



Ethnopharmacological survey of native remedies commonly used against infectious diseases in the tropical island of Mauritius

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ABSTRACT

Ethnopharmacological relevance: Infectious diseases (IDs) still remain a major cause of mortality and morbidity worldwide. This study has been geared to gather primary ethnopharmacological information on common native remedies (NRs) used to treat and/or manage common infectious diseases from different regions of Mauritius, a tropical multicultural island in the Indian Ocean. Given the dearth of updated information on traditional medicine of Mauritius, this work can provide an opportunity to establish valuable primary information on the different NRs used by the local people and hence open new perspectives for further pharmacological research.

Aim of the study: To collect, preserve and document primary ethnopharmacological data from the local population concerning NRs commonly used against IDs in the tropical island of Mauritius.

Materials and methods: Face to face interviews were conducted with Mauritian and herbalists ($n=307$) using a semi-structured questionnaire. Quantitative ethnobotany parameters such as informant consensus factor (F_{IC}), fidelity level (FL), use value (UV) and variety of use (VU) were used for herbal and animal products. Statistical analysis such as Pearson correlation and Chi-squared test were performed to delineate any association.

Results: It was found that 94.8% of the local people claimed that managing IDs with NRs was part of their culture and have been using it since childhood. A total of 39 plant species belonging to 24 families and 9 animal species were reported to be traditionally used in the formulation of herbal remedies and animal products, respectively. Sociodemographic characteristics (gender, age, place of residence and income) had a significant ($p < 0.01$) impact on the use of these NRs. The most relevant family contributing much to the medicinal flora was Zingiberaceae (No of citation=301). The average F_{IC} for all ailments for medicinal plants and animal products were 0.963 and 0.972, respectively. *Acalypha indica* L. had the highest FL (0.83) for skin and subcutaneous tissue problems. Panoply of animal products (*Anguilla japonica*, *Periplaneta americana* and *Helix aspersa*) were culturally used, whereby products from *Bos taurus*, (42.0%) were the most utilized zootherapy. Other remedies used in concurrence with herbal and animal products involved cultural rituals and prayers that were never reported in previous studies. Therapeutic properties of some herbal remedies reported correlated to some extent with those of previous studies while others have open potential perspectives for further research as their chemistry and pharmacology have not been published.

Conclusions: Given the plethora of novel information obtained from the present survey, it is obvious that the indigenous population still relies to a great extent on NRs which need to be preserved and used sustainably. Nonetheless, further research is needed to probe the possible active constituents that could be the basis of an evidence based investigation to discover new drugs.

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Abbreviations: IDs, Infectious diseases; NRs, Native remedies; F_{IC} , Informant consensus factor; FL, Fidelity level; UV, Use value; VU, Variety of use; C, Cultivated; W, Wild; P, Purchased; I, Imported; Lo, local; L, Leaf; R, root; S, Seed; F, fruit; Fl, Flower; St, stem; VN, Vernacular name; CEN, Common English name; UTI, Genitourinary disease; SN, Scientific name; CN, Common name

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1. Introduction

Infectious diseases (IDs) have been in the limelight of the public health sector since the early 1990s. Sub Saharan African countries, including Mauritius are mostly affected by respiratory infections, diarrhea, HIV/AIDS, tuberculosis and malaria (Holmes, 2008; Saker, 2004). According to recent bulletin from the World Health Organization (WHO, 2011a, 2011b), 225 million cases of malaria, 12–16 million cases of tuberculosis and 2.6 million new

cases of HIV/AIDS were reported which tend to indicate the alarming situation that prevails worldwide. Additionally, there is undeniably a high prevalence of emerging IDs such as Chikungunya and dengue fever in tropical islands, particularly those of the Mascarene archipelago. Indeed, Mauritius has greatly been affected by the mosquito borne viral infections such as Chikungunya and dengue fever with more than 1 million people were affected in the epidemic outbreaks in 2005–2006, in the Indian Ocean Islands. It was also reported that by the end of 2010, there were 580 new cases of HIV/AIDS, 86 cases of gonorrhoea, 52 cases of Malaria and 126 cases of tuberculosis in Mauritius (Central Statistics Office, 2011; Ramchurn et al., 2010). Hence, developing countries like Mauritius, with very limited financial support and resource had to develop and revise ways to combat the entry and development of emerging IDs.

