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Experience of Tanzanian Traditional Healers in the Management of Non-insulin Dependent Diabetes Mellitus

Mainen J. Moshi and Zakaria H. Mbwambo

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Abstract

Traditional healers from four wards of the Kilosa district, Morogoro region (Tanzania) were interviewed to assess their knowledge and competence in the management of non-insulin dependent diabetes mellitus (NIDDM). Among 65 reputed healers who were interviewed, 21 (32.3%) recognised and were treating one or more symptoms related to NIDDM, but none could unambiguously relate the symptoms they were treating with NIDDM. Based on what the traditional healers revealed, 54 plants representing 54 species, 48 genera and 33 families were collected. Two of the Kilosa plants, *Cassia auriculata* and *Ricinus communis* are reported to have a hypoglycaemic activity, while *Securinega virosa* has been shown to improve oral glucose tolerance in rabbits. *Albizzia anthelmintica* has hypocholesterolemic activity and some of the plants also have antibacterial and antifungal activity which may benefit NIDDM patients. Some of the ethnomedical reports of the Kilosa healers, related to management of diabetes, have been reported from other areas. However, one of the reported plants, *Albizzia versicolor*, is toxic. We conclude that the traditional healers of Kilosa district can not unambiguously diagnose diabetes mellitus as a disease entity, but some of them recognise symptoms characteristic of the disease and they are well-known with plants that may be useful in alleviating its symptoms. Two of the plants they mentioned, *Cassia auriculata* and *Ricinus communis*, have a proven hypoglycaemic effect. Careful sieving of the knowledge in the custody of the Kilosa district healers is needed to sort out possibly toxic plants and to determine the other properties of these plants that may be useful in the management of diabetes mellitus.

Keywords: Diagnosis, non-insulin dependent diabetes mellitus, management, plants, traditional healers.

Latin bionomials:

Acacia tortilis (Forsk) Hayne
Albizzia anthelmintica Brogn.
Albizzia versicolor Oliv (Welw. ex Oliv)
Asparagus buchananii
Bridelia micrantha Bertol
Cassia auriculata L.
Cassia singueana Del
Combretum molle (R.Br) G.Don
Cymbopogon citratus Stapf
Deinbollia borbonica Schweinff
Diospyrous usambarensis Gurke, F. White
Ehretia amoena Klotsch
Ficus capensis Thumb.
Ficus exasperata Vahl
Grewia forbesii Harv. ex. Mast
Heteromorpha trifoliata (Wendl) Eckl. & Zeyh
IGelia africana (Lam) Benth.
Lannea schimperi (A. Rich.)
Moringa oleifera Lam.
Maytenus senegalensis (Lam) Exell
Ozoroa insignis (Del) Kuntz
Ricinus communis L.
Securidaca longepedunculata Fresen
Securinega virosa (Roxb. ex. Willd) Baill

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Suregada Zanzibariensis (Baill) Muell. Arg
Zanthoxylum chalybeum Engl

Introduction

In Tanzania, as in many developing countries, non-insulin dependent diabetes mellitus (NIDDM) is a growing problem. Socio-economic changes occurring in these countries, resulting in affluence and sedentary lifestyles are some of the contributing factors. An explosion of cases of NIDDM as a result of changes in dietary patterns and living habits, has been reported among the Australian Aborigines (O'dea, 1984) and the Polynesians and Amerindians of Canada (Young, 1993). The extent of this problem is reaching epidemic proportions, for in some countries the prevalence has reached five times that in the West (King & Rewers, 1993). Amidst this crisis, resources to manage diabetes and its complications among developing countries continue to dwindle. In recent years, we have witnessed massive cuts on health budgets resulting in the shortage of drugs in hospitals and increasingly leaving most of the poor population without medical care. This is more evident in rural areas where people are increasingly becoming dependent on traditional healers for their day-to-day health care (Gessler et al., 1995). Similarly, according to a recent unpublished survey done by the authors, there is a growing population of people in urban areas who are now consulting traditional healers for the treatment of diabetes, hypertension, impotence and other diseases. Given the extent of the diabetes epidemic as correctly indicated by the WHO Ad Hoc Diabetes Reporting Group (King & Rewers, 1993), it is very likely that traditional healers are going to be called upon to assist in the management of diabetic patients. The problem at hand is that the competence of the healers in this area is still an issue of debate.

