Special Conference Edition, November, 2019
http://dx.doi.org/10.4314/bajopas.v11i1.41S

Bayero Journal of Pure and Applied Sciences, 12(1): 268 - 273
ISSN 2006 – 6996

LOCAL PLANTS AND DIABETES MANAGEMENT; FOLKLORIC PRACTICES IN METROPOLITAN KANO, NIGERIA

Sani S. B., [1*] Aliyu, B.S.,[2] Musa Haruna[1], Sani Muhammad Yahya[1], Mardiyya Auwal Yakasai[1], Ya'u Sabo Ajingi[1], Ladan Wada Hayatu[1 and] Hamisu Abba[1]
Department of Biology, Kano University of Science and Technology Wudil, P.M.B. 3244 Kano State, Nigeria[1].
Department of Plant Biology, Bayero University Kano, P.M.B 3011 Kano State, Nigeria[2].
[*]Corresponding author: sakinasanibuhari@yahoo.com

ABSTRACT
An ethno botanical survey was carried out in Kano metropolis to investigate medicinal plants used locally for the treatment of diabetes in the area. The respondents for the study included herbalists and herb sellers. Oral interview was used to obtain information from the respondents using their local language and the information was recorded in a semi structured questionnaire. A total of 39 medicinal plant species belonging to 21 families were recorded in the study area. Family Fabaceae had the highest number of plant species and most of the plants were sourced from the wild. The plants were prepared mostly in their dried form and decoction was the most commonly used method of preparation. Moreover, combination of different plants or their parts in the preparation of the recipes for the treatment of diabetes was common among the respondents. Annisopus manii, Laptadenia hastata and Moringa oleifera were the most cited medicinal plants in the preparation of recipes for the treatment of diabetes mellitus in the study area
Keywords: Diabetes management, folkloric, medicinal, plants

INTRODUCTION

Diabetes is a metabolic disorder which results due to deficiency in insulin and its metabolism (Sani and Nair, 2017). The prevalence of diabetes mellitus (DM) is increasing worldwide and it is projected that by the year 2030 over 500millions adult will be affected by the disease (Sabir *et al*., 2019). Diabetes is an expensive disease due to costs result from treating the disease with medication or insuling injection and costs result from treating complications of the disease (Oguejiofor *et al*., 2014). For many, costs of these medications especially insulin consume monthly minimum wages, in a country where National Health Insurance Scheme (NHIS) coverage is < 5% and most of the coverage still go to the privileged working class (Oguejiofor *et al*., 2014). Therefore, there is need for search of an alternative including herbal medicine for the treatment of the disease.

Herbal medicine is an important and significant part of traditional medicine which involves the use of plants or their parts (leaves, roots, flowers, stem, seeds etc) in the form of crude drugs such as powder, decoction, tincture, poultice and other herbal preparations for the treatment of diseases. Herbal medicine is still the mainstay of about 75-80% of the world population mainly in developing countries for primary health care (Tilburt and Kaptchuk, 2003). This is primarily because of their availability, accessibility and affordability as well as general belief that herbal medicine are without any side effects and are more effective than modern medicine. The growing testimonies of increasing effectiveness of herbal medicine coupled with much lower occurrence of side effects made herbal medicine a ready alternative to modern medicine. Hence it is important to explore herbal remedies for the treatment of diabetes mellitus in Kano northern Nigeria.

MATERIALS AND METHODS

STUDY AREA

Kano state is located in the North-west geopolitical zone of Nigeria located on 12° N and 8°30'E. It has a total area of 20,131 km2 (Ali *et al.,* 2017). It is one of the largest states in Nigeria in terms of population of about 9,383,682 in the 2006 census. The state has been a commercial and agricultural center. The state is endowed with biodiversity of medicinal plants which have long being used in the African traditional system of medicine for the treatment of various illnesses.

DATA COLLECTION

The study was conducted in Kano metropolis from September to November, 2017. The target groups for the ethno-botanical survey were the herbalists and herb sellers. Oral interview was used to obtained information from the target groups and the data was recorded in a semi-structured questionnaire (Appendix 1). The collected data was analyzed using descriptive statistics such as frequency and percentage.

