree
24.	*Eucalyptus camaldulensis*	*Myrtaceae*	Turare	Eucalyptus	Leaves	Tree

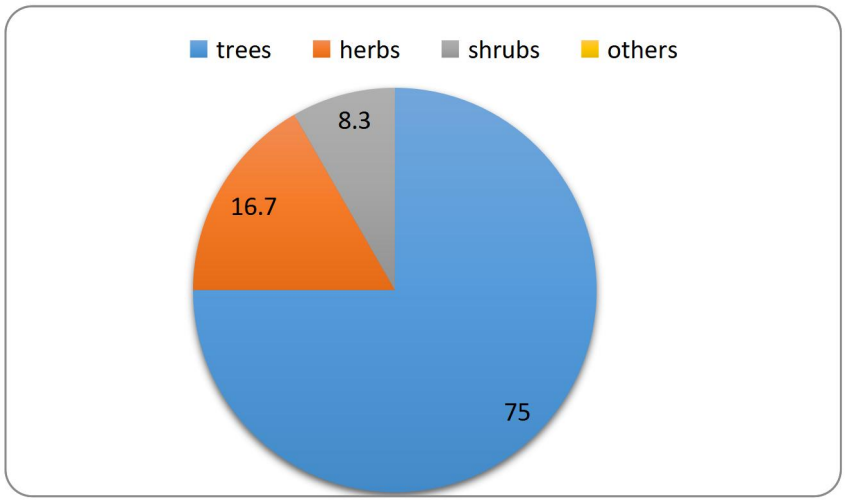

Figure 1: Habits of medicinal plant.

However, majority of the plant parts used were Leaves, followed by bark, root, stem and fruit (Figure 2).

DOI: 10.56892/bima.v8i4.1158

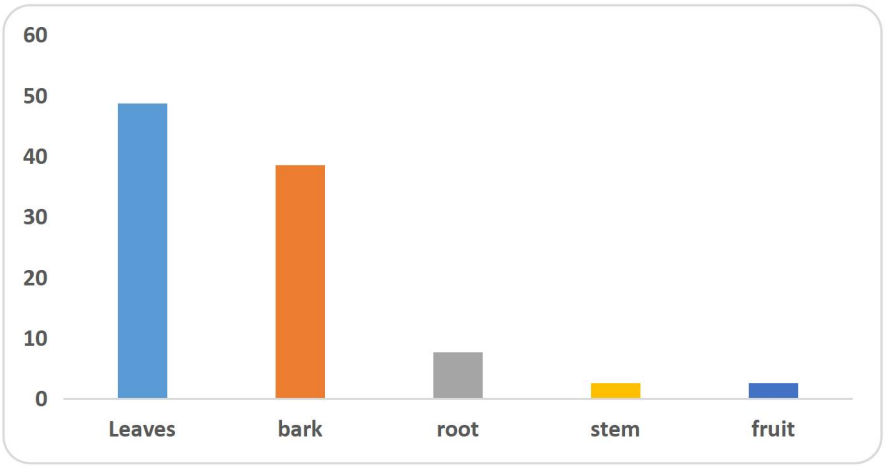

Figure 2: Plant parts used in treatment of skin diseases.

The plant parts used revealed that (48.7%) of the identified plant parts were leaves, (38.7%) were bark, (7.7%) were root, (2.6%) were stem and (2.6%) were fruit (Figure 2).

Table 4 delineated the preparation procedure and administration of the recipe utilized in the treatment of skin diseases. It was noted that recipes are formed from various components of two or more plant species, including leaves, bark, and roots. The preparation methods include decoction (46%), infusion (19%), paste (16.2%), powdered (5.4%), crushed (5.4%), and others (8.1%). The predominant route of administration identified was topical, while the most commonly treated conditions included boils, eczema, wounds, joint discomfort, ringworm, measles, chickenpox, acne, among others.

