

Use of medicinal plants among Ethiopian patients with diabetes: A qualitative exploration

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Abstract

Background: Most studies on the use of medicinal plants reported from Africa (including Ethiopia) have focused on the clinical actions of medicinal plants with little attention given to patient experiences in using these plants and factors impacting patients' decisions about using them.

Objectives: The main objective of this study is to explore the experiences of patients with diabetes attending treatment in the biomedical setting regarding their use of medicinal plants.

Methods: Qualitative interviews were held with 39 purposively selected participants attending their treatment in 3 public hospitals in urban centers of central Ethiopia. Interviews continued until key themes were saturated.

Results: Medicinal plants were used alongside prescribed medicines with a range of factors impacting study participants decisions to trying out and continuing to use medicinal plants and also in recommending against their use or discontinuing them. Some of the main factors that encouraged use of medicinal plants include perceptions that bitter things were thought to be good for diabetes, their claimed and experienced benefits as well as the influence of others and the media while those that discouraged the use of medicinal plants primarily include safety concerns in relation to using the plants.

Conclusions: The findings highlight the use of medicinal plants by patients with diabetes in the context of limited information. This is suggestive of the need for the healthcare practitioners in the conventional healthcare system to give more attention to patients' interest in medicinal plants and for providing more evidence-based information about the plants used by these patients so as to improve health outcomes. [*Ethiop. J. Health Dev.* 2017;31(1):18-26]

Key words: medicinal plants, type 2 diabetes, Ethiopia, qualitative research

Introduction

Self-care practice using medicinal plants comprises one of the common forms of traditional medicine practices in Ethiopia. Limited quantitative surveys report that these practices are primarily used to treat acute conditions (1–3), although there are a few reports of its use in chronic conditions such as diabetes (4,5). It was also apparent from studies done elsewhere and in Ethiopia that sizeable proportions of patients with diabetes used medicinal plants alongside the biomedicines although there was little or no interaction in this regard with their healthcare providers. Few studies from Africa including Ethiopia have cited different reasons that patients reportedly gave for using medicinal plants. These include them being a traditional option, efficacy in managing their condition, less expensive, ease of access, less restriction in terms of diet as compared to biomedicines among other things (5–8). Furthermore, study participants had reported as to how they obtained information regarding these traditional medicines from lay individuals, mostly other patients, and that they had paucity of information about the recommended dosing (5,6,9). Some of the study participants had reported benefits from these medicinal plants including decrease in glycemic levels and resolution of diabetes-related symptoms but also experienced adverse effects including gastric disorders and hypoglycemic incidents (5,6).

Most of the studies reported from Africa, including the one from Ethiopia, focused on the clinical aspects of specific medicinal plants used, but little attention was given to the patient perceptions with regard to their experiences in using (or not using) these medicinal plants. With this in mind, this qualitative study aims to explore in an in-depth manner the experiences with medicinal plants of patients with diabetes who are attending treatment in the biomedical setting. This study intended to explore the perceptions of not only those participants who have used medicinal plants but also those who have not further aim to explore possible reasons for not using them.

Methods

A qualitative method was selected in order to focus on the views and experiences of the study participants(10). This study was approved by the Institutional Review Board of the College of Health Sciences, Addis Ababa University (protocol number 036/13/PSP). All the hospitals have been where the study took place and gave consent for the study which was part of a PhD thesis. All study participants have given their written consent for this study. Anonymity was maintained by storing all data and presenting findings in a way that they cannot be traced back to individuals.

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Study settings: Sites for this study were three public hospitals in central Ethiopia. Two, namely Tikur Anbessa Specialized Hospital and Yekatit 12 Hospital, are located in Addis Ababa (the political and commercial capital of Ethiopia). The third site, Butajira Hospital, which is the

only public hospital in Butajira town, was included to explore the perceptions of patients living in the peri-urban part of the country. A brief description of Addis Ababa and Butajira is given in Table 1.

