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Ethnobotanical survey of anticancer plants in Askira/Uba local government area of Borno State, Nigeria

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Ethnobotanical survey was conducted on anticancer plants in Askira/Uba local government area of Borno State, Nigeria. Administration of questionnaires and oral interviews to 20 traditional medicine practitioners (TMPs) and field trip were carried out in the study area. A total of 65 different plants belonging to 41 families were identified during the survey. Six plants belong to the Caesalpiniaceae, 5 from Fabaceae, 4 each from Mimosaceae and Euphorbiaceae and 3 from Burseraceae. The most frequently implicated plants as anticancer among respondents were *Securidaca longepedunculata* (Polygalaceae), *Andira inermis* ssp. *rooseveltii* (Fabaceae), *Pterocarpus erinaceus* (Fabaceae), *Carissa edulis* (Apocynaceae), *Detarium microcarpum* (Caesalpiniaceae) and *Cassia sieberiana* (Caesalpiniaceae). These 65 plants should be investigated scientifically to ascertain their acclaimed anticancer properties with the view to develop new drugs.

Key words: Ethnosurvey, cancer, traditional medicine practitioner (TMP), Borno State.

INTRODUCTION

Traditional medicine which is the most ancient way of curing diseases still remain the main avenue of developing new drugs for treating deadly diseases such as cancers. Medicinal plants are the major constituents of traditional medicine and are the sources of many conventional therapeutic agents. For instance, the anticancer agents, vinblastine and vincristine were

isolated from the plant *Catharanthus roseus*. Most of the knowledge about the uses of these plants by traditional medicine practitioners (TMPs) are considered as family secrets and are passed from one generation to the next usually within the same family or clan. However there is the need to identify, document and subject these medicinal plants to scientific investigation in order to

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ascertain some of these therapeutic claims.

Cancer is a disease that affects animals and man of all ages. It is a disease that is characterized by uncontrolled cell proliferation in the body leading to impaired functions and high mortality. In 2007, it was estimated that there were 11 million new cancer cases, 7 million cancer deaths and 25 million persons living with cancer and this could increase to 27 million cases, 17 million deaths and 75 million persons living with cancer by the year 2050 (World Health Organization (WHO), 2005). It is one of the diseases that are claimed to be managed by TMPs in Nigeria and across the globe (Abubakar et al., 2007). While attempts have been made to document the potentials of medicinal plants in some geopolitical region of Nigeria (Aiyelaja and Bello, 2006; Abubakar et al., 2007; Soladoye et al., 2010), little or none have been carried out in the Northeast. Therefore, this research is intended to embark on the ethnobotanical survey in this locality so as to identify and document some important anticancer plants in the North-Eastern part of Nigeria. Askira/Uba local government area (LGA) of Borno State was chosen as the case study area.

MATERIALS AND METHODS

Study area

The study area, Askira/Uba local government area, is one of the twenty seven (27) LGA of Borno State, Northeast Nigeria. The study area lies between latitude 11° 15' N and longitude 11° 30' E in the Sudan Savanna with annual rainfall of 550 to 680 cm. It has an area of 780 km² and a population of 158,893 in the 1991 National census. The area is divided into 13 wards and over 80% of the people are farmers. Ethnic groups in the locality include Marghi, Chibok, Babur-Bura, Fulfulde, Hausa and Higgi (Ngulde, 1993; Modu et al., 2010).

Ethnobotanical survey

Information on the medicinal uses of the plants for treatment of cancers was obtained through administration of questionnaires and oral interviews of the TMPs in the study area. Twenty renowned male TMPs spread across the area were selected and interviewed in their homes. The period of survey was from September, 2011 to May, 2012. They were assured the confidentiality of information given. Field trip into the surrounding bush, direct plant observation, identification and photograph of relevant plants were carried out with some of the TMPs. From each TMP, the following data were collected: biodata of the TMP, duration of practice, types, diagnosis and treatment of cancer, medicinal plants, local name and plant parts used for treatment of cancer, preparation and mode of administration of the medication as well as duration of treatments.

Plant identification

Samples (leaves, flowers, twigs, seeds, fruits, etc) from plants identified during survey were collected and authenticated by a

taxonomist in the Department of Biological Science, University of Maiduguri, Nigeria. Voucher specimens were deposited at the Veterinary Pharmacology Laboratory, University of Maiduguri, Nigeria.

