

Herbal medicine and treatment of diabetes in Africa: an example from Guinea

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SUMMARY

Aim: Use of medicinal plants is widespread in Africa, particularly in Guinea where oral transmission of practices is part of the social ritual. The purpose of this study was to determine the proportion of diabetic patients who use herbal medicine and identify the types of plants in use. Reasons for using herbal medicine and the formulations employed were also noted.

Methods: A questionnaire on use of herbal medicine was proposed to all diabetic patients hospitalized or consulting the Endocrinology Unit of the Conakry University Hospital between April 1 and June 30, 2003.

Results: A total of 397 patients responded; 33% declared they used herbal medicine. They proposed many motivations, sometimes in association: belief in its efficacy (74%), easy access to medicinal plants (70%), lower cost (48%), and search for complete cure of diabetes (37%). Hearing about a positive experience had convinced 78% of the users to use herbal medicine. The majority of the users were satisfied (85%). One or more clinical manifestations occurring concomitantly with use of herbs was observed in 23 patients (18%), particularly gastrointestinal disorders (n = 10) and skin problems (n = 8). Two cases of hypoglycaemia were noted.

Conclusion: Herbal medicine plays an important role in anti-diabetes treatment in Guinea. This type of treatment should be based on scientific evidence but very few studies have been conducted. Conditions of use should be better defined and patients should be informed of potential adverse effects.

Key-words: Diabetes · Treatment · Medicinal plants · Herbal medicine · Guinea.

Baldé NM, Youla A, Baldé MD, Kaké A, Diallo MM, Baldé MA, Maugendre D. Herbal medicine and treatment of diabetes in Africa: an example from Guinea
Diabetes Metab 2006;32:171-175

RÉSUMÉ

Phytothérapie et traitement du diabète en Afrique sub-saharienne : l'exemple de la Guinée

Objectifs : Le recours à la phytothérapie est fréquent en Afrique et notamment en Guinée. Sa pratique est transmise oralement et de manière rituelle. Les objectifs de cette étude étaient de déterminer la fréquence de patients diabétiques qui ont recours à la phytothérapie, de recenser les plantes médicinales utilisées, et enfin d'identifier les raisons de l'usage ainsi que les modes galéniques d'utilisation.

Méthodes : Un questionnaire portant sur l'usage de la phytothérapie a été proposé à tous les patients diabétiques hospitalisés ou consultants dans le service d'Endocrinologie du CHU de Conakry entre le 1^{er} avril et le 30 juin 2003.

Résultats : 397 patients y ont répondu ; 33 % faisaient usage de la phytothérapie. Les raisons multiples, et parfois associées, de ce recours étaient la croyance en l'efficacité des plantes (74 %), la meilleure accessibilité à ce traitement (70 %), le coût plus faible des plantes (48 %) et la quête d'une guérison totale (37 %). Le « bouche à oreille » avait convaincu 78 % des utilisateurs. La majorité des utilisateurs de la phytothérapie étaient satisfaits (85 %). Nous avons observé chez 23 patients (18 %) une ou plusieurs manifestations cliniques concomitantes à la prise des phytomédicaments, notamment digestives (10 cas) et cutanées (8 cas). Deux cas d'hypoglycémie ont été notés.

Conclusion : L'usage de la phytothérapie est fréquent dans l'arsenal thérapeutique antidiabétique en Guinée. Cette utilisation doit cependant s'appuyer sur les résultats d'études scientifiques, malheureusement encore trop peu nombreuses. Les conditions de leur utilisation doivent être précisées et ce d'autant plus que les utilisateurs potentiels doivent être mis en garde contre d'éventuels effets secondaires.

Mots-clés : Diabète · Traitement · Phytothérapie · Plantes médicinales · Guinée.

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Received: October 26th, 2005; accepted: January 2nd, 2006.

Introduction

In Africa, many patients use medicinal plants as the first-line treatment for many chronic medical conditions. The lack of access to conventional health care for part of the population contributes to the persistent and important use of herbal medicine until now. However, historical, cultural and economic considerations are also important [1].

Ethnomedical studies have pointed out that many diabetic patients use herbal medicine. Moreover, its use is increasing in some countries. For example, in Morocco, the proportion of patients using medicinal plants increased from 55% in 1987 to 90% in 1997 [2]. Several pharmacological studies have also demonstrated the hypoglycaemic effect of plant extracts, for example periwinkle of Madagascar [3], mango [4], or cashew gum [5], which have justified their use in traditional medicine.

