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Ethnobotanical study of indigenous knowledge on medicinal and nutritious plants used to manage opportunistic infections associated with HIV/AIDS in western Uganda

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ABSTRACT

Ethnopharmacological relevance: Traditional medicine plays an important role in the daily lives of the people of Uganda to treat a wide range of health problems. Our study presents results of an ethnobotanical inventory conducted to identify and document medicinal and nutritional plants used in the management of opportunistic infections associated with human immunodeficiency virus / acquired immunodeficiency syndrome (HIV/AIDS), the plant parts used, preparation and administration methods of herbal remedies.

Materials and methods: We performed semi-structured interviews with 79 respondents (women 78%, men 22%), who included specialists in medicinal plants (such as traditional birth attendants and herbalists) and non specialists with general knowledge of plant use. Respondents answered a semi-structured questionnaire regarding their knowledge of plants and general treatment practices including management of HIV/AIDS opportunistic infections. The reported plants were collected and identified. Data were analyzed using factor informant consensus and fidelity level to determine homogeneity of informants' knowledge on medicinal and nutritional plants suitable for different ailment categories and the most preferred plant species used to treat each ailment category in the study areas.

Results: The study revealed 148 plant species belonging to 54 families, most of which were herbs (50.7%). Leaves (61.6%) were the most frequently used parts in remedy preparations which were mainly administered orally (72%). The majority of plants (62%) were harvested from wild habitats. The most important species according to fidelity values are *Hibiscus sabdariffa* L. for anaemia, *Mangifera indica* L. for cough, *Zehneria scabra* (L. F.) Sond. for skin infections, *Rhus natalensis* Bernh.ex.Krauss for diarrhoea and *Tarenna pavettoides* (Harv.) Sim for appetite boosting. The factor informant consensus highlighted the agreement in the use of plants and showed that the respiratory infections category had the greatest agreement (0.60). Family Asteraceae accounted for 15% of the total species recorded. Sixty plant species (40%) of the plants provide nutritional support.

Conclusion: The study revealed that folk medicine is still widely practised. Fidelity level values indicate that these plants are the most preferred species for particular ailments. The high consensus value (0.6) indicated that there was high agreement in the use of plants for respiratory ailments among others. These preferred plant species could be prioritized for conservation and subjected to chemical screening to ascertain their pharmacological activities.

1. Introduction

Medicinal plants are an important contribution to the indigenous health care systems of local communities in Uganda. Plants provide both medicinal as well as nutritional values to the people. Human immunodeficiency virus (HIV) causes an acquired immunodeficiency syndrome (AIDS) that causes immunosuppression. The virus produces gradual effects on the body's defence mechanisms thereby leading to cancers and opportunistic infections due to severe depression of the T-cell mediated immune system. Such infections involve multiple systems of the body such as gastrointestinal, dermatologic, genitourinary and nervous system (Vermani and Garg., 2002). Globally, an estimated 35.3 million people were living with HIV worldwide in 2012 (UNAIDS, 2013).

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Uganda's HIV sero-prevalence rate of 7.3% is among the world's highest (UNAIDS, 2010, 2012).

Traditional medicines have been the focus for a wider coverage of primary health care delivery in Africa (Elujoba et al., 2005). The dependence on medicinal plants is attributed to poverty, inaccessible biomedical services and cultural acceptability. More so, when Antiretroviral drugs (ARVs) were introduced, they were very expensive for individuals in many parts of Uganda and many patients resorted to traditional medicine. It has been reported that many HIV patients consult traditional healers before or after going to hospital or clinic (Chipfakacha, 1997; Langlois-Klassen et al., 2007). Although many HIV patients have access to ARVs, some still use medicinal plants to treat opportunistic infections and offset side effects from antiretroviral medication (Hardon et al., 2008). Despite the negative sentiments against traditional healers in favour of the conventional medical system, western medicine and traditional healers will continue to be partners in the fight against HIV/AIDS, since herbal medicine is seen as a complimentary rather than an alternative to modern medicine. Research indicates that traditional medicines have contributed to increasing the strength of the immune systems of critically ill people and improved their appetite for food, which is important for the treatment of HIV/AIDS (Calixto, 2000). This is because patients on highly active antiretroviral therapy (HAART) suffer side effects like poor appetite and nausea due to interference with absorption and utilization of nutrients (Ridder, 2003). Hence, the aim of this study was to document medicinal and nutritional plants used by local communities in the management of ailments associated with HIV/AIDS. Documentation of such plants can help preserve indigenous knowledge about traditional medicines and food plants for future generations and identify plant species for future pharmacological and phytochemical research.