RESULTS

The respondents were all traditional medicine practitioners (TMPs), males, age range from 33 to 90 and most of them inherited the practice of traditional medicine from their parents. They have identified cancer as a disease that is called daji in Hausa, mgha or hyemdimunga in Marghi, mva in Chibok and sir-taku or mbulkir-viri in Bura languages. They perceived cancer as a disease that appeared like a wound but could grow and expand or spread from its site of origin to other parts of the body; and usually difficult to treat. Specific cancers mentioned were the cancers of the breast, skin, flesh/muscle, brain/head, bone, stomach, neck and lungs. 15% of the respondents have mentioned pile as a form of cancer.

Based on the respondents, cancer could be diagnosed or suspected on the basis of chronic state of illness, presence of swelling, hard mass and growth, cancer wound smell like cow saliva, presence of hole in the wound, application of specific herb for diagnosis, migration of the disease to other parts of the body and lack of response to treatment. Some respondents said cancer wound has watery discharge while others said it could be dry containing sandy particles. All respondents said they use herbs collected in the bush to treat cancer. One respondent for each has also mentioned the application of hot metal and housefly, two respondents for hare's fur topically in the treatment of some form of tumours and cancers. Herbs were collected around November to March to produce good medicine. A total of sixty five (65) different plants belonging to 41 families were identified during the survey (Table 1). Six (6) plants belong to the Caesalpiniaceae, 5 from Fabaceae, 4 each from Mimosaceae and Euphorbiaceae and 3 from Burseraceae. The most common plants implicated as anticancer among respondents (Table 2 and Figure 1 to 9) were *Securidaca longepedunculata* (Polygalaceae), *Andira inermis* ssp. *rooseveltii* (Fabaceae), *Pterocarpus erinaceus* (Fabaceae), *Carissa edulis* (Apocynaceae), *Detarium microcarpum* (Caesalpiniaceae) and *Cassia sieberiana* (Caesalpiniaceae). 75% of the respondents said there was no incantation during herb collection while 25% said incantation was necessary before tampering medicinal plants. Red guinea corn or beniseed should be spread around the plant before collection. The best herbs are fetched from the site of sunrise and sunset of the plant. One respondent mentioned that *Pterocarpus erinaceus* (madubiya) should be collected just before

Table 1. Medicinal plants used by Traditional Medicine Practitioners (TMPs) as anticancer agent in askira/uba L.G.A., Borno State, Nigeria.