Several studies have been performed to describe the use of herbal medicine in Guinea [6-9]. Until now, no data about diabetic patients was published, but daily observations would suggest that its use is increasing among the diabetic population.

The purpose of this study was first to describe the frequency of diabetic patients using herbal medicine for treatment, secondly to identify the plant extracts the most widely employed and third to report why patients rely on herbal medicine, where the plants are procured and how they are used.

Methods

The study was conducted in a population of 397 consecutive diabetic patients seen at the Endocrinology Unit of the Conakry University Hospital in Guinea between April 1 and June 30, 2003. The series included both inpatients and outpatients. Mean patient age was 47 ± 27 years (range 20-74 years). There were 187 men and 210 women with type 1 (n = 42) or type 2 (n = 355) diabetes mellitus. The patients answered questionnaires concerning the use of herbal medicine. Patients who had interrupted use of medicinal plants more than one year before the study were excluded from the analysis. The questionnaire included the following items:

- the patient's educational level (traditional coranic studies, primary school, secondary school, higher education);
- variables describing use of medicinal plants: reasons for use, plant procurement, traditional formulation (infusion, decoction, maceration), and parallel use of conventional anti-diabetic drugs;
- patient satisfaction with herbal medicine.

A list of common names employed to designate medicinal plants was first established. The corresponding plant species were then established by the Conakry Hospital Pharmacy.

Data were processed with Epi-Info.

Results

Among the 397 patients who participated in the study, 131 (33%) declared they used herbal medicine. They were 9 among type 1 diabetes (21.4%) and 119 among type 2 (33.5%) with no statistical difference. 48 patients (36%) have been taking medicinal plant extracts exclusively (5 with type 1 and 43 with type 2 diabetes). The duration of exclusive herbal medicine was short (less than 48 hours) for patients with type 1 diabetes. All of these patients were admitted in an emergency setting due to uncontrolled glycaemia. Three presented ketoacidosis, leading to death in one. Eighty-three patients (64%) used concomitantly medicinal plant extracts and antidiabetic drugs purchased from a dispensary. This combined treatment concerned 52 patients (40%) taking oral antidiabetic drugs and 31 patients (24%) had insulin (13 with type 1 and 18 with type 2 diabetes).

Educational level of the patients was: 31% had never gone to school, 22% had some primary schooling and 27% some secondary schooling. Only 14% of patients who used herbal medicine had attended a higher education institution and 6% had attended traditional coranic schools.

Patients declared several reasons for using herbal medicine (table I). Oral transmission of experiences others considered positive had convinced 78% of the patients. Better geographical access to medicinal plants and lower cost compared with drugs sold in dispensaries were cited by 70% and 48% of patients. Search for complete cure of their diabetes was mentioned by 37% of patients (table I).

Five modes of plant procurement were noted (table II). Purchase at the market of a known plant was the most frequent (n = 63 patients, 48%). The plant was provided by a traditional therapist for 30 patients (22%) and 19 patients (15%) harvested the plant themselves in the countryside. Some patients used several modes of procurement: market and direct harvest for 14 patients (11%), market and traditional therapist for 5 (4%).

Thirty-one plant species were cited. The most frequent were *Pileostigma thonningii* (27%), *Xylopiya aethiopica*

Table I
Reasons for using herbal medicine.

Reasons cited by patients	Number of patients	Percentage
Experience considered positive by others	102	78
Traditional belief in the efficacy of herbal medicine	97	74
Easy access to medicinal plants	92	70
Low cost of herbs	63	48
Search for complete cure	48	37

Table II
Procurement of medicinal plants.

Site of procurement	Number of patients	Percentage
Market	63	48
Traditional therapist	30	23
Personal harvest in countryside	19	14
Market and personal harvest	14	11
Market and traditional therapist	5	4
Total	131	100

(22%), *Combretum micranthum* (19%), *Ficus capensis* (18%), and *Cassia sieberiana* (15%) (table III).

Several plant parts were used: leaves, roots, bark, stem, seeds or fruits. Traditional formulations were: decoction (103, 79%), infusion (41%), maceration (12%).

