A Different Approach in the Traditional Treatment of Diabetes and of Antidiabetic Plants Discovery in Cameroon

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Abstract

Background: Since primeval times, plants have been used in the management of diabetes. Previous researches mentioned many of these plants. But diabetes stills in upsurge in the world. Local therapists continue to experiment new methods of treatment that play an important role in the management of diabetes, especially in poor developing countries. There is a growing interest in herbal antidiabetic medicines due to low purchasing power of population, absence of hospitals in hinterland and numerous dangerous signs, symptoms and complications of diabetes. The objective of the present work was to identify and evaluate through previous researches, the potential plants used by local therapists for the treatment of diabetes through its observed manifestations in Cameroon.

Methods: The survey was conducted between 2007 and 2017 with the aim of establishing a new ethnopharmacological method for identifying potential antidiabetic plants in Cameroon. To achieve this objective, 70 randomly selected local therapist specialists from the hinterland who don't know diabetes and from 58 tribes, were interrogated. They sometime improve the condition of patients while treating signs, symptoms and complications that they can identify. The potential antidiabetic plants were selected using an identification criterion over suspected antidiabetic plants and suspected diabetic patients, defined as follow: if a single plant is used to treat three signs, three symptoms and/or three complications of diabetes, we considered it as an antidiabetic plants and the patient who presented with either three signs, or three symptoms and/or three complications of diabetes is a suspected diabetic patient.

Results: Symptomatic treatments from local therapists relieved 19.23 % of suspected diabetic patients. Previous pharmacological studies revealed that 53.84 % of suspected antidiabetic plants were confirmed.

Conclusion: These results showed convincing perspectives for the criterion used. The suspected antidiabetic plants confirmed must be documented, subject to toxicity study and used in the development of future antidiabetic drugs.

Keywords: Local therapist specialists; Suspected antibiatic patients; Suspected antidiabetic plants; Signs, symptoms and complications of diabetes identify by local therapists; Early diabetic diagnostic

Abbreviations: QVMU: Quantity of Vegetal Material Used; CPQSU: Category of Preparation and Quantity of Solvent Used; TRP: Time of Recipes' Preparation; RQHTD: Route of Administration and Quantity of Herbal Medicine Taken per Dose; DT: Duration of Treatment
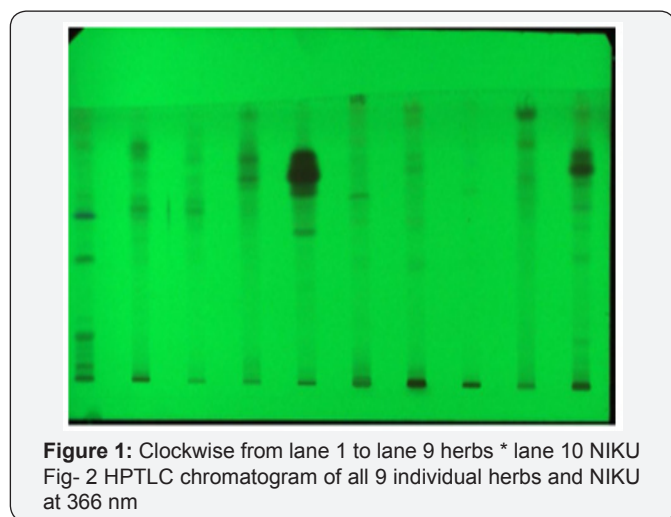
Introduction

According to the Diabetes care organization, the prevalence of diabetes for all age groups in the world was estimated at 2.8% in 2000 and 4.4% by 2030. The total number of diabetics is expected to increase from 171 million in 2000 to 366 Million in 2030. This prevalence is higher in males than in females, yet more women than men are diabetics. Between 2000 and 2030, the developing countries urban' population expected to double. Consequently, several people >65 years .will become diabetic and the prevalence of affected people will increase [1]. The prevalence of diabetes in Cameroon was 6.50% in 2015. It is in constant increase, particularly in urban areas [2]. Lifestyle can increase the prevalence of diabetics worldwide. The Divisional officer of the Fongo-Tongo district (West Region of Cameroon) has greatly encouraged old people to participate to the physical training sessions, organized in his sphere of influence. Also the Head of hospital of this district has invited the people to regularly control their fasting glycaemia.

