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An ethno-botanical survey of medicinal plants used in the treatment of fracture and dislocation in Ogugu, Kogi State Nigeria

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ABSTRACT

Background: The documented information on traditional medicinal plants in Ogugu communities of Kogi State is vague and limited to its species and thus very little research has been done on these medicinal plants. An Ethno-botanical study was conducted to take inventory of the species by the inhabitants of various communities in Ogugu, Olamaboro Local Government area of Kogi State in bone fracture treatment and dislocation. The study was carried out between May through September 2019.
Materials and Methods: Ethnomedicinal knowledge was gathered from 20 traditional bone setters in 10 communities using questionnaires. The plants most referenced from the questionnaire were collected and identified using various standard methods and procedures.
Result: 80% of the respondents were male while 20% were female. 40% were in the range of 31-41 years of age and only 10% were in the age range of 20-30 years. About 45% has no formal education while only 5% had a university degree. TBS with most year of experience (21-25 years) are only 5% while the profession is dominated by those of moderate time of practice (11-15 years) with 40% representative. A total of 49 medicinal plant species distributed in 27 families and genera were documented. Family Euphorbiaceae was found to be mostly used for fracture treatment.
Conclusion: The most frequent used plant parts were the leaves (49.5%). The method of preparation of the herbal remedies were generally best in the form of poultice administered in the form of paste to give the best result in fracture and bone setting treatment.

1. Introduction

In the early 21st century, plant parts have been used as medicine for cure of several diseases. It has been noted that between 35, 000 and 70, 000 species of plants have been utilized at varied times for medicinal purposes.[1] Traditional Medicinal plants therefore play a vital role in maintaining human health throughout the world. Many drugs have been discovered from plant sources and it is estimated that plant materials are present in or have provided the footprint for 50% of modern drugs.[2] It is believed that there are still undiscovered plant species both in the rainforest and the savanna. The usefulness of medical

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ethno-botanical research has been increasing since potential sources for drugs could disappear in the future because of the rapid loss of biodiversity.[3] However,[4] has argued that ethno-botanical research can contribute to developing countries by documenting traditional forms of healthcare. Ethnobotany plays a crucial role in the study of traditional medicine.[3] Traditional medicine is the sum of all knowledge and practical application, whether explicable or not used in diagnosis, prevention, and elimination of physical, mental, or social imbalance; and relying exclusively on practice and experience, and observations handed down from generation to generation, whether verbally or written.[4] Bone-setting is a practice of re-setting joint and treating sprains, dislocations and other simple or complex fractures. It includes manipulation of the bones, application of splints to the area around the fracture or wound and application of material such as herbs and utilization of learned skills to ensure healing of bone-related injuries and fractures. In some cases, incantations are made on the affected region as a means of invoking the spirit of the ancestors for divine intervention and healing.[5] Traditional bone setting arose as an adaptive approach to injury care. With the advent of new technologies and advancements in medicine, traditional fracture care evolved into what is known today as contemporary and modern.[6] Traditional healers use plants in treatment of diseases like bleeding, boils, bronchitis, cold, cough, asthma, dysentery, journey fever, piles, scorpion bite, snake bite, and skin diseases.[7] Plants are also used for other health conditions notably fracture and dislocation and other related cases.[8] A fracture is a lesion produced by mechanical force on the hard tissues such as bone, which are characterized by discontinuity of usage or tissue breakage.[9] Dislocation occurs when the bone is moved out of place by forces twisting or pulling it.[10] Bones are the framework of an individual body and breaking may occur to any bone that forms the body constituents.[11,12] The documented information on traditional medicinal plants in Ogugu communities of Kogi State is vague and limited to its species and thus truly little research has been done on these medicinal plants. This adds to the conflicts between traditional medicine and western medicine and thus cannot help western medicine to overcome its limitations. However, because native plant habitats are destroyed daily, many medicinal valuable plants that are useful in the treatment of fracture and dislocation will be gone before scientist can even investigate them. As the world's population increases, the threat to biodiversity becomes greater.[13]

2. Materials and Methods

2.1. Location and size

Ogugu is situated in Olamaboro Local Government Area of Kogi State, Nigeria. Its geographical coordinates are 70 6'0" North and 70 29')" East and it is originally named Ogugu. Ogugu is located within the middle-belt of Nigeria. Ogugu has over 50 villages including Ogugu centre. The population of Ogugu is put to 180,000 according to 2006 census.