In Tanzania, very often these days, one comes across traditional healers claiming to have plant preparations for treating diabetes. Indeed, such claims of healers being able to cure diabetes are abundant. While these claims still remain unproven, they have quite an impact on patients. It is in this spirit that we have embarked on assessing the indigenous resources to see how traditional healers could be of help in dealing with this problem. We present a case study of the experience of traditional healers in the Kilosa District (Morogoro, Eastern Tanzania). Information collected from interviews and published literature on plants have been used to make a preliminary evaluation of the claims on the management of NIDDM and its complications.

Materials and methods

Study setting

The study was conducted in Kilosa District, Morogoro Region, in August 1997. It involved Traditional Healers from

four wards, Iyogwe, Chanzulu, Kimamba and Kidodi, who are reputed for traditional medicine practice.

Knowledge on diabetes

Healers in each village were given prior information about the visit and on the appointed date, they all assembled in one area (primary schools or local government offices). The symptoms of diabetes mellitus, namely, polyuria, polydipsia, excessive thirst, sweating and general body weakness, were described to the healers. The healers who recognized or had attended patients with these symptoms were enrolled for a detailed interview.

Detailed interview

During the detailed interview each healer was interviewed alone to make sure confidentiality is maintained among them. This is necessary if one is to cultivate confidence among the healers. During the interview, healers recognising the symptoms of diabetes were asked to name the disease presenting with those symptoms. Those healers who mentioned diabetes ("Kisukari" in Kiswahili) were required to mention the plants they used for the treatment. Similarly, for those who could not recognise diabetes, an expanded list of symptoms presenting in diabetes were given to the healers and they were required to mention the plants they used to treat each of the symptoms. Such symptoms included general body weakness, pain or fatigue, headache or back pain. Lack of strength/vitality, numbness, cramping of feet/legs or hands/arms, fainting spells or dizziness, chest pain or heart disease. Also impotence, thirst, diarrhoea at night, excessive sweating, chronic infected skin sores and ulcers, gangrene of toes or feet fungal infection (*Candida* infection of vagina, feet, hands, nails), chronic foot sores that do not heal, round, brown slightly raised, painless lesions on sheens or back of hand and passage of urine which attracts insects. Similarly, case presentations – with and without photographs – were made to the healers and they were required to identify the conditions described or shown in photographs and mention the treatment used for each condition. If any three of the list of symptoms in the expanded diabetes diagnostic criteria were treated by the same plant or if a plant was mentioned three or more times for the treatment of the same symptom, this plant was recorded as potentially useful in diabetes management.

Detailed information, including ethnobotanical, ethnomedical, economical uses, etc., for the identified candidate plants were recorded. Vouchers for each of the identified plants were collected, dried and taken back to the Institute of Traditional Medicine for identification and literature search. The plants were identified by Mr E.B. Mhoro of the Institute of Traditional Medicine. All the vouchers have been deposited in the herbarium of the Institute of Traditional Medicine, Muhimbili University College of Health Sciences.

Results

Knowledge about diabetes

A total of 65 traditional healers was interviewed. Among these healers, 32.3% (21 healers) recognised and were treating one or more symptoms related to NIDDM. None of these healers related the symptoms they were treating with diabetes mellitus. Only treatment of symptoms seemed to be familiar, but none of the healers could unambiguously relate the symptoms to diabetes mellitus.