These measures help to reduce the incidence of cardiovascular diseases and diabetes among people who don't know this pathology. Three research questions were asked. Do local therapists who don't know diabetes succeed to control this disease by plants? Do these plants possess an antidiabetic effect? Is the improvement of the indirect patients, results from the cure of signs, symptoms or complications of diabetes or from the regulation of blood sugar? Adequate responses to these questions necessarily involve the identification of potential antidiabetic plant species used in the management of the signs, symptoms and/or complications of diabetes in Cameroon that may decrease blood glucose level. To achieve this objective we used the following methodology.

Material and Methods

The survey was conducted from 2007 to 2017, using a questionnaire, nearby 70 randomly selected local specialist therapists of hinterlands, who didn't know diabetes and who were distributed in 58 socio-cultural groups in Cameroon [3,4]. Through the treatment of observed signs, symptoms and/or complications they usually improved patients' conditions. In most cases these treated manifestations of diabetes were frequent in the study of diabetic pathology [5]. Therefore we defined and used the following extended criterion to select suspected diabetic patients and suspected antidiabetic plant species from local specialist therapists' treatments: If a single plant is used to treat three signs, three symptoms and/or three complications of diabetes, we considered it as antidiabetic plants and the patient who presented these three signs, three symptoms and/or three complications is a suspected diabetic patient.

Figure 1: Clockwise from lane 1 to lane 9 herbs * lane 10 NIKU Fig- 2 HPTLC chromatogram of all 9 individual herbs and NIKU at 366 nm

In the present work, we focussed our interest on plants used by local specialist therapists to treat suspected diabetic patients whom health conditions were improved. During the fieldwork plants were selected and identified. Then, followed a detailed description of the ethnopharmacological preparations of herbal medicine by local the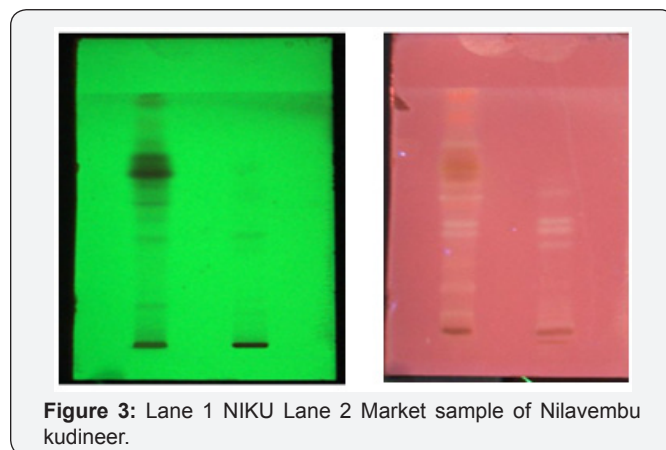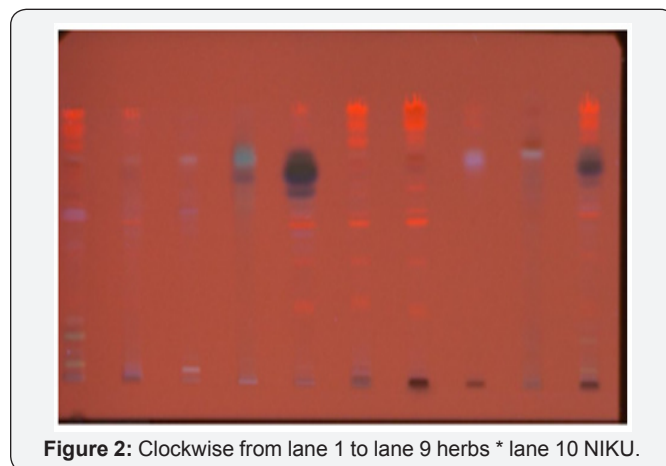rapists, the precision of the ethnomedical modes of administration, the posology, the duration of treatment and the undesirable or secondary and toxic effects. The pharmacological investigations focused on previous searches were used to confirm suspected antidiabetic plants [4]. The confirmation of the diabetic state from suspected diabetic patients being treated by local specialist therapists was realized by the observation of the medical books from these patients. These plant specimens were identified in National Herbarium of Cameroon (Figure 1).