2.2. Research design

The research design used for this study was descriptive research survey. According to[14] descriptive surveys, the status of a phenomenon is also used for assessing the attitudes, opinions, and views of a group of people or individuals. 20 respondents were selected from 100 respondents in each location. Language translation and transmission was done by the research assistance in the local community. Traditional bone setters were identified by the research assistance in each community by their practices of bone setting in the past.

2.3. Identification of the active plants

Identification was done by morphological characteristics making use of the vegetative parts mostly in a method described and employed by.[15] In this method, plant parts such as root, leaves, stem, and inflorescence were collected for taxonomic identification using charts, illustrations, and dichotomous keys.

3. Results and Discussion

Twenty herbalists were selected using the purposive sampling technique, also known as the judgmental sampling, where researchers purposely select who in their opinion are thought to be relevant to the research topic.[16] The sampling was limited to communities such as Emoriko, Emakpe, Emenenga, Emagaba, Emodida, Emonoja, Emomoka, Emojo, Emogodo and Emohiowa villages based on the selection criteria of the respondent knowledge of bone setting as well as involvement in at least one such case. Both qualitative and qualitative data were assembled using structured questionnaire as the principal tool. Twenty traditional bone setters were thus selected from ten communities.

In Table 1, 80% of the respondents were male while 20% were female, 40% were in the age range of 31-40 years and only 10% were in the age range of 20-30 years. About 45% were uneducated while only 5% had a university degree. Most of the TBS are Muslim (95%) while 5% were Christean. Of the respondents, 80% are married while only 10% are divorced. Fifty percent are mostly farmers while 5% are botanist. TBS with most year of experience (21-25 years) were only 5% while the profession is dominated by those of moderate time of practice (11-15 years) amounting to 40%. From the result, 55% obtained the knowledge through their parents while 15% were inspired through dreams.

FromTables 2 and 3 above, it can be deduced that different plants were used for the treatment of fracture

Table 1: Demographic characteristics of the respondents

Factors	Frequency	Percentage
Sex		
Male	16	80
Female	4	20
Age		
20-30	2	10
31-40	3	15
41-50	8	40
Above 50	7	35
Educational Status		
No education	9	45
Primary education	6	30
Secondary education	4	20
University education	1	5
Religious Affiliation		
Christian	1	5
Muslim	19	95
Marital Status		
Married	18	80
Widow	1	10
Divorce	2	5
Single	1	5
Occupation		
Farmer	10	50
Carpenter	4	20
Barber	5	25
Botanist	1	5
Number of Years practice		
1 to 5 Years	2	10
6 to 10 years	7	35
11 to 15 years	8	40
16 to 20 years	2	10
21 to 25 years	1	5
How Knowledge was Acquired		
Husbands	2	10
Friends	3	15
Parents	11	55
Grandparent	1	5
Dream	3	15
Total	20	100

and dislocation in the study area. A total of forty-nine plants were recorded from ten communities. And it was observed that, some plants were used in more than one community. A total of 103 plants were observed in the various communities where Emoriko recorded the highest number of species (20.4%) in terms of frequency of usage, followed by Emagaba and Emodida having 13.6% and 12.6% respectively while Magodo, Emonoja and Emojo recorded the least with a frequency of 5.8% respectively. The plants with the highest frequency usage were Solaniun nigrum M (5.9%) and Sorghastrum bipennata (4.9%) while Azadirachta indica and Annona senegalensis recorded the least (1.0 %) in terms of frequency of usage.