Table 4: Skin diseases treated, Name of plant, Plant parts used, Mode of preparation and administration.

SN	NAME OF PLANT	PARTS USED	MODE OF PREPARATION	MODE OF ADMINISTRATION
1. ECZEMA				
	Ziziphus spina	Leaves	Decoction	Topical
	Vitellaria paradoxa	Stem	Paste	Topical
	Jatropha gossypiifolia	Bark	Paste	Topical
2. BOILS				
	Anogeisus leiocarpus	Leaves and bark	Decoction	Topical
	Parkia biglobosa	Bark and leaves	Decoction	Topical
	Khaya senegalensis	Bark	Decoction, maceration	Topical
	Vernonia amygdalina	Leaves	Paste	Topical
	Azadirachta indica	Bark	Decoction	Bath
	Diospyros ebenum	Root and bark	Decoction	Oral and topical
		Fruits	Burned	Fruit ash is applied to boil
	Ziziphus spina	Leaves	Decoction	Topical
	Tridax procumbe	Root and leaves	Powdered	Topical
	Detarium microcarpum	Bark	Powdered	Topical with cream
3. WOUNDS/CUT				
	Parkia biglobosa	Bark and leaves	Decoction	Topical
	Vernonia amygdalina	Leaves	Paste	Topical
	Azadirachta indica	Bark	Decoction	Bath
	Diospyros ebenum	Root and bark	Decoction	Oral and topical
		Fruits	Burned	Fruit ash is applied to wounds

DOI: 10.56892/bima.v8i4.1158

	Ficus sycomorus	Leaves and bark	Decoction	Topical
	Tridax procumbe	Root and leaves	Powdered	Topical
4. MEASELS				
	Psidium guajava	Leaves	Decoction	Bath
	Citrus Aurantifolia	Leaves	Decoction	Taken orally for 2-3times/day
	Citrus sinensis	Leaves	Infusion	Taken orally for 2-3times/day
5. RINGWORM				
	Anogeisus leiocarpus	Leaves and bark	Decoction	Topical
	Vitellaria paradoxa	Stem	Paste	Topical
	Jatropha gossypiifolia	Bark	Paste	Topical
6. SCABIES				
	Khaya senegalensis	Bark	Decoction, maceration	Topical
	Vernonia amygdalina	Leaves	Infusion	Oral
7. PIMPLES				
	Ziziphus spina	Leaves	Paste	Taken orally with milk or water
	Vitellaria paradoxa	Bark	Decoction	Topical
8. LEPROSY/SKIN CANCER				
i.	*Diospyros ebenum*	Root and bark	Decoction	Oral and topical
9. CHICKEN FOX				
i.	*Khaya senegalensis*	Leaves	Infusion	Bath
10. SKIN CLEANSER				
i.	*Tamarindus indica*	Leaves, bark	Decoction with potash	Oral
11. UTI RASHES/ETCHING				
	Ziziphus mauritiana	Leaves and bark	Infusion, Decoction	Oral
	Ficus sycomorus	Leaves and bark	Decoction	Topical
	Calotropis procera	Leaves	Heated	Placed on affected area for 5 -7 minutes
	Detarium microcarpum	Bark	Decoction	Bath
	Moringa oliefera	Leaves	Decoction	Oral
	Carica papaya	Bark	Decoction	Oral
12. SKIN INFLAMATION				
	Parkia biglobosa	Bark and leaves	Decoction	Topical
	Khaya senegalensis	Bark	Decoction	Topical
	Tamarindus indica	Leaves	Crushed leaves and pulp	Topical
	Eucalyptus camaldulensis	Leaves	Infusion	Oral
	Sclerocarya birrea	Leaves, bark	Decoction	Taken orally 3times/day
		Root	Steam	Steamed to affected area
		Bark	Paste	Topical
	Aloe barbadensis	Leaves	Paste	Topical
	Balanite aegyptiaca	Bark	Decoction	Oral
13. BRUISES				
i.	*Tridax procumbe*	Root and leaves	Powdered	Topical