Identification of plants for treatment of diabetes

A total of 54 plant vouchers representing 54 species, 48 genera and 33 families was collected. Table 1 shows the list of the plants collected. Table 2 shows a classification of the use of the collected plants made based on the information obtained from the interviews. The plants fall under four groups; plants which, according to the interviews, are used for a syndrome which may be similar to NIDDM, plants used for the treatment of fungal infections, plants used for impotence or as aphrodisiacs, and plants used to lower blood pressure. Table 3 shows plants that are reported in literature (with the respective references) to have NIDDM related ethnomedical claims or plants that have shown in biological tests to have activities that may benefit diabetic patients. The table shows that two plants *Cassia auriculata* and *Ricinus communis* have a hypoglycaemic activity while *Albizia anthelmintica* has hypocholesterolemic activity and *Securinega virosa* has been shown to improve oral glucose tolerance in rabbits. *Albizia anthelmintica*, *Bridelia micrantha*, *Ficus capensis*, *Grewia forbesii*, *Kigelia africana*, *Securidaca longepedunculata* and *Zanthoxylum chalybeum* are reported to be used as aphrodisiacs. *Suregada zanzibariensis*, *Zanthoxylum chalybeum*, *Securidaca longepedunculata*, *Ricinus communis*, *Ozoroa mucronata*, *Maytenus senegalensis*, *Kigelia africana*, *Heteromorpha tripholiata*, *Grewia forbesii*, *Ehretia amoena*, *Deinbollia borbonica*, *Albizia versicolor*, *Albizia anthelmintica*, *Asparagus buehneri*, *Cassia singueana* and *Combretum molle* are reported to have antibacterial activity. *Combretum molle*, *Deinbollia borbonica*, *Grewia forbesii*, *Lannea schimperi*, *Ricinus communis* and *Zanthoxylum chalybeum* have antifungal activity. *Securidaca longepedunculata*, *Lannea schimperi*, *Deinbollia borbonica* are reported to be useful in lowering blood pressure, while, *Securidaca longepedunculata* contains sucrose derivatives that may be useful for diabetic patients.

Discussion

This study shows that some of the Kilosa traditional healers have knowledge about the symptoms of diabetes mellitus. However, from the information that was obtained from the interviews, there is no evidence that any one of them has

expertise or detailed knowledge about diabetes mellitus. The evidence thus obtained suggests that they recognise a number of symptoms presenting in NIDDM including the classical symptoms of polyuria, polydipsia and excessive thirst. They are also aware of symptoms that occur much later as complications of NIDDM such as fungal and bacterial infections, impotence and cardiovascular conditions, but they only deal with them in isolation without any clear knowledge of any other pre-disposing pathology. Among the plants listed on Table 2, nine plants, *Lannea schimperi*, *Diospyros usambarensis*, *Cyphostemma* spp., *Bridelia micrantha*, *Acacia tortilis*, *Ehretia amoena*, *Albizia anthelmintica*, *Cymbopogon citratus* and *Moringa oleifera* are used for treatment of the overt symptoms of NIDDM (i.e., polyuria, polydipsia, excessive thirst and sweating). None of these plants has so far been reported to have hypoglycaemic activity. *Albizia anthelmintica* has previous reports showing that it has been used elsewhere as an aphrodisiac (Bally, 1937; Kokwaro, 1976; Merker, 1910), which may be related to the management of impotence. Impotence is one of the manifestations of autonomic neuropathy in diabetics. Similarly, there is a report showing that *Albizia anthelmintica* has hypocholesterolemic activity (Johns et al., 1999), an effect that may be useful for prophylaxis and management of atherosclerosis which is one of the secondary complications of NIDDM. We have, in this laboratory, tested *Diospyros usambarensis* and *Ehretia amoena* from another district, but did not find hypoglycaemic activity (unpublished report). *Cassia auriculata* is among the plants used by the Kilosa healers for treatment of impotence. This has not been reported in literature before, but there are reports that it has been used for the treatment of diabetes (Nagaraju & Rao, 1990; Reddy et al., 1991; Jain & Sharma, 1967). Shrotri and colleagues (Shrotri et al., 1963) showed that the aqueous extract of *Cassia auriculata* has hypoglycaemic activity. *Ricinus communis* is another plant which has hypoglycaemic activity (Matheau & Sichel, 1931). Ethnomedical reports show that it is used for the treatment of scabies (Abreu et al., 1999) and bacterial infections (Sawhney et al., 1978b; Misas et al., 1979; Verpoote & Dihal, 1987) both of which may benefit diabetic patients and augment the benefits derived from its hypoglycaemic effect. Both activities have been confirmed in the laboratory (Sawhney et al., 1978b; Misas et al., 1979; Singh et al., 1994; Rai, 1996). The literature information on Table 3 shows that seven plants have been used as aphrodisiacs, but there is no report that they have hypoglycaemic activity. Among the plants listed in this category, we have had an opportunity to test *Albizia versicolor*, *Deinbollia borbonica*, *Ehretia amoena*, *Ficus exasperata*, *Kigelia africana* and *Securinega virosa* for the ability to improve glucose tolerance during oral glucose tolerance (unpublished report). Only *Securinega virosa* prevented the escalation of post prandial blood glucose but did not cause hypoglycaemia (Moshi et al., 2000). *Albizia versicolor* worsened glucose tolerance and it has been reported to be toxic to sheep and goats (Gummow et al., 1992; Soldan et al., 1996). The case of *Albizia*