Table 4 shows the different plant parts used in the remedy preparation for bone setting. Out of the 103 plants recorded from the various communities of Ogugu, 49.5% of these plants had their leaves as the part used in the remedy assemblage. Emoriko community recorded the highest usage of leaves (17.6%) while Emakpe community recorded the least (5.9%). Plant parts mostly utilized were roots, stem, bark seeds, fruits, which together accounted for 50.5% usage compared to other parts throughout the selected locations.

Figure 1 shows that 24% of these plants had their roots as the part used in the treatments, Emoriko recorded the highest root usage (32%) while Emonoja and Emojo recorded none in terms of roots usage. About seventy-eight

Table 2: Plants utilized in the treatment of fracture and dislocation in Ogugu.

Plant	Locations										Total
	EMK	EMG	EMB	EKA	EMD	EDO	EMJ	EJO	EKP	EHA	
Abrus precatorious	1	0	0	1	0	0	0	0	0	0	2(1.9%))
Ageratum cornizoides	0	0	0	1	1	0	0	0	0	0	2(1.9%)
Alchornea cordifolia	0	0	0	0	0	0	0	0	3	0	2(1.9%)
Allophyllus Africana	0	0	0	0	0	1	0	1	0	0	2(1.9%)
Alstonia boonei	0	1	0	0	0	0	1	0	0	0	2(19%)
Amaranthus dubius	0	0	0	0	0	1	0	1	0	0	2(1.9%)
Ananas comosus	1	1	1	0	0	0	0	0	1	0	4(3 9%)
Annona selegalensis	0	0	1	0	0	0	0	0	0	0	1 (10%)
Azadirachta indica	0	1	0	0	0	0	0	0	0	0	1 (1.0 %)
Bambusa vulgaris	0	0	0	0	0	0	0	0	0	1	1 (10%)
Bridellia feruginia	1	0	0	0	0	0	0	0	0	0	1(10%)
Calotropis procera	1	0	0	0	0	0	0	0	0	0	1(10%)
Carica papaya	0	1	1	0	0	0	0	0	0	1	3(2.9%)
Chromolema odorata	0	0	0	1	1	0	0	0	0	0	2(1.9%)
Cissusa denocaulis	0	0	0	0	0	1	0	0	0	0	1 (1 0%)
Cissus populnea	0	0	0	0	0	1	0	0	0	0	1 (1.0%)
Citrus Aurantifolia	0	0	0	1	1	0	0	0	0	0	2(19%)
Citrus limon	0	0	0	1	0	0	0	0	1	0	2(19%)
Cymbopogon citratus	0	1	1	0	0	0	0	0	0	0	2(19%)
Cynodondactylon	1	0	I	0	0	0	0	0	0	0	2(1.9%)
Desmodium tortosum	0	0	0	0	0	0	0	0	0	1	1 (10%)
Dracaena arborea	1	0	0	1	1	0	1	0	0	0	4(3.9%)
Elaes guiniensis	**0**	1	0	1	0	0	0	1	0	0	4(3 9%)
Ficus Capensis	0	0	0	0	0	0	0	0	1	0	1(1.0%)
Gmelina arborea	0	0	0	0	1	0	0	0	0	0	1(10%)

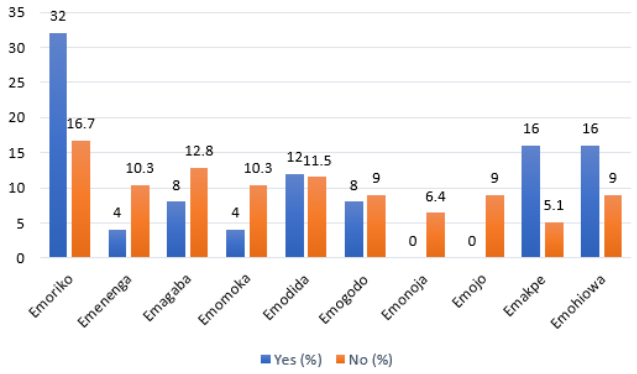

Figure 1: The use of roots in the preparation

of these (75.7%, total NO) were found to use other parts in ther treatments.

