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Ethnobotanical survey of plants used against erectile dysfunction in the commune of Ngaba in Kinshasa / DR Congo

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Abstract

Erectile dysfunction is the persistent inability of a man to achieve or maintain an erection of the penis sufficient for satisfactory intercourse. Its socio-cultural involvement is important, since one of the purposes of marriage is procreation. In the past, the woman was indexed as the cause of the couple's infertility or lack of procreation. Nowadays, this disorder is quite common among men.

The objective of this work is to contribute to the study of medicinal plants used by traditional herbalists for the treatment of erectile dysfunction in the Municipality of Ngaba in Kinshasa in the Democratic Republic of Congo.

Surveys conducted with herbalists have identified 22 plant species belonging to 19 families. The most used organs are the root and the stem. The seeds are the least used. Chewing is the predominant mode of preparation. It is followed by the decoction and the grounded material. Maceration is the least prescribed.

These results have made it possible to inventory the medicinal plants involved in the treatment of erectile dysfunction.

Keywords: Erectile dysfunction; Traditional herbalists; Medicinal plants; Kinshasa; RD Congo

1. Introduction

Conjugal infertility affects 10% of couples worldwide, i.e., 60 to 80 million men and women. One in ten couples is faced with primary or secondary infertility [1, 2].

In sub-Saharan Africa, infertility affects 25 to 40% of the population [3]. It is a condition with significant socio-cultural implications since in Africa, one of the objectives of marriage is procreation [4]. The concept of male infertility refers to all pathologies and disorders affecting the male reproductive system and thus responsible for the involuntary infertility of the couple [5].

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In the vast majority of infertilities of male origin, quantitative and qualitative abnormalities of spermatozoa are involved. Sperm alterations can result from several factors such as varicocele, hormonal, infectious, genetic causes, ejaculation or erection disorders, as they can sometimes remain unexplained [6].

Erectile dysfunction is one of the causes of male infertility [7]. It is defined as a partial or total inability to maintain an erection sufficient to satisfy sexual performance. At the 2nd International Consultation on Sexual Dysfunctions, this definition was later amended to read:

“Erectile Dysfunction (ED) is the persistent or recurrent inability of a man to achieve or maintain an erection of the penis sufficient to permit sexual activity for a period of at least 3 months” [8].

By lack of erection or by premature ejaculation, it becomes impossible to practice the normal and complete sexual act in men [9].

Male sexual impotence is currently drawing renewed interest at the nosographic, epidemiological, and clinical levels. Until 1990, its prevalence was established between 5% and 10% of the male population [10].

The literature review, carried out in 2004 during the 2nd International Consultation on Sexual Dysfunctions [8], led to the conclusion that the prevalence of erectile dysfunction in the general population is globally:

- Less than 10% under 40 years old;
- From 10 to 30% between 40 and 59 years old;
- 20 to 40% between 60 and 69 years old and
- From 50 to 75% after 70 years.

A survey conducted in Massachusetts reports that 52% of men aged between 40 and 70 reported erectile dysfunctions at all levels. Of all the risk factors, age appeared to be the most powerful independently of all the others: between the ages of 40 and 70, the risk of severe and moderate erectile dysfunction increased from 5 to 15% and 17 to 34% respectively [11].

More than a temporary erection problem, impotence can cause real discomfort if it is not treated. This mutual sexual dissatisfaction between the two heterosexual partners is among many other causes of love breakdown in the couple. Furthermore, it is a serious handicap for marriage and family stability.

Masters and Johnson [12] distinguish:

- Primary impotence, "a total absence of erection or an erection too short to allow the sexual act to be performed".
- Secondary impotence, "the fact of a man who has been able, at least once, to practice satisfactory sexual intercourse (...) until the day he experiences his first failure.

They consider secondary impotent a man who fails in 25% of his attempts at coitus. Male impotence is also distinguished according to whether it is of physical origin or whether it is due to psychological causes. According to these authors, the psychogenic etiology was the most frequent cause of male impotence and could concern primary impotence as well as secondary impotence [12].

Today, it is possible to rely on herbal remedies treating erectile dysfunction based on plant extracts which work by increasing blood flow to the genitals, penile tissues, and vessels and also help to increase the libido while treating this condition.

Objective

The objective of this study is to inventory the medicinal plants used against male sexual impotence by herbalists from Inongo in Mai-ndombe and residing in the municipality of Ngaba.