S/N	Voucher No.	Hausa name	Fulfulde name	English name	Parts used	Scientific name	Family name
1	Vet 212A1	Gabaruwa	Gawdi	Egyptian mimosa	Root, stem bark	<i>Acacia nilotica</i> L.	Mimosoideae
2	Vet 212A2	Sanya, Uwar magunguna	Alali	Violet tree	Root	<i>Securidaca longependunculata</i> Fres.	Polygalaceae
3	Vet 212A3	Madubiya	Banuhi	-	Root, stem bark	<i>Pterocarpus erinaianus</i> Poir.	Fabaceae
4	Vet 212B1	Malmo	Asurahi	-	Root	<i>Syzygium guineense</i> DC.	Myrtaceae,
5	Vet 212B3	Gogamasu	Gududal	-	Aerial parts	<i>Borreria</i> spp	
6	Vet 212B4	Danya	Eidi	-	Stem bark	<i>Sclerocarya birrea</i> A.Rich.	Anacardiaceae
7	Vet 212C1	Kamborin shaho	Fatallahi	White galled acacia	Root	<i>Acacia polycantha</i> subsp. <i>Campylcantha</i> Hochst.	Mimosoideae
8	Vet 212C3	Gama fada	Cabbi, Maibi	Drum stick tree, African laburnum	Root, stem bark	<i>Cassia sieberiana</i> DC.	Caesalpinioideae
9	Vet 207A1	Marga	Cabbi, maibi	-	Root	<i>Cassia arereh</i> Del.	Caesalpinioideae
10	Vet 212D1	Bi da garma, Hano	Kabiye	-	Stem bark	<i>Commiphora kerstingii</i> Engl.	Burseraceae
11	Vet 212D2	Gwiwa rakumi	Killi najere	-	Root	<i>Bridelia scleroneura</i> Benth.	Euphorbiaceae
12	Vet 212D3	Kirni, kisni	Bududi	-	Stem bark	<i>Bridelia ferruginea</i> Mull. Arg.	Euphorbiaceae
13	Vet 212D4	Dodoriya	Dodoriyawol, Sheballi	-	Whole stem	<i>Cissus quadrangularis</i> L.	Ampelidaceae
14	Vet 212D5	Bi da sartse	Sheballi haire, Sheballi kasere	-	Whole stem	<i>Euphorbia lateriflora</i> Schum & Thonn.	Euphorbiaceae
15	Vet 212E1	Gwaska	Daluhi, Geloki, Kainiki	Dog almond	Mistletoe, stem bark	<i>Andira inermis</i> ssp. <i>rooseveltii</i> Wright DC.	Fabaceae
16	Vet 212E3	Tsada	Ca'bulli	-	Root	<i>Ximenia americana</i> Linn.	Olacaceae
17	Vet 212E4	Judar kasa, Bata randa	Magiraahi	-	Root	<i>Cissampelos mucronata</i> A. Rich.	Menispermaceae
18	Vet 212F1	Madacin kasa, Kiwaye tsamiya	Jamel deri		Aerial	<i>Aristolochia</i> spp	Aristolochiaceae
19	Vet 212F2	Dashe	Badadi	African myrrh	Root, stem bark	<i>Commiphora africana</i> A.Rich.	Burseraceae
20	Vet 212G1	Mijin tsada	cabbi-taniki	-	Root, Stem bark	<i>Maytenus senegalensis</i> Lam	Celastraceae
21	Vet 212G2	Kaimin kadangare	Kuri pallandi, Wikko pallandi	-	Aerial parts	<i>Achyranthes aspera</i> Linn.	Amaranthaceae
22	Vet 212G3	Tunam, Tunas	Wada worohi	Dry zone cedar	Stem bark	<i>Pseudocedrela kotschy</i> Schweinf	Meliaceae
23	Vet 212G4	Gwandan daji	Dukuhi	Wild custard apple	Root	<i>Annona senegalensis</i> Pers.	Annonaceae
24	Vet 212H1	Runfu	Rumpuhi, Lotorki	-	Leaf	<i>Senna singuena</i> Del.	Caesalpinioideae
25	Vet 212H2	Tawatsa	Fadawandohi	-	Callus	<i>Entada Africana</i> Guill. & Perr.	Mimosoideae
26	Vet 212H4	Takandan giwa	Sabadije nyiwa	-	Stem bark	<i>Steganotaenia araliacea</i> Hochst.	Apiaceae
27	Vet 212J1	Wutsiyar shaarindo, Jalan kadangare	Jalpalhi		Aerial parts	<i>Ctenium mole</i>	Poaceae
28	Vet 212J2	Kiyafa, Mandiwa	Raneranehi		Stem bark	<i>Maerua angolensis</i> DC.	Capparaceae