From Table 5 , it can be deduced that the herbal remedy used for the treatment of fracture and dislocation was prepared in many ways. The most frequently employed method was the paste with the frequency of 75.7%. The least method was the use of oil extract with 2.9%. It has been recorded that more than 3,000 plant species are used for traditional medicine in Nigeria[17] In this study, a total of 49 medicinal plant species that are used for the treatment of fracture and dislocation was recorded. This high amount recorded from just 10 communities is quite high and may provide support for more observation.[17] These species were distributed in twenty-seven families and forty-five genera. The family with the most cited species for the treatment of fracture and dislocation was Euphorbiaceae (8). This finding is in line with results obtained by[18] where Euphorbiaceae was the family with the most cited number (13) of species. Earlier workers in Ghana such as[19] and[20] recorded a high number of medicinal plants in this family. Shrubs were the

Table 3:

Plant	Locations Emoriko	Emenenga	Emagaba	Emomoka	Emodida	Emogodo	Emonoja	Emojo	Emakpe	Emohiowa	Total
Jathropha gossipifolia	1	0	0	0	0	0	0	0	0	0	1(1.0%))
Maranthespoly-andracornizoides	1	0	0	0	0	0	0	0	1	1	3(2.9%)
Momordica charantia	0	1	0	0	0	0	0	0	0	1	2(1.9%)
Moringa oleifera	1	0	0	0	1	0	0	O	0	1	3(2.9%)
Musa paradisiaca	1	0	0	0	0	0	0	0	0	1	1(1.0%)
Occimum gratissimum	0	0	0	0	0	1	1	1	0	0	3(2.9%)
Oriza sativa	1	0	0	0	0	0	0	0	0	0	1(1.0%)
Oxalis corniculata	0	0	0	0	0	1	0	0	0	0	1 (1.0%)
Paullinia pinnata	0	0	0	0	1	1	0	0	0	0	2 (1.9 %)
Persea Americana	0	1	1	0	0	0	0	1	0	0	1 (1.0%)
Phyllanthus amarus	1	0	0	0	0	0	0	0	0	0	2(2.0%)
Pyllanlhuseticulate	1	0	1	0	0	0	0	0	1	1	2(2.0%)
Rauvolfiavomitoria	0	0	0	0	0	0	0	0	0	0	2(2.0%)
Ricinus communis	1	0	1	0	0	1	0	0	0	0	2(1.9%)
Securinegavirosa	1	0	1	0	0	0	0	0	0	0	2 (1 9%)
Sennaalata	1	1	0	0	0	0	0	0	0	0	1 (1.0%)
Sennaoccdentalis	1	0	1	0	0	0	0	0	0	0	1(1.0%)
Sesamumindicum	1	0	1	0	0	0	0	0	0	0	2(1.9%)
Sidaacuta	1	**0**	0	1	1	0	0	0	0	0	5(4.9%)
Solanium nigrum	1	0	1	0	1	0	1	1	1	1	6(5.8%)
Sorghastrum bipennata	1	0	0	0	0	0	1	1	0	1	5 (4.9%)
Tridax procumbent	0	0	0	1	1	0	0	0	0	1	3(2.9%)
Urenalobata	0	0	0	0	1	0	0	0	0	0	1(1. 9%)
Uvaria chamea	1	0	0	0	1	1	0	0	0	1	4(3.9%)
Total	21 (20.4%)	9 (8.7%)	12 (11.7%)	9 (8.7)	12 (11.7)	9 (8.7%)	5 (4.9%)	7 (6.8%)	8 (7.8%)	11 (10.7)	103 (100.0%)