Table 1: **Description of study settings**

	Addis Ababa	Butajira
Significance	Largest urban center in the country	Home to AAU's demographic surveillance site
Population(26)	3.2 million	63,000,000
Ethnic groups(27)	Amhara (47%), Guragie (16.3%), Oromo (19.5%) and Tigrie (6.2%)	Guragie (82%)
Religions (27)	Orthodox Christianity (74.7%), Islam (16.2%) and Protestant Christianity (7.8%)	Islam (51.3%), Orthodox Christianity (39.6%) and Protestant Christianity (8.7%)
Literacy (27)	85.3%	37.9%

Tikur Anbessa Hospital is the largest teaching and national referral hospital in Ethiopia which manages patients with diabetes in its Diabetes Center. This clinical center was managed by three endocrinologists and two internists attending the endocrinology subspecialty program who worked as consultants on a rotation basis during the study period, five to six Internal Medicine residents assigned to take the primary role in managing the patients during their month long attachments, six nurses and one recently recruited pharmacist. Yekatit 12 Hospital is a general hospital managed by the Addis Ababa City Administration which has recently become a training center for general practitioners (GP). Clinical services for patients with diabetes were primarily offered in the general outpatient department run during the study period by four general practitioners. Patients that were deemed to be in need of specialty care were referred to a medical clinic run by specialists who served on a rotation basis. Butajira is also a general hospital that has recently started serving patients with diabetes at a medical clinic along with other chronic conditions in the outpatient setting. This clinic was at the time run by a general practitioner and a nurse.

Study participants recruitment: Study participants were purposively selected patients with type 2 diabetes who were attending treatment during the study period in the selected hospitals. Criteria for inclusion in the study were: age 18 years and above, taking anti-diabetic medications for a minimum of one year and exhibiting no overt or known psychiatric problems. The sole exclusion criterion was being a healthcare provider. In addition, efforts were made to include patients with diverse socio-demographic and economic characteristics (e.g. age, sex, marital status, religious affiliation, educational and income level, employment status, place of residence) and illness duration. The recruitment of study participants was facilitated by the nurses working in the respective clinics. These providers identified the patients and introduced the study. The first author followed this up by

providing further information and recruiting eligible participants.

Interview methods: In-depth individual interviews with a median duration of 49 min (range from 30 to 120 min) were conducted starting from December 2013 until March 2014 by the first author. Interviews (completed in Amharic) were audio-recorded with the consent of participants. The interviews focused on the experiences that patients had with traditional medicinal plants including the types that they used, information sources about them, their reasons for trying out and using them, about any benefits obtained from them as well as concerns that they may have or experienced while using them. The interview guide was originally prepared in English and was translated to Amharic and then back to English to check its consistency, before the Amharic version was used for the study.

Data analysis: The interview data were transcribed by an experienced research assistant. The quality of the transcripts was checked by the first author by listening to randomly selected recordings from each site while reading the respective transcripts. These transcripts were repeatedly read which helped in the development of initial ideas which was followed by open coding to identify key content areas which were further classified into separate sub-themes and main themes using thematic analysis approach, which has been shown to be a flexible tool that can provide rich and detailed account of the findings (11). Coding of data obtained from each study site continued until key themes were saturated and no further information was emerging(10). Initial stages of the analysis were done in Amharic that was followed by further interpretation carried out after translating key parts of the transcripts, i.e. those relevant to the emerging themes, to English. The first and last author worked together in this regard to interpret the key findings until consensus was reached. The qualitative data analysis

software, N Vivo version 10, was used in data management.

Results

A total of 45 patients who fulfilled the inclusion criteria were invited of whom 39 actually took part in this study with the rest having been excluded due to refusal citing personal reasons or problems in telephone

communication. Among the participants, 12 each (a total of 24) were from Tikur Anbessa and Yekatit 12 hospitals with the remaining from Butajira. Table 2 presents a summary of the relevant participant characteristics. As there was apparent difference in experiences and perceptions between the groups from Addis Ababa and Butajira, the findings are presented as a single data set.

Table 2: **Study participants' characteristics (n=39)**

Socio-demographic Characteristics	Number
Sex	
Female	19
Male	20
Age (years)	
30-39	2
40-49	8
50-59	14
60-69	10
>70	5
Educational status	
Low education status (illiterate or basic literacy)	16
Elementary complete	8
Secondary school complete	8
Post-secondary school education	7
Diabetes duration (years)	
1-5	10
6-10	14
11-15	7
16-20	4
21-25	4
Treatment regimen	
Oral:	
Glibenclamide + metformin	22
Glimepiride + metformin	1
Glibenclamide	1
Insulin	14
Insulin plus metformin	1