2. Material and methods

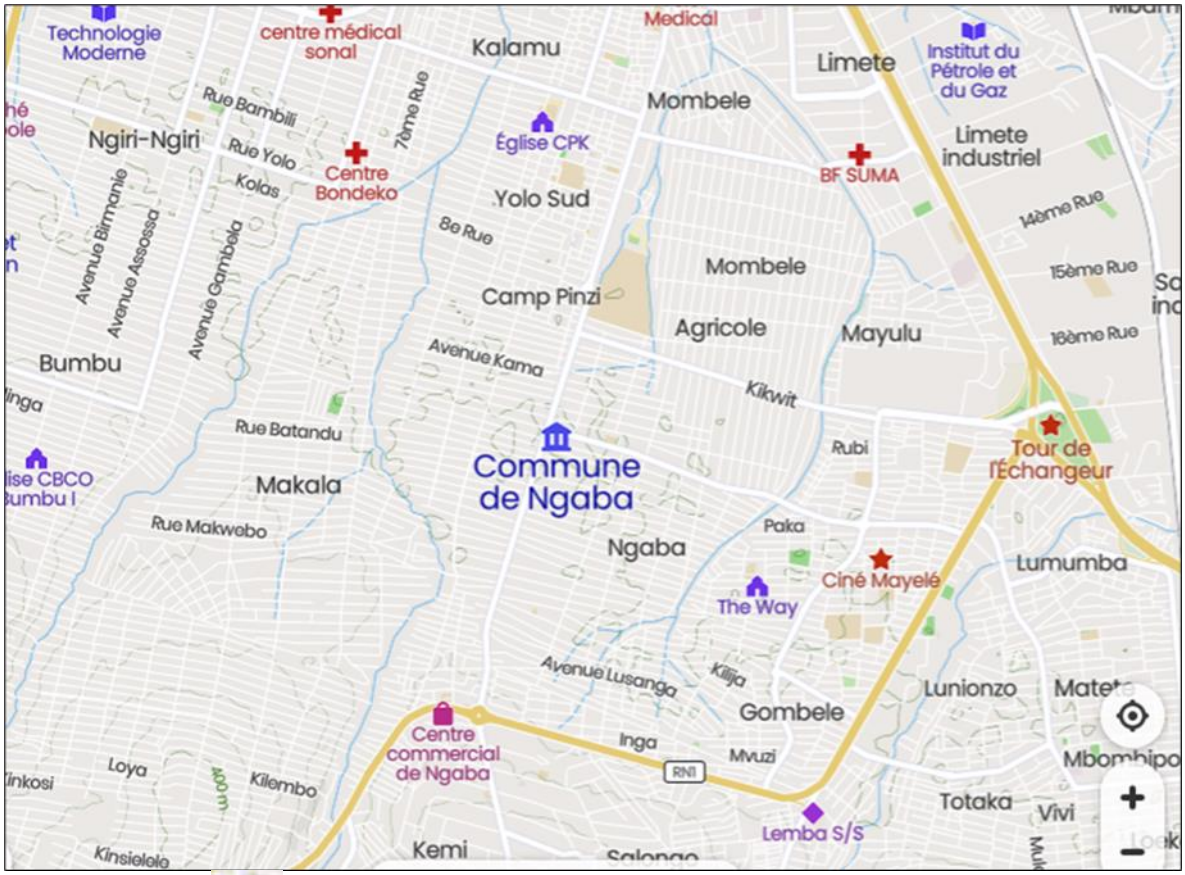
2.1. Study framework

This study was carried out in the municipality of Ngaba from June to December 2021. Ngaba is one of the 24 urban communes of the city of Kinshasa, created by Ministerial Order No. 68- 026 of March 30, 1968 creating and naming the new commune of the city of Kinshasa. This legal act was supplemented by Ministerial Order No. 69-0042 of January 23, 1969, the number, denominations and limits of urban for Kinshasa city [13].

The municipality of NGABA is limited:

- To the North: by the intersection of University Avenue with Kikwit Avenue to its intersection with the Yolo River;
- To the South: via Avenue By-Pass to its intersection with University Avenue;
- To the East: by the Yolo River which separates it from the town of Lemba, by By-Pass Avenue to Kikwit Avenue;
- To the West: along the axis of University Avenue, starting from the NGABA round about to its intersection with Kikwit Avenue.