Table 1. A list of plants used for treating diabetes related symptoms in Kilosa district.

Botanical name (family)	Vernacular name
<i>Abrus precatorius</i> L. (Papilionaceae)	Lufambo/lufyambo
<i>Acacia nilotica</i> (L) Del. Subsp. <i>Leiocarpa</i> (Mimosaceae)	Mkongowe
<i>Acacia tortilis</i> (Forsk) Hayne (Mimosaceae)	Kikwesa/chikwesa
<i>Albizzia anthelmintica</i> Brogn. (Mimosaceae)	Mkuleta
<i>Albizzia versicolor</i> Oliv (Welw. ex Oliv) (Mimosaceae)	Mkingu/mchingu
<i>Alternanthera pungens</i> H.B.& K. (Amaranth.) (Amaranthaceae)	Mbigiri kubwa
<i>Amocarpom</i> spp. (Polygalaceae)	Msingisingi/msigisigi
<i>Asparagus buechananii</i> Bak. (Liliaceae)	Kakwangasale
<i>Astripomoea hyoscyamoides</i> (Vatke) Verdc. (Convolvulaceae)	Kigugile/chigugile/ kigugile kidogo
<i>Bridelia micrantha</i> Bertol (Euphorbiaceae)	Kitovutovu
<i>Carvalhoa macrophylla</i> K. Schum (Apocynaceae)	Kiberuberu
<i>Cassia auriculata</i> L. (Caesalpiniaceae)	Mhumba
<i>Cassia singueana</i> Del (Caesalpiniaceae)	Pumbunyama/mlewelewe/ mhumbahumba
<i>Carica papaya</i> L. (Caricaceae)	Mpapai dume
<i>Celtis zenkeri</i> Engl. (Ulmaceae)	Mhenga
<i>Clausena anisata</i> (Willd) Oliv (Rutaceae)	Kalivumbula/mjavikali
<i>Cyphosterna buechananii</i> (Planch) Descoigns (Vitaceae)	Mwengele jike
<i>Combretum molle</i> (R. Br) G. Don (Combretaceae)	Mlama/mlama meusi/ malamula/muhenga
<i>Cymbopogon citratus</i> Stapf (Graminae)	Majani ya chai
<i>Cynoglossum lanceolatum</i> Forsk (Boraginaceae)	Kifasa
<i>Dalbergia melanoxylon</i> guill (Papilionaceae)	Muhingo
<i>Deinbollia borbonica</i> Schweinff (Sapindaceae)	Mtambala kuzimu
<i>Diospyrous usambarensis</i> Gurke, F. White (Ebenaceae)	Mgoto
<i>Diplorhynchus condylocarpon</i> (Mull. Arg) Pichon (Apocynaceae)	Mtogatogo
<i>Dombeya shupangae</i> K. Schum (Sterculiaceae)	Mtoyo/mruati
<i>Ehretia amoena</i> Klotzsch (Mimosaceae)	Mkirika
<i>Ficus capensis</i> Thumb. (Moraceae)	Mkuyu
<i>Ficus exasperata</i> Vahl (Moraceae)	Mshasha
<i>Grewia forbesii</i> Harv. ex. Mast (Tiliaceae)	Mkongodeka
<i>Heteromorpha trifoliata</i> (Wendl) Eckl. & Zeyh (Apiaceae)	Mgombagomba
<i>Hippocratea indica</i> Willd. (Hippocrateaceae)	Mweleka
<i>Hoslundia opposita</i> Vahl (Labiatae)	Mmolwe/molwe
<i>Kigelia africana</i> (Lam) Benth. (Bignoniaceae)	Mwegea
<i>Lannea schimperi</i> (A. Rich.) (Anacardiaceae)	Mumbu nyika
<i>Leonotis mollissima</i> Gurke (Labiatae)	Muunga mkulu/mpatakwa
<i>Moringa oleifera</i> Lam. (Moringaceae)	Mlong'e
<i>Maytenus senegalensis</i> (Lam) Exell (Celastraceae)	Mwangangoma
<i>Ochna alboserrata</i> Engl (Ochnaceae)	Mkambi
<i>Olea hochstetteri</i> Baker (Oleaceae)	Mwene
<i>Ozoroa insignis</i> (Del) Kuntz (Anacardiaceae)	Mkamachuma
<i>Phyllanthus guineensis</i> Pax (Euphorbiaceae)	Mkwambe maji
<i>Phyllanthus reticulatus</i> Poir (Euphorbiaceae)	Mkwambe kipini
<i>Punica granatum</i> L. (Punicaceae)	mkomamanga
<i>Ricinus communis</i> L. (Euphorbiaceae)	Mnyonyo
<i>Securidaca longepedunculata</i> Fresen (Polygalaceae)	Masukemengi
<i>Securinea virosa</i> (Roxb. ex. Willd) Baill (Euphorbiaceae)	Mkwamba
<i>Solanum incanum</i> L. (Euphorbiaceae)	Mtula
<i>Strychnos spinosa</i> Lam (Loganiaceae)	Mtongatonga
<i>Strychnos</i> spp. (Loganiaceae)	Mruturutu
<i>Suegada Zanzibariensis</i> (Baill) Muell. Arg (Euphorbiaceae)	Mdimu pori
<i>Syzygium guineense</i> (Willd) DC (Myrtaceae)	Muvengere
<i>Terminalia mollis</i> Laws (Combretaceae)	Mdyamhofu
<i>Vernonia hildebrandtii</i> Vatke (Compositae)	Mwarobaini
<i>Zanha africana</i> (Radlk) Excell. (Sapindaceae)	Mdahula
<i>Zanthoxylum chalybeum</i> Engl (Rutaceae)	Mkunungu

Table 2. Symptom based classification of plants as used by the Kilosa healers.