The findings revealed that a little less than half of the study participants claimed to have used or briefly tried out medicinal plants for their diabetes, with all using it on a self-care basis except for one participant who made a visit to a traditional healer against his will by his family. The study participants identified 15 different medicinal

plants believed to have some use in managing their diabetes. The most commonly used medicinal plants included *Moringa* spp. (*Shiferas/ Haleko*) and *Ajuga* spp. Focuses on use, stopped using or decided not to use medicinal plants for their diabetes 'Mostly they advise to take bitter things'

Table 3: Traditional medicines used in the management of diabetes by study participants

Local name*	Scientific name	Preparation and use	Indication
<i>Shiferaw/Haleko</i>	<i>Moringa</i> spp.	Dried, powdered leaves brewed and drunk as tea; drink as juice after the brew cools; eaten as a vegetable or the dried, powdered leaves sprinkled on tea or food	Diabetes, hypertension
<i>Anamuro/ Armagusa</i>	<i>Ajuga</i> spp.	Fresh leaves washed with water and juice obtained from expressed leaves drunk	Diabetes, hypertension
<i>Kosso</i>	<i>Hagenia</i> spp.	The alcohol distilled from the dried and ground fruits and drunk either alone or after mixing with others such as lemon, <i>netchshinkurt</i> or garlic (<i>Allium</i> spp. and <i>feto</i> (<i>Lepidium</i> spp.))	Diabetes mellitus, hypertension
<i>Abish</i> (spice)	<i>Trigonella</i> spp.	Unspecified seed preparation taken orally	Bitter, diabetes mellitus
<i>Meqmeqo</i>	<i>Rumex</i> spp.	Dried, powdered root part brewed and drunk as tea	Hypertension
<i>Gibto</i>	<i>Lupinus</i> spp.	Seeds roasted a bit and soaked to reduce bitterness and then eaten	Bitter, hypertension
<i>Kerkedi</i>	Hibiscus spp.	Dried, unspecified parts drunk as tea	Diabetes mellitus
<i>Grawa</i>	<i>Vernonia</i> spp.	Expressed liquid from leaves drunk	Diabetes mellitus
<i>Qerefa</i> (spice)	<i>Cinnamon</i> spp.	Dried bark ground and brewed as tea and drunk	Diabetes mellitus
Mix of telba, papaya and beso	<i>Linum</i> spp., <i>Caricaspp</i> , barley respectively	Telba and beso ground together which are added to the flesh of papaya to which water is added, allowed to stay overnight and decant the supernatant and then orally taken	Mitigate burning feeling
<i>Damakesse</i>	<i>Ocimum</i> spp.	Fresh leaves rubbed and applied to the gums	Inflammation (mitch)
Lemon	<i>Citrus</i> spp.	Fresh fruit applied to the gums	Gum bleeding
Qey sir	<i>Beta</i> spp.	Boiled with water and water drunk	Diabetes mellitus
<i>Tchat</i>	<i>Catha</i> spp.	Fresh leaves chewed	Bitter

*All the local names for the medicinal plants are the Amharic versions except for *Haleko* (*Moringa*spp) which is term commonly used in South Ethiopia especially in Derashe and GamoGofa(18).

Among the factors that influenced participants' use of traditional medicines is the widely held belief that bitter things are good for diabetes which has led to the use of traditional medicines such as *Damakese (Ocimum spp.)*, *Anamuro (Ajuga spp.)*, *Abish (Trigonella spp.)*, *Meqmeqo (Rumex spp.)*, *Gibto (Lupinus spp.)*, *Tchat (Catha spp.)* and coffee. Such belief led some participants to try out and continue to take different traditional medicines, including the stimulant *Tchat (Catha spp.)*. Some study participants however expressed how the extreme bitterness was actually a reason to refrain from trying out some traditional medicines such as *Anamuro* and to discontinue others, namely *Grawa* and *Shiferaw*.

Bitter is also good for diabetes too. Mostly they advise to take bitter things (Female, low education, 8 years with diabetes).

Anamuro is good (for diabetes). I fear it and don't take it because it is very bitter (Female, low education, 7 years with diabetes).

Benefits of traditional medicines: A number of the study participants identified perceived benefits and expectations which induced them to try traditional medicines. The most commonly mentioned claimed benefits especially of *Shiferaw* include cure from diabetes, controlling diabetes using *Shiferaw* only, reduction of the doses of prescribed medications when used concurrently and expectation to act as 'additional vanguard' to the medications being taken. On the other hand, belief that there is no benefit from taking traditional medicines was cited as reason not to try them.