RESULTS AND DISCUSSION

Medicinal plants reported

A total of 100 respondents were interviewed in the study. The respondents reported the use of thirty nine (39) medicinal plants in the treatment of diabetes mellitus in the study area.. These plants belong to twenty one (21) families. Family Fabaceae had highest number of medicinal plants for the treatment of the disease followed by Malvaceae, Euphorbiaceae , Capparaceae and Asclepiadaceae. (Table1). It was observed in the study that leaves and Stem were the most reported anti diabetic plant parts in the study area (Figure 1). This result is in line with the study of Negbenebor *et al.* (2017). In addition trees were the major source of plant parts, followed by shrubs, herbs and grass. Majority of the plants were sourced from the wild only 5% are cultivated. This findings is also supported by the study of Ali *et al.(*2017) that majority of medicinal plants used in Kano metropolis are sourced from the wild.

It was observed in this study that *Laptadenia hastate*, *Anisopus manii* and *Moringa oleifera* were the most mentioned anti-diabetic plants by the respondents in the study area (Table 2). A literature search on anti diabetic activity of the most mentioned plants in this study was carried out. According to literature search, all the three plants possessed anti-diabetic activity when tested both *in vitro* and *in vivo* (Bello *et al*., 2011; Ukwuwani and Igbokwu, 2015;Khan *et al*., 2017; Zaruwa *et al*., 2018)

Recipes, method of preparation, administration and the dosage form.

Formulation for the treatment of diabetes in the study area by the respondents were made mostly from combination of two or more plant species, while some were made from a single plant part (Table2). The respondents claimed that if a disease is associated with complications, combining different plants or their parts is vital to eradicate the associated complications. This is also supported by the report of Abubakar *et al*., (2017) that polyherbal therapies have synergistic and antagonistic pharmacological agents within themselves that work together in a dynamic way to produce therapeutic efficacy with minimal side effect. Decoction and oral administration were the most prepared method of preparation and administration. It was observed that majority of the plants are prepared in their dried form. This is in line with the study of Salihu *et al.* (2015).

In addition, the dosage form of the recipes is mostly 1 cup once, twice or thrice daily for a period of 1 week to two weeks depending on the severity of the disease. One to two teaspoons of dried powdered recipes could also be dissolved in liquid food, such as kunu (a pap) or yoghurt and water once or twice daily (Table 2).

Table 1: shows the distribution of medicinal plants used for the treatment of diabetes in Kano metropolis

Family	Botanical name	Local name	Parts used	Habit	Form
Amaranthaceae	*Amaranthus hybridus*	Alaiyahu	Leaves	H	C
Anacardiacea	*Lannea microcarpa*	Faru	Leaves	T	W or C
	Mangifera indica	Mangoro	Leaves	T	WorC
Annonaceae	*Annona senegalensis*	Gwandar jeji	Root	S	W
Arecaceae	*Hyphaene thebaica*	Goruba	Fruit	T	W
	Leptadenia hastata	Yadiya	Leaves, stem bark, root	H	W
Asclepiadaceae	*Anisopus mannii*	Kashe zaki	Leaves, stem bark, root	H	W
Asteraceae	*Vernonia Kotschyana*	Domashi	Stem bark, root	S	W
Bignoniaceae	*Stereospermum kunthianum*	Sansami	Stem bark	T	W
Capparaceae	*Cadaba farinosa*	Bagayi	Leaves	S	W
	Boscia angustifolia	Farin moru	Stem bark	T	W
Combretaceae	*Combretum altum*	Geza	Leaves, root	S	W
Compositae	*Vernonia amygdalina*	Shuwaka	Leaves	S	C
Costaceae	*Cadalvena dalzielii*	Takalmin zomo	Leaves		
	Jatropha curcas	Cini da zugu	Stem bark	S	W
Euphorbiaceae	*Chrozophora senegalensis*	Damagi/Baurenki yashi	Stem bark	S	W
	Paradaniellia oliveri	Maje	Stem bark	T	W
	Isoberlinia doka	Doka	Stem bark	T	W
	Dichrostachys nutans	Dundu	Leaves	S	W
Fabaceae	*Afzelia Africana*	Kawo	Stem bark	T	W
	Detarium microcarpum	Taura	Stem bark	T	W
	Trigonella foenum-graecum L	Hulba	Seed	H	C
	Entada sudanica	Tawatsa	Stem bark	T	W
	Tephrosia elongata	Shege ka tsinka	leaves	G	W or C
	Senna occidentalis	Rai dore	leaves	S	WorC
Fabaceae	*Cassia tora*	Tafasa	leaves	S	W
	Pterocarpus erinaceus	Modobiya	Root	T	W
	Erythrina senegalensis	Minjirya	Leaves, stem bark	T	W
	Tamarindus indica	Tsamiya	Fruits	T	W
Lamiaceae	*Vitex cienkowskii*	Dinya	Stem	T	WorC
	Sterculia setigera	Kukuki	Stem bark	T	W
Malvaceae	*Hibiscus sabdariffa*	Soborodo	Flower	S	C
	Adansonia digitata	Kuka	Fruit	T	WorC
Meliaceae	*Khaya senegalensis*	Madaci	Stem bark	T	W
Moraceae	*Ficus thonningii*	Chediya	Stem bark	T	W
Moringaceae	*Moringa oleifera*	Zogale	Leaves	T	WorC
Myrtaceae	*Syzygium aromatica*	Kanumfari	Fruit	H	C
Olacaceae	*Ximenia americana*	Tsada	Leaves	T	W
Poacea	*Echinochloa stagnina*	Buruku	Stem bark	G	W