Documentation of knowledge and sustainable use of native remedies (NRs) are essential for further studies in the field of ethnopharmacology which aims at investigating the biological aspect of medicinal plants and other natural products. It thus helps in the conservation and utilization of biological resources sustainably. Indeed, NRs have a great impact on the health system worldwide including developing countries like Mauritius. WHO reported that the international market of herbal products is estimated to be US \$ 62 billion and which is estimated to increase to US \$ 5 trillion by the year 2050. Moreover countries like Brazil, China, Denmark, Ghana, Japan, Norway, Saudi Arabia, Malaysia and the Republic of Korea have devised ways to regulate the production of natural products (Leonti, 2011; Polat and Satil, 2012; WHO, 2011a, 2011b). The indigenous population of Mauritius has a long-standing tradition in the use of NRs. Many indigenous, endemic and exotic species have been used in folkloric medicine to treat and manage various ailments of man, including various IDs. Currently, several kinds of preparations from various exotic, endemic and indigenous organisms are sold as decoctions or “tisanes” in several markets to treat panoply of ailments. Indeed, available reports tend to highlight that indigenous folk-medicinal plant preservation and study is vital because such plants are fully adapted to local environment and conditions compared to exotic species. Hence, pharmacologically active compounds and phytochemicals isolated from endemic and indigenous plants used in folk medicine have been the main areas of interest.

The present study was therefore geared towards documenting the different NRs that are currently being used against IDs in Mauritius. Currently poverty still prevails in the island, whereby people still rely heavily on NRs. These factors have prompted the need to carry out updated field study to bring in limelight of the scientific community the potential of traditional therapies in an attempt to overcome the burden of IDs. Given the scarcity of

updated information of traditional medicine used in Mauritius, this work has endeavored to document for the first time primary ethnopharmacological data from the local population concerning NRs commonly used against IDs in Mauritius.

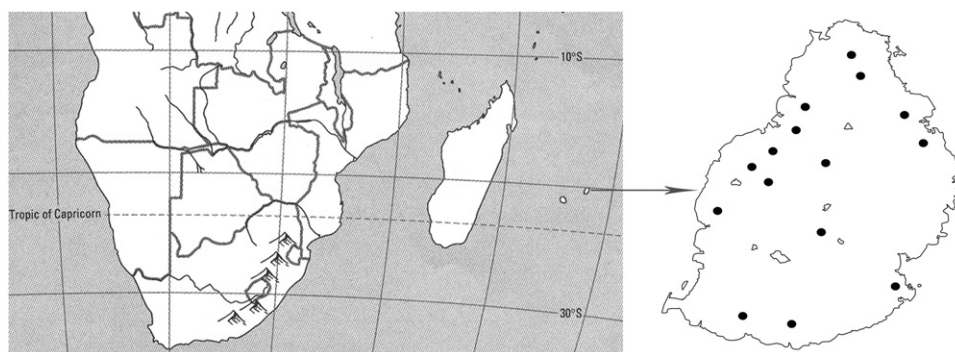
2. Materials and methods

2.1. Study area

Mauritius is situated between the southern latitude of 19°50' and longitude 57°18' and 57°46' (Map 1). It has a total surface area of 1865 km² and with an estimated population of 1,288,000 (Central Statistics Office, 2011; WHO, 2012). The topography of the island rises to its highest point, the Piton de la Riviere Noire, at 828 m. The geography of the land and rain distribution ensures a diverse microclimatic regime throughout the island and hence a direct impact on both the endemic and exotic vegetation. The western and northern regions of the island are the drier zones. Mauritius is known to have maintained one of the developing world's most successful democracies. Previously the economy of the country was based on agriculture. However, the economy has successfully been diversified into textiles, tourism, banking and business outsourcing. It is classified by the World Bank as an upper middle income country (Central Statistics Office, 2011; Issack et al., 2010). The flora of Mauritius is characterized by a significant percentage of endemic and indigenous species given its geographical isolation and evolution over very long periods of the island. However, colonization had a negative impact on the natural vegetation leading to a decrease in primary forests and disappearance of important species of flora and fauna. It is indeed quoted as being the country with the third largest number of threatened plant species in the world. Given that the population of the island is a multicultural society, people from different ethnic groups were also interviewed from different urban and rural regions. Herbalists and traditional healers were also interviewed given their profound knowledge and contributions in the traditional medicine of Mauritius. Map 1 illustrates the different regions whereby the survey was carried out.

2.2. Data collection

The project was approved by the Department of Health Sciences, Faculty of Science, University of Mauritius. The survey was performed using semi structure questionnaires according to Edwards et al. (2005) via a face to face interview on selected local people during the academic year 2011–2012. In order to collect accurate information relating to traditional medicine, inhabitants of the study area were requested to identify indigenous people



Map 1. Location map of Mauritius in the Indian Ocean and study area (black dots indicate sample areas) (Adapted from World Resources Institute, 2011; Africa.com, 2012).

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