Many people say that they have been cured after taking it (Shiferaw) (Female, low education, 2 years with diabetes).

They are telling me about a traditional medicine known as Shiferaw. I just heard from a man whose sugar level has reached 90 while taking it. He told me that his dose has decreased from one and a half tablet to one. He plans to discontinue it (Shiferaw) and try it out with the (bio) medicine only; if the sugar level increases, he plans to abandon the medicine and take only Shiferaw (Female, elementary complete, 2 years with diabetes).

Now that I think about the reasons why I took these medicines was that they might act as additional vanguards against things which may come through food or other ways. I didn't expect total cure from diabetes but to lessen the impact from some of these things (Male, high school graduate, 22 years with diabetes).

I don't take traditional medicine. I have never taken. I don't believe that those who have taken obtained any benefit from it (Male, low education, 6 years with diabetes).

Beliefs that one had observed the benefits such as decrease in blood glucose levels, relieving burning feelings and wound healing have been reported as common reasons for continued use of traditional medicines. In contrast, some of those who tried traditional medicines such as *Shiferaw* discontinued them if they thought they did not get that much benefit.

The one called Shiferaw seems to be a good leaf. In fact I went for my appointment after having drunk it (for some time) and my levels have gone down to 142... I am sure that it is not the medicines only that reduced the (sugar) levels... I am sure the reduction was due to the leaf. I only started metformin later on (Female, diploma graduate, 9 years with diabetes).

There is a leaf known as Anamuro (Ajuga sp.) which is claimed to be medicine for diabetes. It highly reduces it. The fresh leaves are washed with water and then the juice expressed which is then drunk. This should be followed with 2 eggs or one cup of butter as antidote. I take it from time to time and it actually reduces it (Male, low education, 1½ years with diabetes).

It (Shiferaw) didn't reduce the sugar but reduced the tiredness. There were differences when you took it and when you didn't. But in general I didn't get that much benefit from it (explaining why he didn't persist with it) (Male, diploma holder, 8 years with diabetes).

Safety concerns about traditional medicines: A number of study participants were non-supportive of the use of traditional medicines, with many of them warning against its use. Common reasons for this include unpleasant experience with a traditional healer and traditional medicine given, concern about unspecified dose and quantity of traditional medicine, fear of traditional medicine, observation of people who have died after abandoning their prescribed medications, experience of death of a close family member due to traditional medicines given by a traditional healer and personal experience of adverse effect after taking traditional medicine.

Safety concerns, whether potential or observed in others, have been reasons for some study participants who have contemplated using traditional medicines but have refrained from using them to date. Some of these concerns include the uncertainty as to how it would interact with the biomedicine they are taking, fear that it may affect the liver and the heart, cause adverse effects especially if used regularly.

Now there is a leaf known as Shiferaw. For those who took the ground material, they claim that the sugar has gone down. But I have fear that it may affect the liver. Even though I wanted to take it I

was afraid. When you take it regularly, I feared that it may have side-effects... There are many people including in my neighborhood who use it and claim that it was good. I have bought it but have still not used it out of fear. (Male, high school graduate, 14 years with diabetes)

Some of the participants who reported to have started using traditional medicines have discontinued because of the experience of adverse effects which they attributed to *Shiferaw* such as increased heartbeat and blood pressure, burning feeling in the 'kidney', low blood pressure and blood glucose or out of concerns that the dosage is unknown. Others have also cited the fear it may exacerbate existing kidney and abdominal problems to discontinue *Kossoareqe* (a hard liquor made from *Kosso*), and as well as abdominal side effects as reasons to discontinue *Grawa*. Alternatively, the absence of 'problems' with the traditional medicine was a reason for one participant to continue using *Shiferaw* despite having not yet perceived any benefit from it.

But do you test them? The one called Shiferaw seems to be a good leaf. In fact I went for my appointment after having drunk it (for some time) and my levels have gone down to 142 but there seems to be a problem with my heart beat. Perhaps I drank too many glasses... The blood pressure however highly increased [to reach 180/120] and the doctor whom I saw that day tried to calm me and asked me to call family, which I did. He then examined me and ordered medicines. After a while and I have calmed down, he allowed me to go home. It worsened because I drank a lot from the leaves (as tea), which is my guess. After that I discontinued it. That time was very serious (Female, diploma graduate, 9 years with diabetes).