2. Methods

2.1. Study area

The study was carried out in Ibanda and Kiruhura districts (00° 07'S, 30° 30'E and 00° 12'S, 31° 00'E) in western Uganda (Fig. 1). The main livelihood activity is agriculture which includes cultivation of crops and rearing of cattle and goats. The region experiences a mean annual rainfall ranging from 1100–1200 mm and temperature ranging from 17 °C and 30 °C; where there are two wet seasons and two dry seasons. In Kiruhura district, livestock forms the backbone of the economic activity. Subsistence agriculture (crops and livestock) forms the backbone of Ibanda's economy. The 2001 national census estimated the population to be 250,900 and 268,800 people for Ibanda and Kiruhura districts, respectively. This study was done in western Uganda due to the highest burden of HIV/AIDS in the region with a prevalence rate of 13.7% in 2007 (UNGASS, 2010), and also due to a lot of biodiversity which is beneficial to human health and has been used overtime by the local communities (Kamatenesi and Oryem-Origa, 2005; Byarugaba et al., 2007; Kamatenesi–Mugisha and Oryem-Origa, 2007; Katuura et al., 2007 Anoka et al., 2008; Kamatenesi et al., 2008; Namukobe et al., 2011; Asiimwe et al., 2013). Therefore the rich biodiversity forms a basis for the investigation on the biological active substances of natural medicines that can pave way for the development of new alternatives and environment friendly medicines that can be used in the management of HIV/AIDS opportunistic infections.

2.2. Collection of ethnobotanical information

Ethnobotanical data were collected between December 2010 and May 2011. The research team reported to the local administrators and community elders of the area who led them to the respected healers. Key specialist informants including herbalists and traditional birth attendants were selected purposively (Martin, 1995; Ma Dolores, 2007) based on their skills, knowledge and practices in medicinal plants usage. Subsequent interviewees were found with snow ball sampling (Salganik and Heckathorn, 2004). Before conducting interviews, the aim of the study was explained clearly and informants were asked for their consent.

Respondents were asked to list some of the main symptoms of HIV/AIDS related ailments according to Centre for Disease Control guidelines (CDC, 2013). However, the traditional healers were able to recognize signs and symptoms of HIV/AIDS opportunistic infections, for instance, herpes zoster (locally known as 'Kisipi') and tuberculosis ('akakonko'). The healers were also treating patients who were already receiving Antiretroviral drugs (ARVs) prescribed by allopathic medical personnel.

The HIV/AIDS opportunistic infections considered during the study include tuberculosis, herpes zoster and oral candidiasis. Other symptomatic but undefined conditions were cough, malaria, skin rash and diarrhoea. Health conditions related to poor nutrition include anaemia, lack of appetite, immunity, and energy. Semi-structured questionnaires designed for the traditional healers about medicinal plants knowledge mainly focused on local names of plants used, parts used and growth forms, ailments treated / managed, conservation status, mode of preparation and application of the herbal remedies. The biographic characteristics of the respondents in this study include gender, age, religion, education, ethnicity and occupational status. Interviews were conducted in Runyankore dialect. Plant voucher specimens were collected and identified at Makerere University herbarium. Plant names were verified using the International Plant Name Index (IPNI).

2.3. Data analysis

Ethnobotanical data obtained during the study were summarized using descriptive statistics (Hoft et al., 1999) and analyzed using three quantitative tools.

- For the analysis of the general use of plants, factor informant consensus (Fic) was used (Heinrich et al., 1998). The factor was used to highlight plants of particular intercultural relevance and agreement in the use of plants. Fic was calculated as the number of used reports in each category (n_{ur}) minus the number of species used (n_t), divided by the number of used reports in each category minus one: $Fic = N_{ur} - N_t / N_{ur} - 1$. The relative importance of a species was evaluated by the proportion of respondents who cited it.
- Fidelity level (FL), the percentage of informants claiming the use of a plant species for the same major purpose was calculated for the frequently reported ailments using the Fidelity level index, $FL = I_p / I_u \times 100$, where I_p is number of informants who indicated use of a species for the same major ailment, I_u is the total number of informants who mentioned the plant for any other use (Friedman et al., 1986).

With the help of these tools, we could determine which illness had populations with more consensus (using Fic), and the plants with major fidelity (using the FL).

3. Results and discussion

3.1. Demographic characteristics of the study respondents

Traditional healing was found to be a gender-based practice and the amount of knowledge a person has is determined by the role he/she fulfils in society (age, sex, experience, etc).