One or more clinical manifestations concurrent with use of medicinal plant extracts was observed in 23 patients (18%). Ten patients presented gastrointestinal disorders (abdominal pain, diarrhea, vomiting), six were clinically anemic (pale conjunctive and teguments), and three presented edema of the lower limbs. Two cases of hypoglycaemia (clinical signs confirmed by capillary blood glucose at 0.30 g/l and 0.45 g/l) were noted.

Eighty-five percent of the patients stated they were satisfied with herbal medicine and 15% stated they were not.

Discussion

Use of herbal medicine is a common practice in many countries, particularly in Asia [10-12], America [13-15], and Africa [16,17]. In our study, one third of the patients used medicinal plants. This rate of use was nevertheless lower than reported for Morocco [10]. Several explanations could explain this difference. First, the present study was conducted in an urban setting and only concerned patients attending the Endocrinology Unit of the Conakry University Hospital. Furthermore, the fact that several physicians reject herbal medicine could have incited some of the patients to avoid mentioning their use of medicinal plants. The fact that a considerable proportion of patients with sufficient resources to attend a university hospital used herbal medicine would suggest that the practice is very common in the general population.

We observed that the majority of the patients were unemployed or had a very low educational level. However, according to the latest available data only 33% of Guinean people were educated [18]. These observations are in line with studies from Morocco where more than 60% of the users were illiterate and/or unemployed [16,17]. It must be

noted however that use of medicinal plants is not limited to these social groups since 14% of the users had attended a higher education institution. It is also noteworthy that the cost of treatment was cited as the fourth most frequent reason for using herbal medicine, which would suggest that the phenomenon is not limited to the poor population. In addition, certain patients taking conventional antidiabetic drugs continued their use of medicinal plant extracts: parallel use was frequent. Thus the lower cost of treatment and easier access to medicinal plants would explain the popularity of herbal medicine in Guinea. For the patients, ancestral beliefs, customs, and traditional lifestyle greatly contribute to the use of herbal medicine. In the traditional African society, disease is linked to evil spirits. It is believed that plants have magical powers which can cast off evil spells. The concept is illustrated by the religious incantations and rituals that the traditional therapist uses to harvest medicinal plants and prepare herbal extracts.

Traditional transmission of oral knowledge, a characteristic feature of the African society, was clearly at play here. The majority of the users (78%) were convinced to use medicinal plant extracts after hearing about an experience others considered to be positive. Thus herbal medicine is a social phenomenon which even traditional therapists do not control. Most of the users purchased herbs directly at the market or harvested the plants themselves in the countryside. Jouard [16] noted the same phenomenon, observing that the majority of the users purchased herbs at the market.

Self-medication dominates the use of medicinal plant extracts. The practice is simple, but the potential risks are not generally recognized by users because plants are "natural" products. In fact, ingestion of plant extracts can have adverse effects or potential toxicity [19-21]. Moreover in our study, most of the extracts used were prepared by decoction. This method used the crude plant with a high risk of bacterial [22] or fungal contamination [23]. We reported potential adverse effects in 18% of our patients. These manifestations appeared to be concomitantly observed with the ingestion of the plant extracts, but pharmacological and toxicological studies would have to be conducted to demonstrate a cause-and-effect relationship.

Even though patients are generally satisfied — 85% in our series and 72% in the series reported by Jouab et al. [16] — the clinical and biological efficacy should be demonstrated. There is evidence that medicinal plant extracts can have a real therapeutic effect in diabetes patients via hypoglycaemic [24-26], antioxidant [27] or cytoprotector [28] effects. In the present series, the observation of well-documented episodes of hypoglycaemia suggests that some plant extracts do have a hypoglycaemic effect. However, among the list of plant species used by the patients in this study, scientific data on this effect is available for only one-third of them (*Ocimum sanctum*, *Anacar-*

Table III
Medicinal plants used by the patients (n=131).