Data analysis

Determination of informant's factor: The following formula: ICF =(Nur-Nsp)/(Nur-1) was used to calculate the Informants Consensus Factor (ICF) that permitted to assess the homogeneity of informants' knowledge [6].

Where

Nur is the number of use reports for a particular illness category and Nsp is the number of species cited for the same particular illness category by all informants. ICF values range between 0 and 1, where '1' indicates the highest level of consensus that helps to determine which medicinal plants are culturally most important for the socio-cultural groups [7] (Figure 2 & 3).

Figure 2: Clockwise from lane 1 to lane 9 herbs * lane 10 NIKU.

Figure 3: Lane 1 NIKU Lane 2 Market sample of Nilavembu kudineer.

Results

Efficiency of the extended criterion of the diabetic patient and antidiabetic plants

Local therapists' symptomatic treatments relieved 10/52 implying 19.23% of suspected diabetic patients and previous pharmacological researches confirmed 7/13 implying 53.84% of suspected anti diabetic plants recorded. These results showed convincing perspectives for the criterion used. All the 19.23% suspected diabetic patients were previously identified in hospitals, where they were hospitalized at least one time. The treatments from local therapists that they received often improve their health. They confirmed to have regular satisfaction. Signs, symptoms and complications of diabetes treated and detailed ethnopharmacological preparation of herbal medicines.

Table 1 presents the 7 suspected plants that satisfied the 10 confirmed suspected diabetic patients. We conclude that people who don't know diabetes and certain of its signs, symptoms and complications can succeed to regulate indirectly this disease through the treatment of its manifestations that they can identify.

Table 1: Detailed ethnopharmacological preparation of local specialist therapists' herbal medicines.

Scientific Names References Confirming the Hypoglycemic Effects of Suspected Plants	Signs, Symptoms and Complications	QVMU in Gram	CPQSU In Liter	TRP in Mn	RQHMTD	DT in Days
1-Momordica charantia [8]	obesity and wounds, skin infections, sexual weakness, Polyuria	250g of leaves	Decoction in 3 l of water	15	Drink 250 ml 4 times per day Excessive intake provokes abdominal pain, diarrhea, nausea and headache. Seeds are toxic.	7
2-Portulaca oleracea) [9]	Sexual weakness, cardiac problems (Tiredness, fatigue; Lack of appetite, nausea), swellings legs/edema	250g of young leaves	Decoction in 3 l of water	15	Drink 250 ml 2 times per day	7
3-Morinda lucida [10]	Cardiac problems (Fatigue at the slightest effort, Shortness of breath, kidney failure (polyuria, weakness, shortness of breath, lethargy, swelling, and confusion), sexual weakness; Paralysis/Hemiplegia	100g leaves	Decoction in 2 l of water	15	Drink 250 ml 3 times per day	7
4-Spathodea campanulata [11]	Cardiac problems (strengthener fatigue, Persistent coughing or wheezing), kidney failure Swelling legs/edema, wounds	300g of stem bark	Decoction in 4 l of water	15	Drink 250 ml 3 times daily	7
5-Sclerocarya birrea [12]	feet pains, sexual weakness and, fatigue, polyphagia	300g of stem bark or 100g of leaves	Decoction in 4 l or 2l of water	15	Drink 250 ml 3 times per day	7
6- Allium cepa [13]	Severe fungi infection, Polyuria	150g of bulb	Decoction in 2 l of water	15	Drink 250 ml 2 times per day	10
7-Ceiba pentandra [14]	Polydipsia, muscles' pains, sexual weakness	300g of stem bark	Decoction in 3 l of water	15	Drink 250 ml 1 time a day	7

QVMU: Quantity of vegetal material used; CPQSU: Category of preparation and quantity of solvent used; TRP: Time of recipes' preparation; RQHTD: Route of administration and quantity of herbal medicine taken per dose; DT: Duration of treatment.