I have used Moringa. It had indeed lowered it (my sugar levels) when I drank it as tea every morning after brewing it as a tea. After a week I felt light headed. When I went for tests to Arsho (Laboratories), they told me that the hemoglobin had reached 8. I took this result to Zewditu (Hospital). They asked me as to how it could happen while I was on Vitamin B12. I told them that I was taking Shiferaw. They told me to stop it or to take it once every 15 days. I was okay for the next 15 days. I stopped it thereafter. Previously my levels wouldn't go lower than 200 but while taking it (Moringa) it reached 105, 107 (Female, high school graduate, 6 years with diabetes).

I don't agree with such kinds of things (referring to traditional herbal medicines). I am afraid of traditional medicines when a doctor is available. There are some for whom it does not agree with. For example, that individual may not know about it but the traditional medicine might damage his liver. If I tell you my experience, my sister was sick and

she went to that traditional healer and the medicine affected her liver and she passed away. Her belly swelled and when she went to the hospital they asked what it was she drank but she died soon after. So I don't like it, I am afraid (Female, low education status, 3 years with diabetes).

Influence of the media and significant others: Information obtained from the media such as broadcast media and the internet was among the reasons cited to influence taking medicinal plants. On the other hand, those who have contemplated using medicinal plants but refrained from using often cited safety concerns such as possible adverse effects. Moreover, those who have tried but were still concerned, articulated their desire to obtain credible and adequate information from their healthcare providers which unfortunately was not forthcoming.

I even heard on TV (a satellite-based TV channel broadcasting in Amharic) doctors in the United States urging Ethiopian doctors to give (Moringa) to diabetic patients as it brings very good results (Female, high school graduate, 6 years with diabetes).

Among factors that influenced study participants to try traditional medicines were recommendations from other patients or push from their families.

I have been made to go to a traditional healer with push from my family. After payment of close to 600 birr (significant sum at the time of his visit), I was made to take 'Altet', a medicine for buda (evil eye) sold in Merkato, which had a very repulsive odor. For a whole month I was made to drink a bitter thing with coffee on empty stomach. It looks like mud, I don't even know what it is prepared from. Even after it was completed, there is the thing known as Armagusa. It is extremely bitter. It was brewed and placed in the fridge for me to take. I couldn't take it and then quarrelled with my family and left home (Male, high school graduate, 22 years with diabetes).

Discussion

This study has revealed the experience of participants with diabetes using medicinal plants that were taken alongside prescribed biomedicines. The major factors in the decisions patients made regarding the use of traditional medicines included: the perceptions that bitter things were good for diabetes; the claimed and perceived benefits of the medicinal plants; safety concerns; and the influence of others including the media.

There seems to be a widely held belief among study participants that bitter things are good for diabetes and that one should take such things. This seems to be among the most common reasons for using medicinal plants including the psycho-stimulant *Tchat* (*Catha* spp.), whose fresh leaves were cited as beneficial for diabetes

although studies elsewhere have reported quite the reverse where chronic *Tchat* chewing led to increase in glucose levels in patients with diabetes (12). Perceptions that bitter things are thought to be good for the treatment of diabetes does not seem to be unique to Ethiopia. Studies involving participants of Indian and Bangladeshi origin have also reported traditional beliefs in the value of bitter foods and bitter herbs for the management of diabetes (13–15). While culture appears to influence these perceptions, recommendations by some healthcare providers to ‘take bitter things and avoid sweets’ seems to have a role in supporting these perceptions as observed in the present study.

Claimed benefits, namely cure and controlling diabetes, solely using medicinal plants such as *Shiferaw*, were an important impetus for trying them. Hope for a cure is a belief held by many Ethiopians and is arguably much more attractive than taking medications for the rest of one’s life, which would induce them to try out different traditional and religious healing options including medicinal plants (16,17). Among the medicinal plants frequently mentioned were *Shiferaw* (*Moringa* spp.) and *Anamuro* (*Ajuga* spp.), which the study participants claimed to lower their blood glucose levels. *Shiferaw* (*Moringa stenopetala*) is a tree that is native to the southern part of Ethiopia where it is a staple food providing a good source of balanced diet. In addition to its use as food, the plant is also used for water treatment and as medicine for various conditions, including diabetes (18). *Shiferaw* was not mentioned as a medicinal plant by a study of herbal medicine use among Ethiopian patients with diabetes in 1985 (5), when this plant had not yet become a popular folk medicine in Ethiopia. Claims of anti-diabetic activities of these plants have previously been reported by other local studies (5,18) and there is some support from pharmacological studies of *M. stenopetala* carried out in animal models (19,20). *M. oleifera* was one of two most frequently mentioned medicinal plants identified by a study carried out among patients with diabetes in Senegal which also reported about its effectiveness to reduce blood glucose levels in diabetic rat models (6). So it is possible that some of the traditional medicines may reduce diabetes symptoms; however, to date there is no evidence that they are as effective as or more effective than conventional pharmaceuticals or that they can ‘cure’ diabetes.