Diabetes mellitus related symptoms	Botanical name	Traditional name	Part used
Overt NIDDM symptoms (polyuria, polydypsia, excessive thirst and passage of urine which attracts insects)	<i>Lannea schimperi</i>	Mbumbunyika	Stem bark
	<i>Diospyros usambarensis</i>	Mgoto	Roots
	<i>Cyphosterna</i> spp.	Kigugire/kigugile kidogo	Roots and leaves
	<i>Bridelia micrantha</i>	Kitovutovu	Roots
	<i>Acacia tortilis</i>	Kikwesa/chikwesa	Roots
	<i>Ehretia amoena</i>	Mkirika	Roots
	<i>Albizzia anthelmintica</i>	Mkutani	Roots
	<i>Cymbopogon citratus</i>	Majani ya chai	Leaves
	<i>Moringa oleifera</i>	Mlong'e	Roots
	<i>Cyanoglossum lanceolatum</i>	Kifasa	Roots
Fungal infections	<i>Dalbergia melanoxyllon</i>	Muhingo	Roots
	<i>Ficus exasperata</i>	Mshasha	Roots
	<i>Ficus capensis</i>	Mkuyu	Roots
	<i>Heteromorpha trifoliata</i>	Mgombagomba	Roots
	<i>Hippocratea indica</i>	Mweleka	Roots
	<i>Phyllanthus reticulatus</i>	Mkwambe kipini	Stem and root barks
	<i>Phyllanthus guineensis</i>	Mkwambe meji	Roots
	<i>Albizzia anthelmintica</i>	Mfuleta	Roots
	<i>Combretum molle</i>	Mlama	Leaves
	<i>Leonotis mollissima</i>	Mpatakwa	Leaves
	<i>Strychnos</i> spp.	Mruturutu	Leaves
	<i>Syzygium guineense</i>	Muvengere	Roots
	<i>Alternanthera pungens</i>	Mbigiri kubwa	Roots
	<i>Abrus precatorius</i>	Lufambo/lufyambo	Roots
	<i>Olea hochstetteri</i>	Mngwene	Roots
	<i>Deinbollia borbonica</i>	Mtambala kuzimu	Roots
	<i>Carica papaya</i>	Mpapai dume	Roots
	<i>Kigelia africana</i>	Mwegea	Roots
Impotence/aphrodisiac	<i>Securidaca longepedunculata</i>	Masuke mengi	Stem bark
	<i>Ochna alboserrata</i>	Mkambi	Stem
	<i>Celtis zenkeri</i>	Mhenga	Roots
	<i>Zanha africana</i>	Mdahula	Roots
	<i>Ozoroa insignis</i>	Mkamachuma	Roots
	<i>Amocarpon</i> spp	Msingisingi	Roots
	<i>Abrus precatorius</i>	Lufambo	Roots
	<i>Carica papaya</i>	Papai dume	Roots
	<i>Cassia singueana</i>	Pumbunyama	Roots
	<i>Cyanoglossum lanceolatum</i>	Kifasa	Root/leaves
	<i>Vernonia hildebrandtii</i>	Mwarobaini	Roots
	<i>Diplorhynchus condlylocarpon</i>	Mtgotogo	Roots/tubers
	<i>Calvalhoa macrophylla</i>	Kiberuberu	Roots
	<i>Punica granatum</i>	Mkomamanga	Roots
	<i>Dalbergia melanoxyllon</i>	Mpingo	Roots
	<i>Solanum incanum</i>	Mtula	Roots
	<i>Strychnos spinosa</i>	Mtongatonga	Roots
	<i>Albizzia versicolor</i>	Mkingu	Roots
	<i>Astripomea hyoscyamoides</i>	Kigugile	Roots
General body weakness (Tonics)	<i>Diospyros usambarensis</i>	Mgoto	Roots
	<i>Cassia auriculata</i>	Mhumba	Roots
	<i>Suregada zanzibariensis</i>	Mdimu pori	Roots
	<i>Lannea schimperi</i>	Mumbunyika	Roots
	<i>Hoslundia opposita</i>	Molwe	Roots
Blood pressure	<i>Ehretia amoena</i>	Mkirika	Roots
	<i>Clausena anisata</i>	Mjavikali	Roots
	<i>Zanthoxylum chalybeum</i>	Mkunungu	Roots

Table 3. Plants with previously reported ethnomedical uses/biological activity that may be useful in the management of NIDDM.