Table 4: The use of leaves in the remedy preparation

Location	Yes (%)	No (%)	Total (%)	Chi-square	Df	P. value
Emoriko	9(17.6)	12(23.1)	21 (20.4)	7.963^{a}	9	0.538^{ns}
Emenenga	4 (7.8)	5 (9.6)	9 (8.7)			
Emagaba	5 (9.8)	7(13.5)	12(11.7)			
Emomoka	4 (7.8)	5 (9.6)	9 (8.7)			
Emodida	6(11.8)	6(11.5)	12(11.7)			
Emogodo	4 (7.8)	5 (9.6)	9 (8.7)			
Emonoja	5 (9.8)	0 (0.0)	5 (4.9)			
Emojo	5 (9.8)	2 (3.8)	7 (6.8)			
Emakpe	3 (5.9)	5 (9.6)	8 (7.8)			
Emohiowa	6(11.8)	5 (9.6)	11 (10.7)			
Total	51 (49.5)	52 (50. 5)	103 (100.0)			

Table 5: Mode of preparation of herbal remedy

Mode of preparation	**Total%**
Paste	78(75.7)
Decoction	5(4.9)
Paste and Decoction	6(5.8)
Juice	2(1.9)
Paste and Juice	5(4.9)
Bandage and Oil	4(3.9)
Oil	3(2.9)
Total	103(100)

most (40 %) represented growth form for bone healing in Ogugu. This could be because they are relatively drought resistant, which may be due to their geographic location. This was also confirmed in the findings of,[21] where 62.97 % of the Medicinal plants he examined were shrubs and trees. Moreso, 60% of these species were woody. This may be related to the fact that woody species are a resource that is available all year unlike herbs which are limited by the scarce rainfall.[22]

4. Conclusion

This study revealed that a total of forty-nine medicinal plants distributed in twenty-seven families and forty-five genera were involved in traditional medicinal practices in Ogugu. The family that was mostly believed to be more effective for bone setting was Euphorbiaceae having 8 representatives. From this study, the most frequently employed plant parts for the treatment of fracture and dislocation were the leaves with 49.5% usage. The herbal remedy was mostly administered in the form of paste (75.7%) to give the best result in fracture and bone setting treatment. However, there were no scientific evidence as to the use of these herbal medicines and their associated side effects for the treatment of fracture. Hence, there is a need to document the plants used in the community.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Farnsworth NR, Akerele O, Heywood V, Soejarto DD. Global Importance of Medicinal Plants. In: Conservation of medicinal plants. Cambridge, U.K: Cambridge Univ. Press; 1991. p. 25–51.
2. Robbers JM, Speedie A, Tyler V. Pharmacognosy and Pharmacobiotechnology. Baltimore: Williams and Wilkins; 1996. p. 1–14.
3. Pei SJ. Ethnobotany and development of new traditional Chinese medicines. *J Ethnobotany*. 2005;17:35–40.
4. Almeida FC, Amorim ELC, Albuquerque UP, Maia MBS. Medicinal plants popularly used in the Xingó region – a semi-arid location in Northeastern Brazil. *J Ethnobiology Ethnomedicine*. 2006;2:15. doi:10.1186/1746-4269-2-15.
5. Chris M, Kwaja A. Setting the bones of traditional bone setting. *Pan Afr Med J*. 2011;8:82–7.
6. Upadhya V, Hegde HV, Bhat SR, Hurkadale PJ, Kholkute SD, Hegde GM, et al. Ethnomedicinal plants used to treat bone fracture from North-Central Western Ghats of India. *J Ethnopharmacol*. 2012;142(2):557–62.
7. Kola P, Metowogo K, Kantati YT, Lawson-Evi P, Kpemissi M, El-Hallouty SM, et al. Ethnopharmacological Survey on Medicinal Plants Used by Traditional Healers in Central and Kara Regions of Togo for Antitumor and Chronic Wound Healing Effects. *Evid Based Complement Altern Med*. 2020;p. 1–12. doi:10.1155/2020/6940132.
8. Upadhya V, Hegde HV, Bhat SR, Hurkadale PJ, Kholkute SD, Hegde GM, et al. Ethnomedicinal plants used to treat bone fracture from North-Central Western Ghats of India. *J Ethnopharmacol*. 2012;142(2):557–62.
9. Lee NK, Sowa H, Honoi E, Ferron M, Ahn JD, Confavreux C, et al. Endocrine regulation of energy metabolism by the skeleton. *Cell*. 2007;130(3):456–69.