Table 1. Cont'd

29	Vet 212J4	Uwar yara, Dullu, Beru	Rima becehi	Bush fig	Stem bark	<i>Ficus sur</i> Forssk.	Moraceae
30	Vet 212K1	Karen kafo, Ci-zaki	Be-hohi	Carisse	Root	<i>Carissa edulis</i> Vahl	Apocynaceae
31	Vet 212K2	Ararabi	Janawhi	Frankincense tree	Stem bark	<i>Boswellia dalzielii</i> Hutch.	Burseraceae
32	Vet 212K3	Taura	Konkehi	Tallow tree	Root, stem bark	<i>Detarium microcarpum</i> Guill. & Perr.	Caesalpinioideae
33	Vet 212L2	Hankufa	Kapappi		Aerial parts	<i>Waltheria indica</i> L.	Malvaceae
34	Vet 212L3	Bango	Bango, Filaskwo		Flower	<i>Cassia alata</i> L.	Caesalpinioideae
35	Vet 212L4	Dinyar biri	Bummehi		Root	<i>Vitex simplicifolia</i> Oliv.	Verbenaceae
36	Vet 212M1	Kaaba-giwa	Mbalanyiwa, mbeskoje		Corm	<i>Aloe buettneri</i> W.	Asphodelaceae
37	Vet 212M2	Gaude	Dinyali		Root	<i>Gardenia aqualla</i> Stapf & Hutch.	Rubiaceae
38	Vet 212M3	Kokara	Jalahi	African blackwood, Senegal ebony	Root	<i>Dalbergia melanoxylon</i> Guill. & Perr.	Fabaceae
39	Vet 212M4	Gwanja kusa	Kobelli		Stem bark	<i>Parinari polyandra</i> Benth.	Chrysobalanaceae
40	Vet 212N1	Tarkon Bere, Adamu-adawa	Nyarnyargil		Root	<i>Asparagus africanus</i> Lam.	Asparagaceae
41	Vet 212N2	Yawo	Kassiyawo	Star burr grass	Aerial parts	<i>Acanthospermum hispidum</i> DC.	Asteraceae
42	Vet 212N4	Shuwaka	Siwakewal	Bitter leaf	Stem	<i>Vernonia amygdalina</i> Del.	Asteraceae
43	Vet 212P1	Kadanya	Karihi	Shea butter tree	Stem bark	<i>Vitellaria paradoxa</i> Gaert n.f.	Sapotaceae
44	Vet 212P2	Kukkuki	Bobori	Karaya gum tree	Stem bark	<i>Sterculia setigera</i> Del.	Sterculiaceae
45	Vet 212P3	Madaci	Dalehi	Mahogany	Stem bark	<i>Khaya senegalensis</i> A. Juss.	Meliaceae
46	Vet 212P4	Kokiyan biri	Tubulbali	Monkey ball tree	Root	<i>Strychnos spinosa</i> Lam.	Loganiaceae
47	Vet 212P6	Namijin kokiya	Tappi, Narbatanayil		Root	<i>Strychnos innocua</i> Del.	Loganiaceae
48	Vet 212Q1	Kaucin kasa			Tuber	<i>Aristolochia albida</i> Duch.	Aristolochiaceae
49	Vet 212Q2	Lalle	Nalli	Henna	Leaf	<i>Lawsonia inermis</i> L.	Lythraceae
50	Vet 212Q3	Takalan kasa, Takalan dutse	Bore		Tuber	<i>Ipomoea mauritiana</i> Jacq.	Convolvulaceae
51	Vet 212Q4	karya gatari	Pallahi	Satin wood, Afromosia	Stem bark	<i>Pericopsis laxiflora</i> Benth.	Fabaceae
52	Vet 212R1	Kayan giwa	Jingile		Ash/burnt parts	<i>Hygrophila auriculata</i> schum. (Heine)	Acanthaceae
53	Vet 212R2	Kurna	Kurnahi	Christ's thorn	Stem bark	<i>Ziziphus spina-christy</i> L.	Rhamnaceae
54	Vet 212R3	Zogale	Gaware	Horse radish tree	Root	<i>Moringa aleifera</i> Lam.	Moringaceae
55	Vet 212R4	Gaiyo, kawo	Kawohi	African oak	Stem bark	<i>Azelia Africana</i> Smith ex Pers.	Caesalpinioideae
56	Vet 212S1	Wuyan damo	Nyarnyarki		Stem bark	<i>Combretum molle</i> R. Br.	Combretaceae
57	Vet 212S2	Manta uwa			Corm	<i>Ansellia spp</i>	Orchidaceae
58	Vet 212S3	Rumaana	Laurehi, Kote,		Corm	<i>Habenaria spp</i>	Orchidaceae
59	Vet 212S4	Zambo	Ndubilhi, go'e'		Tuber	<i>Curculigo pilosa</i> Schumach. & Thonn.	Hypoxidaceae
60	Vet 212S5	Garafuni	Garahunu		Aerial parts	<i>Momordica charantia</i> L.	Cucurbitaceae
61	Vet 212T1	Dundu			Root	<i>Dichrostachys cinerea</i> L.	Mimosoideae
62	Vet 212T3	Marke	kojoli	African birch	Stem bark	<i>Angoissus leicarpus</i> DC.	Combretaceae
63	Vet 212T5	Yadiya	Yahi, Yadiyahi		Root	<i>Leptadenia hastata</i> Pers.	Alclepiadaceae
64	Vet 212U1	Malmaliyo, Cediya	Biskehi, Cilihi		Stem bark	<i>Ficus thonningii</i> Blume	Moraceae
65	Vet 212U2	Tinya	Kwidehi		Root	<i>Euphorbia poissoni</i> Pax	Euphorbiaceae

Table 2. Frequency of usage of some anticancer plants among Traditional Medicine Practitioners (TMPs) in Askira/Uba LGA, Borno State, Nigeria.