Plant name	Previously reported ethnomedical uses/biological activity that may be useful in the management of NIDDM
<i>Albizia anthelmintica</i>	Aphrodisiac (Bally, 1937; Kokwaro, 1976; Merker, 1910), antibacterial (Samuelsson et al., 1992; Chhabra & Uiso, 1991; Arnold & Gulumian, 1984), hypocholesterolemic (Johns et al., 1999)
<i>Albizia versicolor</i>	Antibacterial (Chhabra & Uiso, 1991; Arnold & Gulumian, 1984), toxic to goats and sheep (Gummow et al., 1992; Soldan et al., 1996)
<i>Asparagus buechananii</i>	Antibacterial (Hedberg et al., 1983a)
<i>Bridelia micrantha</i>	Aphrodisiac (Bouquet & Debray, 1974), antibacterial (Le Grande, 1989; Kerharo, 1963; Le Grande et al., 1988); treatment of wounds (Arnold & Gulumian, 1984)
<i>Cassia singueana</i>	Antibacterial (Mutasa et al., 1990; Hussain & Deeni, 1991)
<i>Cassia auriculata</i>	Used to treat skin diseases and bronchitis (Vedavathy & Rao, 1991); used for diabetes (Nagaraju & Rao, 1990; Reddy et al., 1991; Jain & Sharma, 1967) and an aqueous extract showed hypoglycaemic activity (Shrotri et al., 1963).
<i>Combretum molle</i>	Used to treat tuberculosis and diarrhea (Hedberg et al., 1983a; Lall & Meyer, 1999) and has been shown to possess both antibacterial (Lall & Meyer, 1999; Eloff, 1998; Khan et al., 2000) and antifungal activity (Baba-Moussa et al., 1999) but the fruit is reported to be toxic to men (Panzini et al., 1993).
<i>Dalbergia melanoxylon</i>	Used to treat headache, joint pains (Hedberg et al., 1983b)
<i>Deinbollia borbonica</i>	Used to treat gonorrhea, dysentery and wounds (Bhat et al., 1990; Sawhney et al., 1978b) and cardiac palpitations and hypertension (Chhabra et al., 1993). It has antifungal activity against <i>Candida albicans</i> and <i>Trichophyton mentagrophytes</i> (Sawhney et al., 1978b)
<i>Diplorhynchus condylocarpon</i>	Used to treat gonorrhea, pneumonia, leprosy and dysentery (Chhabra et al., 1987; Chhabra & Uiso, 1991)
<i>Ehretia amoena</i>	Used for skin diseases (Chhabra et al., 1984), treatment of wounds pneumonia and dysentery (Chhabra et al., 1987).
<i>Ficus capensis</i>	The fruit is used to treat impotence (Bouquet & Debray, 1974; Kerharo & Bouquet, 1950). The stem bark has antibacterial activity (Laurens et al., 1985).
<i>Grewia forbesii</i>	Used as aphrodisiac (Haerdi, 1964; Hedberg et al., 1983b; Chhabra et al., 1993), used to treat diarrhea and leprosy (Chhabra et al., 1993), and has been shown to have antifungal activity (Sawhney et al., 1978b)
