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Research Article

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An ethno-botanical survey of plants used for management of cancer in north-eastern Nigeria

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Abstract An ethno-botanical survey was conducted to collect plants use in cancer management within the North-Eastern Nigeria. A semi structured questionnaire was administered to traditional medicine practitioners (TMPs) to collect relevant information. Thirty nine (39) respondents were interviewed and questionnaire administered to them. The average age of respondents is 46.7 years and there was a dominance of the male gender 31(93.9%) in the practice of traditional medicine compared to their female counterpart 2(6.1%). Seventy percent (70.9%) of the respondent inherited the practice from their fathers, while 29.1% joined the practice without family history of the practice. Most of the TMPs have not had formal education; only about 3(9.1%) had tertiary education of up to University level, 8(24.2%) high school, 3(9.1%) had up to primary school level. However, because of the religious background most 19(57.6%) had informal education; none has admitted to be illiterate. A total of twenty five (25) plant species belonging to about 14 different families were identified that are claimed to have anticancer potential. Thirteen 13 (52%) of the plants identified are used as single plant by the TMPs, while 12(48%) of the plants are used as recipes. Different parts of the plant are used, plant root have higher preference, with 28% being used, followed by leaves 24%, while other part of the plant comprises the remaining percentage. Fifty two percent 52% of respondent administer their medications orally, 3% topically, and 29% administer both topically and orally. This study confirmed the use of medicinal plants in managing cancer in North-Eastern Nigeria, and further revealed that many different combinations as recipes are used in curing cancer in addition to using single plants. The challenge now is to scientifically validate the claims and work toward producing novel anticancer drug(s) from the identified plants.

Keywords Ethno-medicine, Recipe, Traditional medicine

Introduction

Healthcare provision in developing nations still relies on traditional medicine. Human beings vital interest in plants, primarily as a source of food, shelter and clothing, is as old as the beginning of human civilization. Plants contain a large number of spread of pharmacologically active ingredients and each herb may have its own unique phytochemicals and properties [1]. According to World Health Organization (WHO) about 25% of modern medicines were developed from plants sources used traditionally; and research based discovery of herbal drugs from traditional medicinal plants is up to 75% [2]. The oldest component of the Nigerian health sector consists of traditional healers and birth attendants, who are the *de facto* providers of primary health care [3]; this is true for all the regions of the country including the North-Eastern part. There is a general belief that the remedies used in traditional medicine are safe and more readily acceptable [4], in addition to that they are less expensive and readily available. These and many more reasons make medicinal plants very attractive.

Cancer is a major leading cause of death in the world today. Conventional treatments are chemotherapy, radiation and surgery. However, these approaches are costly and with many adverse side effects and little hope of surviving beyond 5 years in most cancer cases [5]. An estimated 14.1 million new cancer cases and 8.2 million cancer- related deaths occurred in 2012, compared with 12.7 million and 7.6 million respectively in 2008 [6]. This is about 11.04% and 7.8% rise in new cases and death respectively just within 4 years which is very alarming. TMPs in this part of the world still believe they have cure for cancer as crude as their practice may be.

The North-Eastern part of Nigeria is a multicultural, multiethnic and multi-religious region; however, this diversity is translated to versatility in terms of the regions traditional medical practice.

This present study was conducted in three cities of Maiduguri, Damaturu and Gombe of North East Nigeria with a view for documenting important medicinal plants with possible anti cancer potentials for scientific validation.

Materials and Methods

Study Area

Figure 1: Map showing the north-eastern part of Nigeria.

The study was conducted in Maiduguri, Borno state, Damaturu, Yobe state, and Gombe, Gombe state. The major ethnic groups of these states are Kanuri, Hausa, Fulani, Marghi, Babur Bura Tangale, kare kare and host of others minors.

Administration of Questionnaire and interview

A verbal informed consent of the respondents was sought first, Information on the medicinal plants was obtained by administering a semi structured questionnaire and oral interview to traditional medical practitioners to obtain relevant data. The interviews were conducted in local language of the respondents or in Hausa being the common *lingua franca* of the region avoiding using jargon that are not easily translated to English. The questionnaire was divided into two sections. Section 1 deal with demographic information of respondent and section 2 form information of the plants and part used as well as the expertise of the practitioners. The respondents were mostly local hunters, local barbers (Wanzam) spiritualist and herbalist.

Statistical analysis

Informants' data on their background and that of the plants used were schematically recorded in an excel spread sheet software and analysed statistically.