Keys: Decoction= Plant parts are boiled in water for 30minutes or more, and strained into cup to drink; **infusion=** Water is boiled and poured over the herbs or a combination of herbs in a pot, which is covered then allowed steeping for 10-15minutes or more; **maceration=** Macerations Fresh /dried plant material is covered in water and soaked overnight. The herb is strained out and the liquid is taken; **paste=** plant material is powered and then made into mixture by adding water; **bath=** medicinal plants/herbs are prepared as vapour bath, or are

DOI: 10.56892/bima.v8i4.1158

added to bath water and the patient is soaked inside it; **topical**= apply on the affected spot; **oral**= taken through mouth.

The predominant preparation method was decoction (46%), followed by infusion (19%), paste (16.2%), maceration (2.7%), steam (2.7%), and powdered (2%) (Figure 3). The predominant ailments addressed in this study area included boils, rashes, lacerations, eczema, ringworm, arthralgia, measles, acne, chickenpox, among others. Nevertheless, the majority of traditional healers exhibited inadequate expertise of dosage in treatment prescriptions for patients.

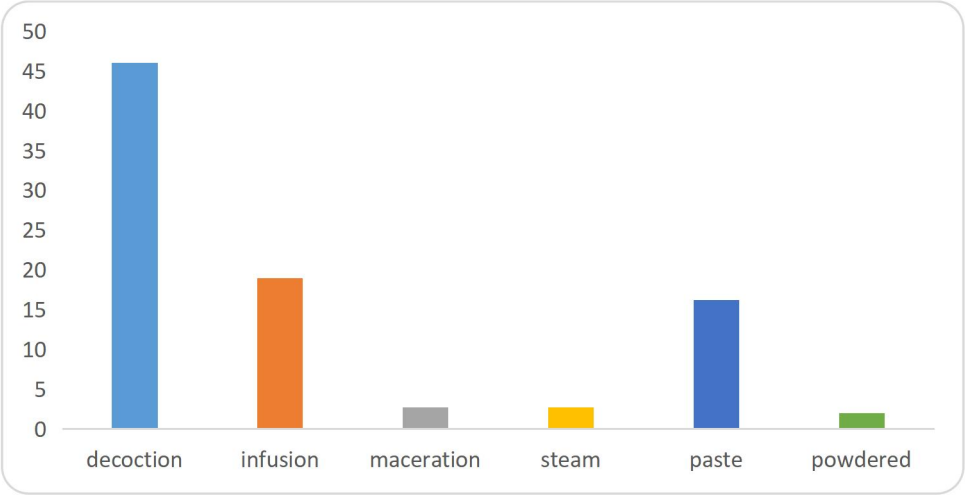

Figure 3: Method of preparation.

DISCUSSION

Twenty-four medicinal plant species from eighteen families were gathered from the natural vegetation utilized by traditional healers in Bauchi metropolis, Bauchi State, Nigeria. The data indicate that the predominant flora in this region consisted of trees. This may be attributed to the perennial availability of trees, which remain unaffected by seasonal fluctuations (Naranjo, 2014). The The phytochemical screenings of the crude extracts of most of the plants reported reveals the presence of alkaloids, saponins, tannins, steroids, phenolic acid, flavonoids and terpenes (Burkill, 1997 and Audu, 1993). These phytochemical are known to exhibit medicinal activity as well as pharmacological activity. (Mowobi, et. al., 2016; Ahn, 2017; Adebayo, et al. 2010). The bark of *Ziziphus spina* and the leaves of *Anogeisus leiocarpus* are utilized for eczema therapy; the bark of *Jatropha gossypiifolia* is employed for ringworm; *Diospyros ebenum* and *Vernonia amygdalina* are applied for boils; and *Psidium guajava* is used for joint discomfort. Additionally, skin conditions like measles rashes are addressed with citrus leaves administered orally, while chickenpox is treated with *Khaya senegalensis* leaves by bathing and urinary tract applications. Infection is addressed with the leaves of *Calotropis procera*. Ethno medicinal knowledge is predominantly held by senior family members, and transferring this knowledge to the younger generation is relatively challenging (Oladunmeye and Kehinde, 2011). The findings of this study indicated that most herb merchants and traditional medicine practitioners possess inadequate understanding regarding dosage and prescription of remedies for patients. They also reported minimal side effects such as nausea and dizziness when individuals utilized herbal remedies. This can be ascribed to the remedy's low toxicity (Haile and Delenasaw, 2007). The formulation of the treatments utilizes exclusively plant components, aligning with the findings of