It is further subdivided into 6 districts: Mukulua, Bula-Mbemba, Mateba, Luyi, Mpila and Baobab.



Legend: : Municipal house; : Health structure; : Mall; : Training center

Figure 1 Map of Ngaba Commune

2.2. Methods

2.2.1. Study population and sampling

The study population includes all herbalists living in the study area. The sample only includes the herbalist from the territory of Inongo in the province of Mai-Ndombe practicing traditional medicine in the Commune of Ngaba.

2.2.2. Inclusion criteria

- Be a phytotherapist from the ethnic groups of the Inongo territory in the province of Mai-Ndombe, all genders included.
- Have given their consent for the study.
- Reside in the study area and be known by the surrounding inhabitants.

2.2.3. Exclusion criteria

- Refusal to participate in the survey.
- Use of drugs other than the plant in the treatment of male sexual impotence.

2.2.4. Data collection

The data were collected by the standardized interview method where we used the individual interview technique. Therefore, a standard questionnaire was submitted to informant and included the following subjects:

- An introductory note section.
- A section of the socio-demographic characteristics of the respondent.
- A section of the actual survey;
- A section of ethical considerations.

Following the interview, the informants sold some specimens for further identification.

- The identification of specimens was carried out in the field by the taxonomist of the Laboratory of Systematic Botany and Plant Ecology of the Department of Biology of the National Pedagogical University Pr. Dr. Idrissa Assumani Zabo.
- The identification was confirmed by comparison with the specimens in the Research Laboratory of the Department of Biology at the National Pedagogical University and that of INERA at the University of Kinshasa. The phylogenetic classification was carried out according to APG IV.

3. Results

3.1. Sociodemographic data

A total of 11 herbalists including 9 men (82%) and 2 women (18%) participated in the study.

3.2. Inventory of plants used against male impotence

The treatment of erectile dysfunction uses 19 families divided into 23 plant species. The Zingiberaceae, Clusiaceae, Apocynaceae and Euphorbiaceae families each have 2 species. The other families are monospecific (Table 1).

3.3. Parts used the mode of use and the routes of administration.

The analysis of the parts used reveals that the roots represent 32.0% of the prescriptions. They are followed by seeds and stem bark (20.0%). The rhizomes are the least stressed organs (4.0%).

Regarding the modes of use, chewing predominates with 44.0%. It is followed by the decoction (24.0%) and the ground material (20.0%). As for the routes of administration, the oral route intervenes with 60.0% against 40.0% assigned to the anal routes (Figure 2).

Table 1 List of plants used against male impotence

Family	Scientific name	Vernacular name	Parts used	Modes of use	Routes of administration
Annonaceae	*Annona reticulata* L.	Mbundungombe, mutimangombe (Kikongo)	Stem bark	Decoction	Oral
Apocynaceae	*Tabernaemontana crassa* Benth	Bonkeka (Ntomba)	Stem bark	Decoction	Anal
	Mondia whitei (Hook. f.) Skeels	Kimbiolongo (Kikongo)	Root	Chewing	Oral
Clusiaceae	*Garcinia epunctata* Stapf	Bosefe (Nkundo)	Seed	Chewing	Oral
	Garcinia kola Heckel	Bompoma (Sengele)	Seed	Chewing	Oral
Convolvulaceae	*Ipomoea batatas* Poir.	Libenge (Lingala)	Root	Shredded	Anal
Costaceae	*Costus afer* Ker Gawl.	Mekako (Sengele)	Stem	Sap extract	Oral
Euphorbiaceae	*Alchornea hirtella* Benth.	Ilando (Nkundo)	Stem bark	Decoction	Anal
	Alchornea cordifolia (Schumach. &Thonn.) Müll. Arg.	Libobonzi (Lingala)	Leaf	Shredded	Anal
Ericaceae	*Eriocoelum microspermum* Radlk. ex De Wild.	Monkese (Lingala)	Stem	Decoction	Oral
Fabaceae	*Piptadeniastrum africanum* (Hook.f.) Brenan	Bokungu (Mongo Befale)	Root	Maceration	Anal
Irvingiaceae	*Irvingia smithii* Hook.f.	Bonsombo (Ngongo)	Sterm bark	Decoction	Oral
Lamiaceae	*Ocimum basilicum* L.	Bensonsolo (Sengele)	Root	Chewing	Oral
Malvaceae	*Cola acuminata* (P.Beauv.) Schott &Endl.	Lobelu (Sengele)	Seed	Chewing	Oral
Pentadiplandraceae	*Pentadiplandra brazzeana* Baill.	Bonsimi (Nkundo)	Root	Chewing	Oral
Piperaceae	*Piper guineense* Schumach. &Thonn.	Bololoko (Mongo Befale)	Leaf	Decoction	Anal
			Root	Chewing	Oral
Rubiaceae	*Heinsia crinita* (Afzel.) G.Taylor	lyakuY'ongala (Sengele)	Root	Chewing	Oral
Rutaceae	*Citrus aurantium* L.	Ndimo (Lingala)	Root	Chewing	Oral
Sapindaceae	*Allophylus schweinfurthii* Gilg.	Ekuke (Sengele)	Sterm bark	Maceration	Anal
Sapotaceae	*Synsepalum dulcificum* (Schum.) Baill.	Mpunga (lingala)	Root bark	Shredded	Anal