Results and Discussion

Plants contain a large number of pharmacologically active ingredients and each herb has its own unique combination and properties [1]. In the beginning of the 19th century the first pharmacologically active compounds were isolated. In modern drug development such pure compounds are preferred as pharmaceutical agents, enabling precise

treatment dosage and monitoring of drug distribution in the human body. However, whole plants or plant parts are also used as herbal remedies, which provide potential for naturally occurring compounds to act synergistically. In many parts of the world medicinal treatment based on crude herbal remedies still prevails [7]. According to World Health Organization (WHO) about 25% of modern medicines were developed from plants sources used traditionally; and research based discovery of herbal drugs from traditional medicinal herbal plants is up to 75% [2]. Owing to the very large biodiversity of medicinal plants worldwide it is often cumbersome to embark on random screening of plant for a particular targeted ailment, thus approach such as ethno medicinal survey is adopted to collect specific plants of interest for a particular disease such as cancer, relying on the experience of the respondent such as the traditional medicine practitioners. In this study an ethno medicinal survey was carried out by administering semi-structured questionnaires to traditional medicine practitioners.

Table 1: Age and Gender of Respondents

Age range	Gender frequency		Percentage
	Male	Female	
<20	0	0	0
21-30	8	0	24.2
31-40	9	0	27.3
41-50	7	0	21.2
>50	7	2	27.3
Total	31	02	100

Table 2: Educational Level and Duration of Practice of Respondents

Duration of Practice (years)	Frequency	%	Educational Level	Frequency	%
<5	7	21.2	Tertiary	3	9.1
6-15	8	24.2	High school	8	24.2
15-25	8	24.2	Primary school	3	9.1
25 and above	10	30.3	Non formal	19	57.6
			Illiterate	0	0.0
Total	33	100		33	100

Demographic features

A total of thirty nine (39) respondents were interviewed and questionnaire administered to them, out of that number, six (6) were excluded for the fact that they are just ordinary vendors of the drugs without knowledge of plants used or how it is processed, the remaining (33) are directly involved in collection, processing and administration of medicinal plants as TMPs. This study revealed the general dominance of the male gender 31(93.9%) in the practice of traditional medicine compared to females 2(6.1%) in this part of the world. This perhaps could be due to religious inclination or other socio-cultural believes. However, this finding is in agreement with similar survey conducted by Rafatro *et al.*, on plants with anti-malaria activity from Madagascar in which out of 22 respondents only two were female practitioners [8]. On the contrary, a study conducted by Malla *et al.*, in Parbat region of western Nepal revealed women to be the predominant practitioners with 61.07% as against their male gender 38.92% [1] The Custodians of knowledge on medicinal plants are mostly the elderly and this generation of people are fast aging and facing out [9]. Seventy percent 70.9% of the respondents inherited the practice from their fathers while 29.1% just joined the practice at a particular period of their life. Hope is rekindled as growing number of people within age bracket of 20 to 40 years are joining the practice as TMPs, thus the fear that the practice will go extinct due to modernization is perhaps put to rest (Table1). Education is one important factor that militate the progress of this practice, this study showed that only about 9.1% of the respondents attended up to tertiary education, 24.2% High school, 9.1% primary school and 57.6% education was informal education (Table 2). This is no doubt affecting the putting forward of verifiable claims for scientific validation hence the total set back in this sector in our own part of

the world compared with the developed world. Most of respondents requested for some sort of gratification as inducement either in cash or kind before they open up, confirming the educational backwardness of the TMPs. The idea and knowledge of identifying and diagnosis of cancer by the respondents is not clearly defined. Most of the respondents believe any "hard swellings," abscesses, chronic ulceration, or sometime mere inflammation may be cancer, this is contrary to the conventional orthodox ways of diagnosis that follows some routine and specialized laboratory investigations that can give clear cut diagnosis, although majority of the respondent have had more than 10 years of experience we believe there may be misdiagnosis of the disease.

Table 3: Composition of Recipes with Possible Anticancer Potentials Used By Traditional Medicine Practitioners