Voucher No.	Hausa name	Scientific name	Family name	Parts used	Frequency (%)
Vet 212A2	Sanya, Uwar magunguna	<i>Securidaca longepedunculata</i>	Polygalaceae	Root	30
Vet212E1	Gwaska	<i>Andira inermis</i> ssp. <i>Rooseveltii</i>	Fabaceae	Mistletoe, stem bark	20
Vet 212A3	Madubiya	<i>Pterocarpus erinaceus</i>	Fabaceae	Root, stem bark	15
Vet 212K1	Karen kafo, ci zaki	<i>Carissa edulis</i>	Apocynaceae	Root	15
Vet 212K3	Taura	<i>Detarium microcarpum</i>	Caesalpinioideae	Root, stem bark	15
Vet 212C3	Gama fada	<i>Cassia sieberiana</i>	Caesalpinioideae	Root, stem bark	15
Vet 212F2	Dashe	<i>Commiphora Africana</i>	Burseraceae	Root, stem bark	10
Vet 212D4	Dodoriya	<i>Cissus quadrangularis</i>	Ampelidaceae	Whole stem	10
Vet 212P6	Namijin kokiya	<i>Strychnos innocua</i>	Loganiaceae	Root	10
Vet 212R1	Aluran tsofi, Kayan giwa	<i>Hygrophila auriculata</i>	Acanthaceae	Ash/burnt	10
Vet 212J2	Kiyafa, Mandiwa	<i>Maerua angolensis</i>	Capparaceae	Stem bark	10
Vet 212P2	Kukkuki	<i>Sterculia setigera</i>	Sterculiaceae	Stem bark	10
Vet 212G4	Gwandan daji	<i>Annona senegalensis</i>	Annonaceae	Root	5
Vet 212M4	Gwanja kusa	<i>Parinari polyandra</i>	Chrysobalanaceae	Stem bark	5
Vet 212H2	Tawatsa	<i>Entada Africana</i>	Mimosoideae	Callus	5

usage and sufficient enough for that particular purpose only. Keeping it at home would attract the disease into the community.

During preparation, 95% of the respondents said more than one plants were mixed to prepare the medicament. 90% used the herb powder without boiling while 10% of respondents said it should be boiled and decoction taken orally. The stages in preparation were that the plant samples should be collected fresh, mixed, chopped, dried, ground, sieved and used orally or topically. The powder was to be taken on pap or milk for the oral route. Duration of treatment varied but usually from one week to one month. Most respondents said treatment should be continued until after complete healing and in some situation could reach one year.

DISCUSSION

It is clear that the people in the study area, Askira/Uba LGA are aware of the disease cancer as they call it in different native languages as daji in Hausa, mgha or hyemdi-munga in Marghi, mva in Chibok and sir-taku or mbulkir-viri in Bura languages. The name daji is the most popular as it was reported in earlier study in the northern part of Nigeria (Abubakar et al., 2007). Marghi, Chibok and Bura people are dominant inhabitants in the study area. The respondents were able to explain cancer as a wound characterized with hard mass that can expand and migrate to other parts of the body with slow response to treatment. While they are aware that cancer can develop from any part of the body, the ones that appear

externally are most clearly known to them. The ability of the respondents to understand the disease well enough is very important otherwise information provided on the treatment can be misleading. It is also important to note that these TMPs are experienced practitioners in the locality and inherited the knowledge from their fore fathers. Some TMPs could not reveal the information requested from them or reveal the information with reluctance because they took it as family secrets that should be protected. They were also afraid of revealing the information because they thought they would lose patronage. This is a common problem in this type of survey. But the TMPs should understand that collaboration among scientists, conventional and traditional medicine practitioners as well as the



Figure 1. *Securidaca longepedunculata* (Vet 212A2).



Figure 3. *Pterocarpus erinaceus* (Vet 212A).



Figure 2. *Andira inermis* ssp. *Rooseveltii* (Vet212E1).



Figure 4. *Carissa edulis* (Vet 212K1).

support of government and private sectors are crucial for the successful management of some deadly diseases

such as cancer. This will expose the expertise of the TMP to a larger society creating avenue for more patronage.



Figure 5. *Detarium microcarpum* (Vet 212A3).