Thomandersiaceae	*Thomandersia hensii* De Wild. & T. Durand.	Imelempaka (Lomongo)	Root bark	Shredded	Anal
Zingiberaceae	*Aframomum melegueta* (Roscoe) K. Schum.	Mondongo (Lingala)	Seed	Chewing	Oral
			Seed	Shredded	Anal
	Zingiber officinale Roscoe	Tangausi (lingala)	Rhizom	Chewing	Oral

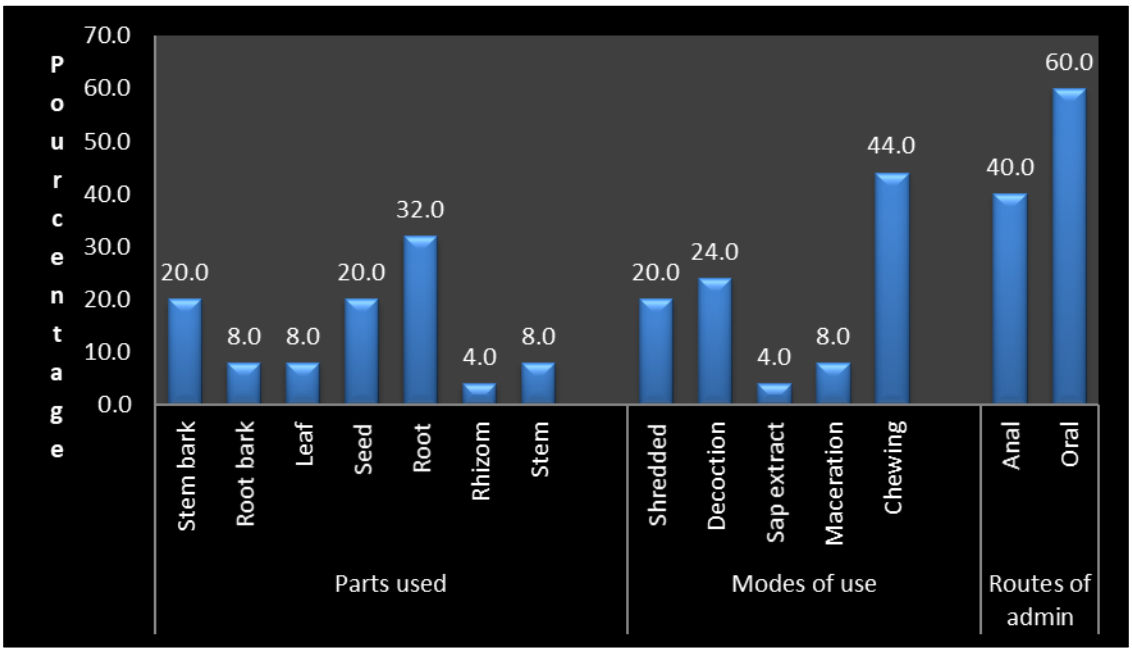


Figure 2 Parts used, mode of administration and routes of administration

4. Discussion

Ethnobotanical survey of plants used against erectile dysfunction in the commune of Ngaba in Kinshasa / DR Congo concerned 11 herbalists including 9 men (82%) and 2 women (18%). 23 plant species grouped into 19 families. Roots are the most used in the prescriptions, chewing predominates the mode of utilization.