Study participants also reported a number of concerns about traditional medicines in general and specifically about those commonly used for diabetes. The general safety concerns have to do with negative experiences that some of these study participants have encountered either personally or with a close family member or acquaintance. The safety issues mostly had to do with lack of standardization about the doses and quantity of these medicines. Such concerns may emanate from the limited regulatory work in Ethiopia for traditional medicines despite the existence of a regulatory

framework (21–23). Study participants, most of whom used these medicinal plants on a self-care basis reported experiencing a number of adverse effects including hypoglycemia, anemia and kidney, heart and abdominal problems. Such adverse outcomes are also reported elsewhere and it has been suggested that they may be related to patients’ inadequate knowledge about the doses, inherent toxicities of these medicinal plants even at low doses as well as interactions with the biomedicines already taken for diabetes (6,9,24).

This study may be limited by the fact that only patients with diabetes who were attending their treatment in the hospitals were included and that those who have avoided biomedicine and perhaps were more successfully managing their condition with medicinal plants upon the recommendation of a traditional healer or on self-medication basis or were not included. The perspectives of traditional healers who routinely use and prescribe medicinal plants for the management of diabetes have not been included, which may be a further limitation. Nevertheless, great efforts have been made to include participants with diverse socio-demographic and economic backgrounds so as to be able to obtain a diverse outlook on the use of medicinal plants for the management of diabetes.

Practice and research implications: The findings of this study have different practice and research implications. With regards to practice implications, health providers need to regularly assess the use of medicinal plants with their patients, including their identity and mode of use. Based on the information obtained, they can make efforts to know further about those medicines so as to strive to provide evidence-based information. Patient education should be given about medicinal plants, including that they can have adverse effects and interaction with other medicines as is true with other biomedicines or existing illness. Patients’ perceptions related to ‘bitter diets’ need additional investigation and education should be provided that incorporates evidence-based information relevant to local contexts and cultures. Finally, sessions with patients should assess patient perceptions about diabetes including its incurability and provide need-based education in this regard.

Evidence-based information about medicinal plants commonly used for the treatment of type2 diabetes could help providers and patients make more informed decisions. It is recommended that a survey is done to compile information about medicinal plants commonly used including the common local names of the medicinal plants, uses, expected adverse effects, potential interactions with biomedicines as well as with existing illness conditions. Such a study may also identify gaps for further pharmacological studies to assess about efficacy, adverse effects and interactions among other things. In relation, the perspectives of patients with diabetes who do not follow treatment in a biomedical

setting as well as those of traditional healers and herbalists need to be included in the survey. Such information can be used by providers in their counseling of the patients and for the media, as well as for patients provided it is available in local languages.

Government needs to work to implement the regulatory frameworks stipulated to improve the safety, efficacy and quality of at least the commonly used medicinal plants as it has also been recommended by the World Health Organization. This may involve instituting measures to ensure that any medicinal plant approved for sale to the community is safe, fulfills minimal information required for the appropriate use by patients and is of suitable quality. Furthermore, the pharmacovigilance program currently in place in the country should be designed and promoted to include adverse effects as a result of medicinal plants that may be taken by patients. The national medicine regulatory body should also strive to provide evidence-based information to consumers, healthcare providers and traditional healers and others involved in the provision of these medicinal plants (24,25).

Conclusion:

The present study is indicative of the use of medicinal plants by patients with diabetes in the context of very limited information which can easily contribute to suboptimal health outcomes among these patients. This calls for more attention to the use of medicinal plants and for the provision of evidence-based information to these patients and their healthcare providers.

Acknowledgements

The authors would like to thank all the participants who took part in the study, the health providers who facilitated the research process and Berhanu Abera for his transcription of the interview data. The authors acknowledge Addis Ababa University for sponsoring this study which is part of the PhD thesis of the first author.

Conflict of interests

The authors declare that they have no conflicts of interest related to this article.

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