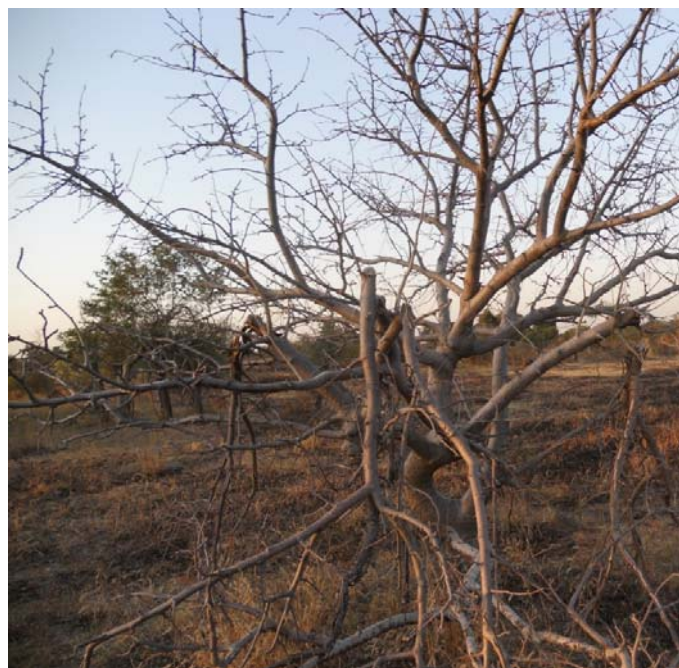


Figure 6. *Commiphora africana* (Vet 212F2).

This ethnobotanical survey of anticancer plants in Askira/Uba LGA has revealed 65 different plant species that are used in the area as anticancer agents. These



Figure 7. *Cissus quadrangularis* (Vet 212D4).



Figure 8. *Annona senegalensis* (Vet 212G4).

plants belong to 41 different families but the most common families are the Caesalpiniaceae, Fabaceae, Mimosaecae, Euphorbiaceae and Burseraceae. The most common plants reported to be used by the TMPs for treatment of cancer were *S. longepedunculata* (Polygalaceae), *A. inermis* ssp. *rooseveltii* (Fabaceae), *P. erinaceus* (Fabaceae), *C. edulis* (Apocynaceae), *D. microcarpum* (Caesalpiniaceae) and *C. sieberiana* (Caesalpiniaceae). The stem bark and/or root of these plants were utilized. The Mistletoe (*Tapinanthus species*) from *A. inermis* ssp. *rooseveltii* was also reported to have anticancer property. The efficacies of these plants need



Figure 9. *Entada Africana* (Vet 212H2).

to be evaluated scientifically to prove their importance in the management of cancer.

Abubakar et al. (2007) reported 72 different plants used by Hausas and Fulanis from the Northwestern Nigeria in the management of cancers and inflammations. About 20 of these plants were also reported in this study from the Northeastern part of the country. The families of the most commonly used plants from the studies conducted in the two different regions were also similar (Caesalpiniaceae, Fabaceae and Euphorbiaceae). This may not be unconnected with the similarity of common cultural background throughout the Northern Nigeria. However it is surprising to report that the four plants (*S. longepedunculata*, *A. inermis* ssp. *rooseveltii*, *P. erinaceus* and *C. edulis*) which happened to be the most frequently implicated as anticancer by the TMPs in this study were missing in Abubakar et al. (2007). Similar work by Soladoye et al. (2010) in the Southwest revealed 73 anticancer plants but only four (*Bridelia ferruginea*, *S. longepedunculata*, *Senna alata* (*Cassia alata*) and *Pseudocedrela kotschy*) tally with the ones reported in this work. This variation may be related to the difference in culture and vegetation from the north and south.

In the study area all the plants were obtained in the nearby bush within the locality with no effort of conserving or domesticating them. *Cissus quadrangularis* and some *Urginea spp* (*gadali*) are the only plants cultivated at home for their medicinal uses. Over-exploitation with no effort of conservation has put many plant species to be endangered (Gupta et al., 2013). More than one plant is usually combined together by most TMPs to treat cancer topically or by swallowing the herbs. The plant mixture may produce synergistic actions or some may be acting symptomatically while only one

actually has anticancer property. It is not always 100% herbs as some TMPs include fetal brain, milk, kerosene, potash, hare's fur or housefly in the preparation. While the use of fetal brain, milk, kerosene and potash may serve as vehicle for the administration of the herbal medicine, hare's fur and housefly may be believed to contain anticancer activity. Hot metals were also used to cauterize some external cancerous wound. Duration of treatment varies depending on the response to therapy. Some patients may be treated within one week but in some cases treatment may continue up to a year. Although the TMPs interviewed were experienced practitioners, diagnosis of cancer may not always be perfect and sometimes they may successfully treat a different disease altogether.

Conclusion

This study has documented 65 species of plants used by TMPs in Askira/Uba LGA for management of cancers. These plants are obtained in the wild with their stem bark or root mostly used, orally or topically. The most frequently used plants are *S. longepedunculata*, *A. inermis* ssp. *rooseveltii*, *P. erinaceus* and *C. edulis*. Conservation of these medicinal plants should be encouraged to avoid extinction. Scientific investigations of anticancer activities of these plants need to be carried out to ascertain their medicinal use or disuse.

Conflict of interest

Authors declare that there are no conflicts of interest.

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