Recipe	Plants	Family	Voucher Specimen	Part Used	Ratio of Recipe	Traditional Method of Preparation	Route of Administration
NCR001	*Diospyros mespiliformis Hochst* *Guiera senegalensis* J.F Gmel *Cassia singueana* *Dichrostachys cinerea* W and Arn	Ebenaceae Combretaceae Fabaceae Mimosaceae	BCH#0051 BCH#0052 BCH00#61 BCH00#55	Twig Twig Twig Twig	Equal Amount	Dissolve in water add little milk	Oral / topical
NCR002	*Acacia nilotica* *Nigella Sativa* *Cassia alata* L	Leguminosae Ranunculaceae Caesalpiniaceae	BCH#0053 BCH#0057 BCH#0056	Fruit Seed Root	2:1:1	Boil in water	Oral
NCR003	*Diospyros mespiliformis Hochst* *Calotropis procera* (Aiton) *Combretum glutinosum*	Ebenaceae Asclepiadaceae Combretaceae	BCH#0051 BCH00#54 BCH#0060	Leaf Root Leaf	2:1:2	Dissolve in hot Water or mix with cow milk fat	Oral / topical
NCR004	*Ampelosus grantii* (Barker) planch *Euphorbia balsamifera* L *Tamarinus indica* L.	Vitaceae Caesalpineaceae Fabaceae	BCH#0059 BCH#0058 BCH#0062	Root Root Fruit	3:2:1	Boil in water	Oral

NCR is the recipe code

Table 4: Plants with Possible Anticancer Potentials Used By Traditional Medicine Practitioners

Plants	Family	Voucher Specimen	Part Used	Traditional Method of Preparation	Route of Administration
Balanite egyptica	Balantiaceae	BCH#0063	leaf	Boil in water	Oral
Luffa egyptiaca	Cucurbitaceae	BCH#0065	leaf	Boil in water	Oral
Senna italic	fabaceae	BCH#0075	Seed	Oil	Topical
Azadiracta indica	meliaceae	BCH#0076	Kernel	Oil	Topical
Irvingia gabonensis	irvingiaceae	BCH#0078	Fruit	Infusion of powder	Oral

Cucumis pustulatus	cucubitaceae	BCH#0079	Seed	Infusion	Oral
Vitellaria paradoxa	sapotaceae	BCH#0068	Root	Infusion	Oral/topical
Bauhinia rufescens	fabaceae	BCH#0069	Leaves	Infusion	Oral
Adansonia digitata	malvaceae	BCH#0071	Root	Infusion	Oral
Ziziphus spina-christi	Rhamnaceae	BCH#0070	Bark	Dissolve in milk/oil	Oral /topical
Senna occidentalis	fabaceae	BCH#0072	Leaves	Dissolve in milk/oil	Oral/topical
Khaya senegalensis	Meliceae	BCH#0073	Seed	Oil	Topical
Ampelocissus africanus	Vitaceae	BCH#0067	Root	Infusion	Oral

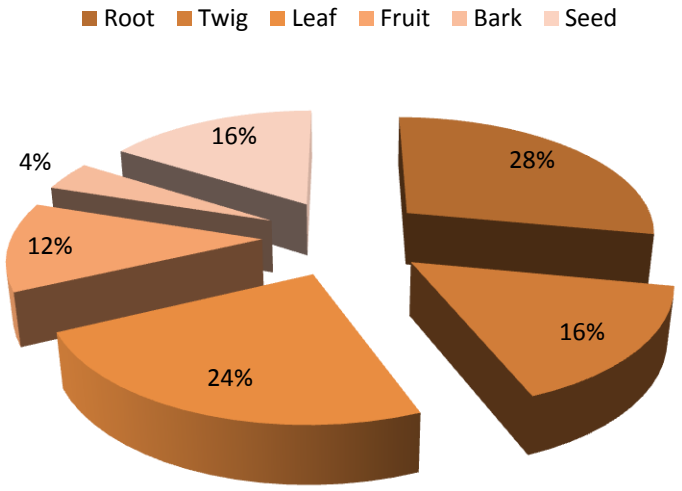

Figure 2: Parts of the plant often used in traditional practice of herbal medicine.

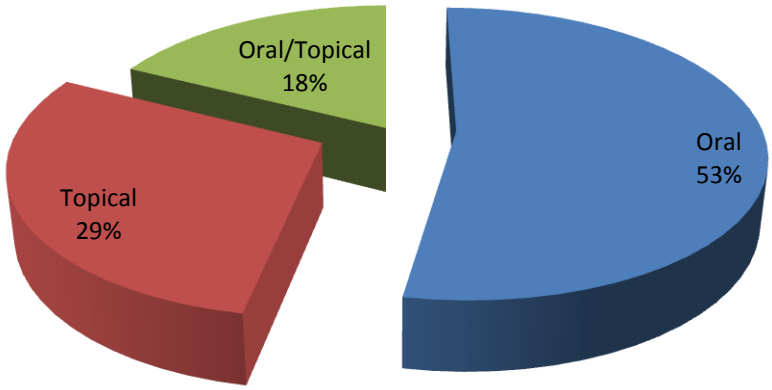

Figure 3: Route of administration of drugs by traditional medical practitioners

Plant Information

This survey was able to identify twenty five (25) plant species belonging to about 14 different families that were claimed to have anticancer potential. Thirteen 13 (52%) of the plant are used as single plant by the TMPs (Table 4), while 12(48%) of the plants are used as recipes (Table 3). The reason(s) behind this combination could be probably