DOI: 10.56892/bima.v8i4.1158

Olapede (2000). Milk and gruel have been documented as components in remedy formulations.

CONCLUSION

This study presents data on the medicinal plants utilized for the treatment of skin ailments by some indigenous communities in Bauchi metropolis, Bauchi State, Nigeria. The study demonstrated that herbal therapy possesses significant potential to heal many skin problems, as individuals in the study area continue to utilize medicinal plants offered by herbalists for such ailments. The study also indicated a significant diversity of medicinal plants and extensive traditional knowledge regarding their usage, preparation, and application in the area. Nevertheless, the expertise in herbal treatment resides predominantly with the elders, which may impede the sustained utilization of these plants. The diminishing utilization of plants by the younger generation may progressively result in the elimination of indigenous knowledge related to medicinal flora. This study also identified low levels of traditional knowledge on the utilization of many therapeutic herbs. Although, knowledge of the utilization of leaves and bark was extensive among the Bauchi city, however understanding of the stem, fruit, and root was limited. Preliminary phytochemical screening provides a concise overview of the qualitative characteristics of active phytochemical constituents in plant extracts, aiding researchers in selecting specific extracts for further investigation or isolation of active compounds (Tapsell et al., 2006).

Acknowledgement

We hereby extend our deepest appreciations to TETFund Nigeria for funding this research under its institution based research grant (TETFund - IBR grant) with Ref: BASUG/CERI/IBR/023/Vol.1.

REFERENCES

Abdulsalami H., Mudi S. Y., Daudu O. A. Y., Aliyu B. S., Adabara N. U. and Hamza R. U. (2020) Ethnobotanical survey of medicinal plants used in the treatment of gastrointestinal tract infections in Ebiraland Kogi state, Nigeria. Journal of Medicinal Plants Studies; 8(1): 38-44.

Adebayo, T, B. C., Adegoke, A. A., okoh, A. I and Ajibesin, k. k. (2010). Rationalizing some medicinal plants used in the treatments of skin diseases. *African journal of Microbiology Research*. 10:958-963.

Ahn, K. (2017). "The worldwide trend of using botanical drugs and strategies for developing global drugs". BMB Reports. 50.

Aluko, O. J. (2019). Evaluation of various uses of Aloe barbadensis miller (*L.*) Burm (Aloe vera plant) by Rural Dwellers in Ille-ogbo, Ayedire local government Osun State. S*cientific Research Journal* 7 (6).

Audu, J. A. (1993). Observation on the efficacy and palliative action of medicinal herbs used by herbal practitioners in Bauchi *State. Journal of economic and Taxonomic Botany 17,501-507.*

Burkill, H. M. (1997). The usefulness plants of West Tropical Africa.Vol.4. Royal Botanic Gardens. Kew. 969 Pp.

Farnsworth, N. R. (1994). Ethnopharmacology and drug development in ethnobotany and the search for new drugs. Ciba foundation symposium 185 chic ester, UK John Wiley and Sons. 2-59.

Gabriel C. I., Onwuka G. I., Stephen Y. O. (2017) A Simple Gastroenteritis Dynamics in Kebbi State, North western Nigeria. International Journal of Mathematics and Statistics Studies; 5(5):1-6.