Habit**;** S- shrub, T- tree, P-palm, G-grass, Form; W- wild, C- cultivated.

Table 2**:** Formulation, method of preparation, method of administration and dosage form of plants locally used for the treatment of diabetes

Formulation	How plant part is used	Method of Preparation	Administration and dosage
Anisopus manii(l)	Dried	Powdered	1 teaspoonful in kunu/yogurt twice daily for two weeks
Anisopus manii(l)+*Leptadenia hastata*(l)+*Isoberlinia doka* (sb)	Dried	Decoction	Taken orally 1/2 cup twice daily
Anisopus manii (sb)+ *Leptadenia hastata*(sb)+red potash	Dried	Infusion/maceration	Taken orally twice daily
Anisopus manii (r)+ *Leptadenia hastata* (l)+*Moringa oleifera*(l)	Dried	Decoction	Taken orally1 cup daily
Anisopus manii (l)+*Vernonia Kotchyana*(l)	Dried	Decoction	Taken orally 1 cup daily
Anisopus manii +*Annona senegalensis*(r)+ *Moringa oleifera* (l)	Dried	Decoction	Taken orally 1 cup daily
Anisopus manii (r)+ *Leptadenia hastata* (r)+*Combretum altum*(r)+Lemon	Dried	Decoction	1cup is taken twice daily for two weeks
Anisopus manii (l)+*Cadaba farinosa*(l)	Dried	Powdered	1 teaspoonful is taken in yoghurt daily for two weeks
Anisopus manii (l)+*Sterculia setigera*(sb)+ *Cadaba farinosa* (l)+*Vernonia amygdalina*(l)	Dried	Decoction	Taken orally 1 cup twice daily for 3 weeks
Hyphaene thebaica(fr)	Dried	Decoction	Taken orally I cup for two weeks
Anisopus manii (sb)+*Vitex cienkowskii*(s)+*Hibiscus sabdariffa*(fr)	Dried	Decoction	1/2cup twice daily for two weeks
Leptadenia hastata (l)+red potash	Dried	Decoction	1 cup twice daily
Leptadenia hastata (l)+ *Cadaba farinosa* (l)	Dried	Decoction	Taken orally 1 cup twice daily for two weeks
Leptadenia hastata (l)+*Moringa oleifera*(l)	Fresh	Decoction	1 cup daily
Leptadenia hastata (l)+*Stereospermum kunthinum*(sb)	Dried	Powdered	1 teaspoon is taken in water
Khaya senegalensis(sb)	Dried	Powdered	1 scoop of groundnut shell in 1 cup of water
Cadaba farinosa (l)	Dried	Powdered	1 teaspoon is taken in yoghurt twice daily
Annona senegalensis(r)+*Paradaniellia oliveri*(sb)+*Detarium microcarpum*(sb)	Dried	Decoction	1 cup twice daily for two weeks
Vernonia amygdalina(l)+*Amaranthus* hybridus(l)	Fresh	Crush	½ teaspoon of the extract is taken for 2 weeks
Echinochloa stagnina+red potash	Dried	Powdered	In water 1 cup daily
Vernonia amygdalina(l)+*Trigonella foenum-*(sd)	Dried	Powdered	1 teaspoonful is taken in water in an empty stomach
Senna occidentalis(l+r)+red potash	Dried	Decoction	1 cup daily for two weeks
Afzelia africana(sb)	Dried	Infusion	1 cup daily in an empty stomach
Chrozophora senegalensis(sb+r)+red potash	Dried	Infusion	1 cup daily
Lannea microcarpa(l)+*Isoberlinia doka*(sb)	Dried	Powdered	1 teaspoon is taken in yogurt daily for 2 weeks
Ficus thonningii(sb)+red potash	Dried	Decoction	1 cup thrice daily
Moringa oleifera(l)+Mangifera indica(l)	Fresh	Decoction	1 cup daily
Adasonia digitata (fr)	Dried	Maceration	1 cup thrice daily
Cassia tora(l)	Dried	Powdered	To be taken with yoghurt
Dichrostachys nutan +*Ximenia americana*+red potash	Dreied	Decoction	1 cup daily
Cadaba farinosa + Tamarindus indica	Fresh	Decoction	I cup daily
Erythrina senegalensis	Dried	Boil	Orally 1 cup twice daily

