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Herbal medicine commonly used against non-communicable diseases in the tropical island of Mauritius

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ABSTRACT

Indigenous Mauritians from diverse cultures use herbal medicines (HMs) against various diseases. Nonetheless, currently there is no updated ethnobotanical documentation concerning the HMs being used for the treatment of chronic non-communicable diseases (NCDs) such as diabetes, cardiovascular, hypertension and gastrointestinal diseases (to mention a few). The study was therefore geared towards identifying different HMs frequently used by Mauritians, and to establish association(s), if any, with common demographic factors. Demographic characteristics of participants ($n=334$), different HMs used against NCDs, information concerning specific plants (vernacular names, utilised parts, preparation methods and side effects) were recorded systematically via a standardised questionnaire. The relative importance values of the plant species were determined via quantitative ethnobotanical indices such as informant consensus factor (FIC), use value (UV) and fidelity level (FL). Significant associations were found between age, educational level, income group and the use of natural remedies ($p<0.01$). Thirty medicinal plants species belonging to 22 families were recorded with Asteraceae, Fabaceae and Rutaceae being the most used species. Leaves (51%) were the most frequently used plant parts and decoction (46.1%) was the most common method of preparation. Based on UV, *Azadirachta indica*, *Pimpinella anisum* L. and *Momordica charantia* were among the most used plants. Adverse effects like hypertension and gastrointestinal toxicity were also reported with the use of some plant species. In conclusion, therapeutic properties of some HMs correlated to some extent with that of previous studies while others have open potential perspectives for further research as their chemistry and pharmacology have not been published.

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1. Introduction

Non-communicable diseases (NCDs) are the leading causes of death globally, killing more people each year than all other

causes combined. Of the 57 million deaths that occurred globally in 2008, 36 million or 63% were due to NCDs, principally cardiovascular diseases (CVDs), diabetes, cancers and chronic respiratory diseases. The annual NCD deaths are predicted to rise worldwide, and the greatest increase is expected to be

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seen in low- and middle-income sectors. Mauritius has unfortunately not been spared and the WHO global status report on NCDs 2010 for Mauritius has shown that NCDs were responsible for 87% of all deaths with the proportional mortality (percentage of total deaths, all ages) being cardiovascular diseases (87%), cancers (12%), respiratory diseases (5%), diabetes (23%), injuries (6%), communicable maternal, perinatal and nutritional conditions (7%) and for other NCDs (11%) (WHO, 2011). Notably, Mauritius has also one of the highest prevalence of diabetes in the world with nearly one in five of the adults above age of 30 years suffering from diabetes. There are at least 120,000 diabetics in the country and 25% of Mauritians have reached the pre-diabetic stage (MOH, 2012). Enormous advances have been made in medical care and there are a range of conventional medicines and preventative strategies available against the NCDs but still the management of NCDs remains totally unsatisfactory. Indeed, NCDs are devastating scourges and despite the recent surge in new conventional drugs to treat and/or prevent the condition, NCDs prevalence continues to increase significantly. Therefore, the last few decades have witnessed a renewed interest in complementary and/or alternative medicines such as herbal medicines (HMs).

Knowledge gained from the use of medicinal herbs and their active ingredients has served as the foundation for much of modern pharmacology and many modern drugs have their origin from botanical sources. Additionally, the development of modern chemistry has permitted the isolation of phytochemicals from medicinal herbs which have served as drugs or starting materials for the synthesis of many important commercially important drugs used today. Drugs such as aspirin, digitalis, morphine, metformin and quinine amongst others were all originally isolated or synthesised from materials derived from plants (Mahomoodally et al., 2010a,b).

Despite the availability of different approaches for the discovery of therapeutics, natural plant products still remain one of the best sources of new structural types. Concurrently, many people in developing countries such as China, Taiwan, India, Pakistan, Latin America as well as Mauritius have begun to turn to alternative and complementary therapies as cheap sources of complex bioactive compounds and evidence of the beneficial therapeutic effects of these medicinal herbs is evidenced by their continued use (Mahomoodally, 2012).

The indigenous people of Mauritius have a long-standing tradition of the use of phytomedicines. Furthermore, being a tropical island, Mauritius has a very rich and diverse flora and many indigenous and endemic plant species of Mauritius have been used in folk medicine to treat various human ailments of man. Nonetheless, even with this vast array of data, few medicinal plant species of Mauritius have been scientifically evaluated for their possible medicinal application. Currently, several kinds of extracts from various exotic, endemic, and indigenous plants are sold as decoctions or “tisanes” in several markets across Mauritius to treat minor ailments. This native herbal folk medicinal practice forms an essential part of the heritage of the local pharmacopoeia of Mauritius. Nonetheless, only few medicinal plants have been validated for their medicinal uses (Mahomoodally et al., 2010a). Previous studies have tried to address the pharmacology of some plants from Mauritius, but to the best of our knowledge no studies have endeavoured to document the medicinal plants that are

used against common chronic NCDs. To this effect, the present study aims at identifying the different herbal medicines used by Mauritians against common NCDs (diabetes, cardiovascular, hypertension and gastrointestinal diseases among others) and to establish correlations, if any, with common demographic factors.

2. Methodology

2.1. Study area

Mauritius is a subtropical island located in the southwestern Indian Ocean with a population of 1.3 million. Data was collected via personal interviews during field trips and visits to local people. Around thirteen different towns and villages namely Grand Gaube, Port Louis, Bon Accueil, Dagotiere, Quartier Militaire, Vacoas, Curepipe, La flora, Rose Belle, Plaine Magnien, Flacq, Chamouny and Chemin Grenier amongst others were visited.

2.2. Questionnaire design and interview with local people

The survey was carried out during the academic year 2011–2012. Data was collected from the local people, through face-to-face interviews, using a standardised semi-structured questionnaire (Appendix A) which was adapted from a previous study (Cakilcioglu et al., 2011). Quota sampling method was used, with age as the main determinant; i.e., information was sought mainly from people over 40 years old, based on the assumption that the mature population tend to have more knowledge on the traditional botanical remedies.

A nationally representative sample of 334 people was interviewed and from this 256 participants were included in the final study. Those respondents having NCDs and using plant remedies against these diseases were included in the survey and those not suffering from any NCDs or having NCDs but not using any natural remedies were excluded. Interviews were conducted in both rural and urban regions of the island with both male and female participants. Participants were interviewed, both at their homes and during busy hours in common areas such as the traditional markets.

The questionnaire comprised of closed questions about the respondent's personal data, such as gender, age, profession, and income (expressed in the net monthly amount of their salary), and the data was used to define a profile of the subjects. In addition, open questions were used to collect information regarding the use of different plant remedies used. If the interviewee claimed to be using herbal remedies as alternative therapy, then a description of the plant was requested, with all the details concerning its use, the local name, the therapeutic indication, and the site of collection or purchase, mode of preparation and administration, form of usage either fresh or dried, route of application, approximate dosage, possible contraindications, duration of treatment and complications, if any. As far as possible, the vernacular languages (‘Kreol’ and ‘Bhojpuri’) were employed to collect accurate data. The present research was approved by the Department of Health Sciences, University of Mauritius

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