Grice, E A, Kong, H. H, Conlan, S. Deming, C. B, Davis, J. Young, A. C. (2009). Topographical and temporal diversity of the human skin microbiome. *Journal of Science*. 324:1190–2.

DOI: 10.56892/bima.v8i4.1158

Gurib-Fakim, A. (2006). Medicinal plants: Traditions of yesterday and drugs of tomorrow. Mol. Asp. Med., 27: 1.

Haile, Y. and Delenasaw, Y. (2007). Traditional medicinal plants knowledge and uses by local healers in Sekeru district jimmazne. *Ethiopia journal of ethno biology and ethno medicine* 3:21

Hostettmann, K., Marston, A., Ndojoko, K., and Wolfender, J. (2000). The potential of African plants as a source of drug. curr. org. chem. 4:973-1010.

https://www.countrycoordinate.com/city-bauchi-nigeria/

Kochhar, S. L. (2016).Economic Botany: A Comprehensive Study (5 ed.). Cambridge University. p. 644. ISBN 9781316675397.

Madison, K. C. (2003). Barrier function of the Skin: *journal of investigative Dermatology.* 121 :231-41.

Marks, J. G. and Miller, J. (2006). Looking bill and Marks principle of Dermatology.ISBN 1-416-3185.5.

Mathias S., Ilyas N., Musa K. (2012) Traditional Medicine Practice amongst the Takkad People of Nigeria. Journal of Natural Sciences Research; 2(10):1-12.

Mowobi, G. G, Abubakar, S., Osuji, C., Etim, V. N., Ogechi, N. and Egya, J. J. (2016) Ethnobotanical survey of medicinal plants used for the treatment of skin diseases in Keffi Nigeria. *American journal of phytomedicine and clinical therapeutics* 4 (02) 073-090

Naranjo, P. (2014). The urgent need for the study of medicinal plants. In: ethnobotany: *Bayero University journal of science.* Pp 23-34.

National Population Commission (2006) Report of Nigeria National Population Commission on Census. Population Development Review 33(1);206-210.

Nwaeze, C. U. and Abariku, P.O. (2006). Antimicrobial activity of certain medicinal plants used in traditional medicine in Nigeria. *Nigerian Journal of Microbiology.* 6(12): 32-40.

Igoli J. O, Oyali O. G, Tor-Ayin T. A, Igoli N. P. (2005) Traditional medicine practice amongst the Igede people of Nigeria Part II. African Journal of Traditional and Complimentary/ Alternative Medicine; 2:37-47.

Oladunmeye, M. K. and Kehinde, F. Y. (2011) Ethnobotanical survey of medicinal plants used in treating viral infections among Yoruba tribe South Western Nigeria. African Journal of Microbiology Research , 5(19). 2991-3004.

Olapede, O. (2000). The use of herbs in alternative health care delivery in Nigeria. Paper deli vered at the symposium organized by the National Associated of botany students, Obafemi Awolowo University, Ile-Ife journal of science. Pp 47-60.

Okigbo, R. N. and Mmeka, E. C. (2006). An appraisal of phytomedicine in Africa. *Science.Technology Journal*., 6(2):3-94.

Obute, G. C. and Osuji, L. C. (2002). Environmental Awareness and Dividends: A scientific Discourse.*A frican journal of interdisciplinary studies 3 (1):90-94.*

Soforowa, A. (1996). Research on medicinal plants and traditional medicines in Africa. *Journal of alternative and complementary medicine,* 2(3):365-372.

Tapsell, L. C., Hemphill, I., Cobiac, L. (2006). "Health benefits of herbs and spices: the past, the present, the future". *Medicinal Journal*. Aust. 185 (4 Suppl): S4–24.

World Health organization (2002). *WHO Traditional Medicine strategy* 2002-2005. World Health organization, Geneva.