l-leaf, sb-stem bark, sd-seed, r-root, fr-fruit

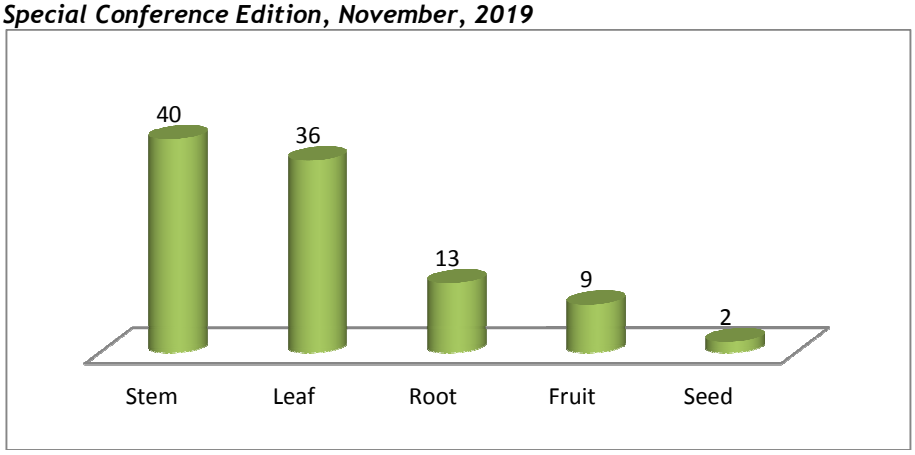

Figure1: percentage distribution of plant parts used

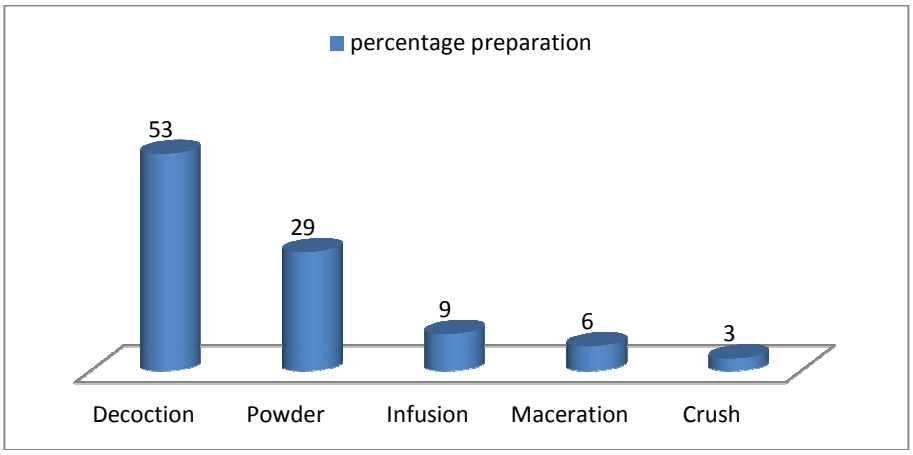

Figure 2: Percentage distribution of method of preparation

CONCLUSION

A total of 39 medicinal plants were recorded in this study for the treatment of diabetes mellitus in the study area. *Annisopus manii*, *Laptadenia hastata* and *Moringa oleifera* were the most cited medicinal plants in the preparation of recipes for the treatment of diabetes mellitus in the study area. Stem and leaves were the most used plant parts and decoction was the most common preparation method for the treatment of the disease. However, further studies need to be conducted to prove the efficacy of the plants both *in vitro* and *in vivo*.