to explore the different benefits inherent in individual plants as synergistic effects of the cocktail of plant metabolites and the multiple points of intervention offer higher efficacy during chemoprevention regimens [10]. All parts of the plant are used with plant root having higher preference (28%), followed by leaves (24%). Other parts of the plant comprise the remaining percentage, (Figure 2). Studies by Sawodago *et al*., also showed the preference of the root over other parts of the plant [11]. The presence of varied active ingredients in different parts of a plant could explain the diversity of use of different parts for different disease conditions.

Decoction, infusion and Poultice are the preferred methods of preparing the herbal formulation which in some cases affect the integrity of the active principles. Most of the formulations are administered orally. Fifty two (52%) of respondents administer their medications orally, 3% topically, 29% both topically and orally, (Figure 3). This may be is as a result of limitations on the skills of using other routes of administration use in conventional medicine such as intravenous or intra muscular administration which has faster and better effect.

Conclusion

This study affords us to collect plants used by TMPs in managing cancer in north-eastern Nigeria. Conducting survey involving TMPs may be the most convenient and holistic way of gathering information on plants with medicinal values. This further revealed that many different combinations as recipes are used in curing cancer in addition to using single plants. There was an appreciable number of TMPs of less than 40 years which allays the fear of the practice going extinct. Lack of formal education of the TMPs is factor that appeared to hinder the progress of the practice that otherwise would have lead to the discovery of new plant derived medication.

References

1. Birendra Malla, DhurvaP.Gauchan, RanB.Chhetri: An ethnobotanical study of medicinal plants used by ethnic people in Parbat district of western Nepal. *Journal of Ethnopharmacology*. 2015.165:103–117.
2. MianYing,W.,Brett,J.W.,Jensen,C.J.,Nowicki,D.,Chen,S.,Palu,A.K.,Anderson,G: *Morinda citrifolia* (Noni) A literature review and recent advances in Noni research. *Acta Pharmacological Sinica*. (2002) 23:1127–1141.
3. M.S. Abubakar , A.M. Musa, A. Ahmed, I.M. Hussaini The perception and practice of traditional medicine in the treatment of cancers and inflammations by the Hausa and Fulani tribes of Northern Nigeria. *Journal of Ethnopharmacology* . (2007) 111 625–629.
4. De Smet, P.A.G.M. Is there any danger in using traditional remedies? *Journal of Ethnopharmacology* . 1991; 32, 43–50.
5. Janssen-Heijnen ML, Maas HA, Houterman S, Lemmens VE, *et al*. (2007). Comorbidity in older surgical cancer patients: influence on patient care and outcome. *European Journal of Cancer*, 43(15):2179-93.
6. WHO (2013): International agency for research on cancer (IARC) GLOBACAN 2012. Press release.
7. Felth. J: Studies of cytotoxic compounds of natural origin their mechanisms of action. Acta Universitatis upsaliences. Digital *comprehensive summaries of Uppsala dissertations from the faculty of pharmacy*. 2011; 141. 56pp Uppsala
8. Rafatro Herintsoa, Robijaona Rahelivololoniaina Baholy, Razafimahefa Andriantiaray Solofoniaina, Rasoamahenina Antsa Mirindra, Ramanantsoa Edwinstaël, Keller De Fernanto, Rakotoarimanana Hajatiana, et al., Screening of Plant Extracts for Searching Antiplasmodial Activity. 11th NAPRECA symposium book of proceedings, Antananarivo Madagascar. (2005); Pp 136-1464.
9. Z.K. Mohammed, A. Daja, H.G Hamza, A. Gidado, and I.M Hussaini. Ethno-medicinal Survey of Folkloric Plants Used in Managing Breast Cancers by the Traditional Medical Practitioners of North- East Nigeria. Journal of Medical and Applied Biosciences. (2014): Volume 6, Number 1.
10. Guilford JM, Pezzuto JM. Natural products as inhibitors of carcinogenesis. *Expert Opin InvestigDrugs*. 2008: 17:1341-52.

11. Sawadogo W.R., Schumacher M., Teiten M.H., Dicato M., Diederich M. Traditional West African Pharmacopeia, Plants and Derived Compounds of Cancer Therapy. *Biochem Pharmacol.* (2012); 15: 84(10): 1225- 1240.