<i>Lannea schimperi</i>	The leaves are used to treat bloody diarrhea and chest problems (Chhabra et al., 1983) and has been proven to have antibacterial activity (Chhabra & Uiso, 1991). It is also used to treat backache and general body weakness (Chhabra et al., 1987).
<i>Kigelia africana</i>	Used to treat venereal diseases, diarrhea and syphilis (Sharma & Kaul, 1993), wounds and ulcers (Sawhney et al., 1978a) and has been shown to have antibacterial activity (Khan et al., 1980; Taniguchi et al., 1978). It is also used as an aphrodisiac (Kokwaro, 1981).
<i>Heteromorpha trifoliata</i>	Used to treat backache and headache (Deans et al., 1994), Used for scabies (Recio et al., 1995; Heyndrickx et al., 1992), antifungal (Deans et al., 1994; Desta, 1993; Villegas et al., 1988), hypotensive (Parry & Duri, 1996)
<i>Maytenus senegalensis</i>	Antibacterial (Lall & Meyer, 1999; Chhabra & Uiso, 1991), used as a chewing stick (Delaveau et al., 1979)
<i>Ozoroa mucronata</i>	Antibacterial and antifungal activity (Abreu et al., 1999)
<i>Ricinus communis</i>	Used to treat scabies (Manandhar, 1995), skin diseases (Al-Said, 1993), venereal diseases (Sawhney, 1978b) and paralysis (Samuelsson et al., 1992). Some laboratory studies have shown that extracts of the plant have antibacterial (Sawhney et al., 1978b; Misas et al., 1979; Verpoorte & Dihal, 1987) and antifungal activity (Singh et al., 1994; Rai, 1996). A 50% aqueous ethanolic extract of the leaves showed hypoglycaemic activity in rats (Mathieu & Sichel, 1931) but the seeds are toxic to man (Gowanloch & Brown, 1943).
<i>Securidaca longepedunculata</i>	Used as aphrodisiac (Azevedo & Madeiros, 1963; Arnold & Gulumian, 1984; Watt & Breyer-Brandwijk, 1962; Hedberg et al., 1983b), used to treat palpitations (Chhabra et al., 1991; Hedberg et al., 1983b) and has been shown to lower blood pressure (Ojewole & Odebiyi, 1983); has antibacterial activity (Desta, 1993; Taniguchi et al., 1978; Odebiyi, 1978). It contains a sucrose derivative that may be useful for diabetics (De Tommasi et al., 1993)
<i>Securinega virosa</i>	Improved glucose tolerance in rabbits (Moshi et al., 2000)
<i>Strychnos spinosa</i>	Antibacterial (Laurens et al., 1985)
<i>Suregada zanzibariensis</i>	Antibacterial (Hedberg et al., 1983a)
<i>Terminalia mollis</i>	Antifungal (Baba-Moussa et al., 1999)
<i>Vernonia hildebrandtii</i>	Used to treat paralysis of limbs (Samuelsson et al., 1992)
<i>Zanthoxylum chalybeum</i>	Used as aphrodisiac, for heart affections, pneumonia and diarrhea (Chhabra et al., 1991; Hedberg et al., 1983b). It is also used as a tooth brush (Taniguchi et al., 1978) and has proven antibacterial and antifungal activity (Taniguchi et al., 1978; Khan et al., 1980).