10. Mccollum DE, Gray WA. Dislocation After Total Hip Arthroplasty Causes and Prevention. *Clin Orthop Relat Res*. 1990;(261):159–70.
11. Diame GLA. Ethnobotany and Ecology of plants of importance in reproductive health: A case study of the Subri River Forest Reserve in the Western Region of Ghana. M. Phil. Thesis. University of Cape Coast; 2007. Available from: https://inis.iaea.org/search/search.aspx?orig_q=RN:53046355.
12. Sarpong K, Sofowora A, Tackie AN. Traditional Medicine and Pharmacopoeia contribution to the revision of Ethnobatanical and Floristic studies in Ghana. Organization of African Unity/ Scientific, Technical and Research Commission (OAU/STRC).; 2000. Available from: https://library.au.int/traditional-medicine-and-pharmacopeia-contribution-revision-ethinobotanical-and-floristic-studies-3.
13. World Resource Institute. In: A Guide to World Resources 2000 to 2001, people, and ecosystems: the fraying web of life. Washington, D. C: World Resource Institute; 2000. p. 106–15.
14. Sapp JLC, Vogel RL, Telfair J, Reagan J. Evaluating Web-Based Platforms and Traditional Methods for Recruiting Tattoo Artists: Descriptive Survey Research Study. *JMIR Dermatol*. 2019;2(1):14151. doi:10.2196/14151.
15. Jasnić S, ŽS Marjanović, Vidić M, Bagi F, Budakov D. Pathogenic, morphological, and molecular characteristics of Alternaria tenuissima from soybean. *Zbornik Matice Srpske Za Prirodne Nauke*. 2011;120:183–96. doi:10.2298/zmspn1120183.
16. Etikan I, Musa SI, Alkassim R. Comparison of Convenience Sampling and Purposive Sampling. *Am J Theor Appl Stat*. 2016;5(1):1–1. doi:10.11648/j.ajtas.20160501.11.
17. Dokosi OB. Herbs of Ghana. Accra: Ghana Universities Press; 1998. p. 23–8.
18. Atawodi SE, Olowoniyi O, Daikwo M. Ethnobotanical Survey of some Plants Used for the Management of Hypertension in the Igala Speaking Area of Kogi State, Nigeria. *Ann Res Rev Biol*. 2014;24(4):4535–43.
19. Irvine FR. Woody plants of Ghana. London: Oxford University Press; 1996. p. 89–94.
20. Nguta JM, Appiah-Opong R, Nyarko AK, Yeboah-Manu D, Addo P. Medicinal plants used to treat TB in Ghana. *Int J Mycobacteriology*. 2015;4(2):116–23.
21. Namsa ND, Tag H, Mandal M, Kalita P, Das A. An ethnobotanical study of traditional anti-inflammatory plants used by the Lohit community of Arunachal Pradesh, India. *J Ethnopharmaco*. 2009;125(2):234–45.
22. Albuquerque UP, Andrade LHC. Usoderecursosvegetaisdacaatinga: ocaso do agreste do estado de PernambucoNordeste do Brasil. *Interciencia*. 2002;27(7):336–46.

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