Determination of the informant factor

Table 2 shows that the Informant Consensus Factor (ICF) ranged between 0.78 and 1.00. These values revealed a high homogeneity in the majority of the reported diabetic related manifestations. They are good indication of high informants on the species used in the treatment of a particular category of diabetic manifestations [6-15]. The highest values were obtained for blurred vision, polydipsia, polyuria, muscles' pains,

skin infections and Paralysis/Hemiplegia. From the quantity of plants per category used, were repetitions of species. Then, the exact quantity of plants recorded from the local specialist therapists for is equal to the reported quantity of plants minus the number of repetitions of plants (Table 2).

Table 2: Principal signs, symptoms and complications of diabetes treated by local specialist therapists.

Signs, Symptoms and Complications Treated at Local Specialist Therapists	Quantity of Plant Species Used (Nps)	Number of Times that Plants Were Repeated	Number of Uses-Reports (Nur)	Informants Consensus Factor (ICF)
1- Sexual weakness	5	15	20	0.78
2- Kidney failure	2	8	10	0.88
3- Blurred vision	1	2	3	1
4-Cardio-vascular Heart failure (cough, swelling feet and neck)	3	12	15	0.85
5- Feet pains	2	8	10	0.88
6-Intence fatigue	2	18	20	0.94
7- Muscular pains	1	9	10	1
8- Polydipsia	1	19	20	1
9- Polyuria	1	14	15	1
10- Polyphagia	2	19	21	0.95
11- Skin infection	1	11	12	1
12-Paralysis/ Hemiplegia	1	5	6	1
13-Swellings legs/edema	2	31	33	0.96
14- Wounds	2	60	62	0.98
15- Obesity	1	2	3	1
Total	27	266	390	0.93
Total	7 species			

Discussion

The following important point is raised in this study: the provision of local therapists with an appropriate simple support, well adapted to their intellectual comfort and social conditions for identifying diabetic suspected patients and plants that can improve their health condition. This simple support may be a mean of diagnostic in traditional medicine and of discovery of antidiabetic plants [3]. Local therapists must imperatively require the suspected diabetic patients to confirm their diabetic status by a fasting blood glucose test before their treatments. Co-operation under the aegis of the health authorities, between local therapists, ethnobotanists, pharmacists and doctors for early diagnostic, better monitoring and manufacturing of phytomedicine at lower cost is highly advantageous. All the 7 recorded suspected antidiabetic plants were confirmed by previous studies (Table 1). Many other suspected antidiabetic plants were already published [16,17].

In addition to its antidiabetic properties Portulaca oleracea is conclusive in the local therapists' symptomatic treatment of diabetes. This plant is diuretic and depurative [18] and may be very interesting to facilitate urination in patients suffering from kidney failure. Also Portulaca oleracea can clean the body of the excesses of foods. Then it is an excellent plant for detoxifying the organism [18]. The Informants Consensus Factor values range between 0.78 to 1. We conclude that it is a significant indicator of the cultural importance of medicinal plant species and that it can be helpful in cases where there is a need to recognize which culturally important plants species are more at risk in the nature.

Conclusion

In term of this work, we can conclude that people who don't know diabetes and certain of its signs, symptoms and/or complications can indirectly succeed to regulate this disease using medicinal plants for the treatment of its manifestations that they can identify. Indeed local therapists' symptomatic treatments based on 7 suspected antidiabetic plants have relieved 19.23% of suspected diabetic patients previously diagnosed in a health care. Also previous pharmacological literatures confirmed that 53.84% of suspected antidiabetic plants recorded have hypoglycemic effects. Subject to toxicity, recorded plants can be used to produce the improved traditional medicines necessary for the good management of diabetes worldwide.

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