REFERENCES

Abubakar, U.S., Yusuf, K.M., Abdu, G.T., Saidu, S.R., Jamila, G.A. and Fatima, A. (2017). Ethnorpharmacological survey of medicinal plants used for management of pediatric ailments in Kano state, Nigeria. *Research Journal of Pharmacognosy*, 4(3):29-39

Ali, M., Diso, S.U., Minjibir, A.A., Sani, J.A., Nas, F..S. and Yahya, A. (2017). Assessment of medicinal plants used in treatment of various ailment in Kano city Nigeria. *Asian Journal of Bioresources technology*, 2(4):1-11

Bello, A., Aliero, A.A., Saidu, Y. and Muhammad, S. (2011). Hypoglycaemic and Hypolipidaemic effects of *Laptadenia hastata* Pers.) Decne in Alloxan Induced Diabetic Rats. *Nigerian Journal of Basic and Applied Sciences*, 19(2):187-192

Khan, W., Parveen R., Chester K., Parveen, S., and Ahmad, S.(2017). Hypoglycemic Potential of Aqueous extract of Moringa oleifera Leaf and *in vivo* GC-MS Metabolomics. *Frontiers in pharmacology*, 8(577):1-16

Negbenebor, H.E., Shehu, K., Mukhtar, M.F., Oiza, A.Z., Nura, S. and Fagwalawa, L.D. (2017). Ethno Botanical Survey of Medicinal Plants Used by Hausa People in the Management of Diabetes Mellitus in Kano Metropolis, Northern Nigeria. *European Journal of Medicinal Plants*, 18(2):1-10.

Oguejiofor, O., Odenigbo, C. and Onwukwe C. (2014). Diabetes in Nigeria: Impact,

Challenges, Future Direction. *Endocrinology and Metabolic Syndrome*, 3(2):1-9

Sabir, A.A., Balarabe, S., Atta, S.A., Simeon, I., Sada, K.B., Jimoh, A.O. and Sandra, O.I. (2019).Prevalence of Diabetes mellitus and its risk factors among the suburban population of Northwest Nigeria. *Sahel Medical Journal,* 20:168-172

Salihu, T.S., Bello, L., Hassan, S.W. and Ali, S. (2015). An ethnobotanical survey of antidiabetic plants used by Hausa–Fulani tribes in Sokoto, Northwest Nigeria. *Journal of Ethnopharmacology*, 172:91-99

Sani, S.B. and Nair,S.S. (2017). Studies on *in vitro* evaluation and antidiabetic potentials of watermelon and pomegranates peels. *Bayero Journal of Pure and Applied Sciences,* 10(1):32-35

Tilburt, T.C. and Kaptchuk, T.J. (2003). Herbal medicine research and global health:an ethical analysis. Buletin of the world Health Organization, 86(8):594-599..

Ukwuani, A.N. and Igbokwu, M.O (2015). In vitro antidiabetic effect of *Leptadenia hastata* leaves. *Biosciences Research in Today's World*, 1:40-46

Zaruwa, M.Z, Manosroi, J., Akihisa, T. and Manosroi, A. (2018). Manosrin a new hypoglycaemic compound from *Anisopus mannii* N.E.Br. *international Journal of Advanced Research and Publications*, 2(8):72-78

Appendix 1

BAYERO UNIVERSITY KANO

DEPARTMENT OF PLANT BIOLOGY

MEDICINAL PLANTS FOR DIABETESE MANAGEMENT

RESEARCH QUESTIONNAIRE

1. Date ……LGA…….
2. Name……..
3. Address …….
4. Gender……..
5. Occupation ……..
6. Formal training in herbal/plant medicine:10yrs [ ] 10-20yrs [ ] 21-30yrs [ ] 31yrs & above
7. Do you have any knowledge of diabetes? Yes [ ] No [ ]
8. Diagnostic measure: Observation of the patient [ ] Patient feedback [ ]
9. Are there herbal remedies for diabetes? Yes [ ] N0[ ]
10. Plant(s) used?
    ……
    ……
11. Plant part(s) used (?)in medicine: Leaf [ ] Stem bark [ ] Root [ ] Flower [ ] Fruit[ ] Seed [ ]
12. How plant part(s) is used? Fresh [ ] Dried [ ]
13. Is this part(s) used in combination with other ingredient(s)?
    Yes…… No [ ]
14. Method of preparation for used ……..
15. Method of administration……
16. Dosage form……..
17. Any other information
    ……
    ……