Plant species	Family	Part of plant used	Percentage of users
<i>Pileostigma thonningii</i>	Caesalpinaceae	Leaves	27
<i>Xylopia aethiopica</i>	Annonaceae	Leaves, fruits	22
<i>Combretum micranthum</i>	Combretaceae	Leaves	19
<i>Ficus capensis</i>	Moraceae	Leaves, roots, bark	18
<i>Cassia sieberiana</i>	Caesalpinaceae	Leaves, roots	15
<i>Nauclea pobeguinii</i>	Rubiaceae	Leaves, bark	8
<i>Ocimum sanctum</i>	Labiaceae	Leaves, Stalk	6
<i>Anacardium occidentale</i>	Anacardiaceae	Leaves, fruits, bark	5
<i>Jatropha curcas</i>	Euphorbiaceae	Leaves, stem	5
<i>Nauclea latifolia</i>	Rubiaceae	Leaves, fruits, roots, bark	3
<i>Allium sativum</i>	Liliaceae	Leaves, bulb	3
<i>Citrus medica</i>	Rutaceae	Leaves, fruits	3
<i>Moringa oleifera</i>	Moraceae	Leaves, roots	3
<i>Persea americana</i>	Lauraceae	Leaves, seeds	2
<i>Catharanthus roseus</i>	Apocynaceae	leaves	2
<i>Landolphia heudeloti</i>	Apocynaceae	Leaves	2
<i>Tamarindus indica</i>	Caesalpinaceae	Leaves	2
<i>Azelia africana</i>	Caesalpinaceae	Roots, bark	1
<i>Andansonia digitata</i>	Bombacaceae	Leaves	1
<i>Carica papaya</i>	Caricaceae	Leaves, roots	1
<i>Cissus aralioides</i>	Ampelidaceae	Leaves	1
<i>Euphorbia hirta</i>	euphorbiaceae	Leaves	1
<i>Garcinia kola</i>	Guttiferaeae	Fruits	1
<i>Landolphia dulcis</i>	Apocynaceae	Leaves	1
<i>Lannea acid</i>	Anacardiaceae	Leaves	1
<i>Mesonerum benthamianum</i>	Caesalpinaceae	Leaves	1
<i>Ocimum viridae</i>	Sabaitae	Leaves	1
<i>Psidium guajava</i> L	Myrtaceae	Leaves	1
<i>Pterocarpus ericens</i>	Papilionaceae	Leaves	1
<i>Scoparia dulcis</i>	Apocynaceae	Leaves	1
<i>Uvaria chamae</i>	Anonaceae	Leaves	1

dium occidentale, *Jatropha curcas*, *Allium sativum*, *Moringa oleifera*, *Catharanthus roseus*, *Tamarindus indica*, *Garcinia kola*, *Psidium guajava* L, *Scorparia dulcis*). Furthermore, the exact mechanism by which phytotherapy acts as a hypoglycaemic agent remains to be determined. In the past years, there have been several exciting advances in the understanding of how phytotherapy exerts its effect. Active components in plant or environmental factors (for example, inadvertent contamination by fungal or microbial species) could play a role [29]. Scientific knowledge of these plants could facilitate their integration into the formal health care system. In this regard, in 2000 the WHO [1] recommended that African countries undertake research on medicinal plants and to promote their use within the health care system in the perspective of health for all in the 21st century.

Conclusion

Medicinal plant extracts are commonly used for anti-diabetic treatment in Guinea. Use of these products is not only motivated by more difficult access to conventional anti-diabetic drugs and their high cost, but also to sociocultural belief in the efficacy of herbal medicine.

The contribution of herbal medicine to the modern health care system should be based on scientific validity and conditions of use should be better defined. Patients should be informed of potential adverse effects. Thus a rational and pertinent approach to herbal medicine as an integral part of national health care systems, as recommended by the WHO [1], could help these developing countries meet the objective of health for all in the 21st century.

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Peu de temps avant l'acceptation finale de cet article, le Professeur Didier Maugendre, Chef du Service d'Endocrinologie et Maladies Métaboliques du Centre Hospitalo-Universitaire de Rennes, nous a quittés. Le Rédacteur en Chef, qui avait pour lui beaucoup d'affection, et le Comité de Rédaction de *Diabetes & Metabolism*, tiennent à exprimer leur profonde tristesse à la famille et à l'équipe de leur ami et collègue.

Professor Didier Maugendre, Head of the Department of Endocrinology and Metabolic Diseases of the University Hospital of Rennes, died suddenly a few days before this article was accepted for publication. The Editor, who was quite fond of him, along with the Editorial Board of *Diabetes & Metabolism*, wish to express their deep sympathy to the family and to the team of their friend and much regretted colleague.