versicolor, toxicity may not be unique. *Securinega virosa* is known to contain pyrrolizidine alkaloids (Ikertubosin & Mathieson, 1963), which are known toxic compounds (Uiso & Johns, 1995). These are few reports but they are eye openers to the fact that some of these plants may be toxic, so scrutiny of reports from the healers is very much desired.

Hypertension is one of the secondary complications of NIDDM. Plants which lower blood pressure could be useful as an adjunct therapy for the management of diabetes. *Zanthoxylum chalybeum* is used in Kilosa for lowering blood pressure which agrees with previous reports that it has been used for the treatment of heart affections and as an aphrodisiac (Chhabra et al., 1991; Hedberg et al., 1983b). Although the three reports are in agreement no laboratory proof has been obtained to support these claims. *Deinbollia borbonica* (Chhabra et al., 1993) and *Securidaca longepedunculata* (Chhabra et al., 1991; Hedberg et al., 1983b) are also claimed to treat hypertension and cardiac palpitations.

We conclude that the traditional healers of Kilosa district can not unambiguously diagnose diabetes mellitus as a disease entity, but some of them recognise symptoms characteristic of the disease and they are well-known with plants that may be useful in alleviating the symptoms of this disease. Two of the plants they mentioned *Cassia auriculata* and *Ricinus communis* have a proven hypoglycaemic effect. Careful sieving of the knowledge in their custody is needed to sort out possibly toxic plants and to determine the other properties of these plants that may be useful in the management of diabetes mellitus.

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