In Benin, Azonbakin *et al.* [4] listed 109 species used in the treatment of male infertility. Agbodjento *et al.*[14] inventoried 60 species against male infertility. It emerges from the comparison of these two studies that the florula of Ngaba is poor in plant species. This is explained not only by the smallness of our study framework, but also by the size of the sample: 11 herbalists in Ngaba against 80 herbalists in Benin. No species is listed twice in the two studies. The difference between the two pathologies (erectile dysfunction and male infertility) could justify this situation. However, the approximation of sexual pathologies explains the existence of common families. These are in particular Annonaceae, Asclepiadaceae, Euphorbiaceae and Fabaceae retained as families offering species entering into the composition of the treatment, either of male infertility or of erectile dysfunction.

Erectile dysfunctions are the cause of male infertility in about 5% of cases, because they disrupt ejaculation and do not allow sperm to access the genital tract [15].

Kouame et al. 2022 [16] point out that extracts from the leaves of *Alchornea cordifolia* contain isoflavones and lignans for an estimated yield of 40%. This justifies their prescription in women going through menopause as a provider of phytoestrogens, nonsteroidal molecules whose chemical structure resembles that of natural estrogens.

With the exception of *Annona reticulata* and *Costus afer* whose efficacy requires a combination the other species are used separately. On the other hand, depending on the mode of use adopted, *Aframomum melegeta* is administered, either orally or anally.

During the last decade, the main advance in the understanding of impotence has been the observation that the state of contraction or relaxation of smooth muscles regulates the flow of blood in the corpora cavernosa and determines the state of flaccidity or erection of the penis. The ability to influence the state of smooth muscles by intracavernous injection of pharmacological agents has led to the development of new diagnostic and therapeutic procedures for impotence [17, 18].

The treatment of libido in men must be psychotherapeutic and reassure the patient. The doctor must, above all, play down and shed light on what causes the drop in libido. If the psychotherapy is insufficient, it is advisable to have an action on the testosterone level, on the central nervous system as much with plant sedatives as with "antidepressants" of the libido. Finally, treatment with an erectile stimulant should reassure the patient about his erectile potential [19].

The latest product used to treat all forms of impotence results from the synergistic combination of active ingredients including papaverine; alpha-blockers and various substances that act on neurotransmission [20]. On the other hand, Fizazi [5] informs that the pharmaceutical prescription in case of erectile dysfunction includes beta-blockers, thiazide diuretics, metoclopramine, cholesterol-lowering agents, anxiolytics, antidepressants, antiepileptics.

The experience of sexuality can be constructed in terms of illness, from different stages that organize the therapeutic itinerary. Beltran Fernandez [21] highlights the role of psychology and psychologists in the study of the experience of sexuality and in the therapeutic management of sexual problems. This observation is in line with the ceremonies of traditional healers consisting in exploring the psyche of their patients before and during the administration of drugs.

Aphrodisiac dominate the food-medicine plants market by Congolese Migrants (men and women). The sexual dysfunction is at the heart of the Congolese/African culture in general, an important factor for the life quality especially for those in marriages, or relationship (man-woman) [22, 23].

5. Conclusion

This work aimed to inventory the plant species used in the preparation of recipes for the treatment of erectile dysfunction in the town of Ngaba.

The surveys conducted with herbalists from the Territory of Inongo residing in the Commune of Ngaba made it possible to identify 23 plant species grouped into 19 families.

The analysis of the parts used reveals that the roots represent 32.0% of the prescriptions. They are followed by seeds and stem bark (20.0%). The rhizomes are the least stressed organs (4.0%).

Regarding the modes of use, chewing predominates with 44.0%. It is followed by the decoction (24.0%) and the ground material (20.0%). As for the routes of administration, the oral route intervenes with 60.0% against 40.0% assigned to the anal routes.

These results confirm the existence of this pathology in Kinshasa and the contribution of the endogenous knowledge of the nationals of the Territory of Inongo on the reproductive health of the population of Kinshasa in general and that of the Commune of Ngaba in particular.

Compliance with ethical standards

Acknowledgments

We thank all the stakeholders who participated in this study. Our thanks go more particularly to the traditional healers for their agreement.

Disclosure of conflict of interest

There is no conflict of interest be the authors of this manuscript.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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