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Ethnopharmacological analysis of medicinal plants used against non-communicable diseases in Rodrigues Island, Indian Ocean

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ABSTRACT

Ethnopharmacological relevance: Rodrigues is an autonomous outer island that form part of the Republic of Mauritius and one of three islands that constitute the Mascarene archipelago in the Indian Ocean. Though herbal medicine is in common use in Rodrigues, there has been no ethnopharmacological study to document quantitatively such traditional practise particularly against non-communicable diseases (NCD) which is currently a growing major health issue on the island. The aim of the present study was to collect, analyse and document traditionally used medicinal plants (MP) from key informants and traditional medicine practitioners (TMP) in the tropical island of Rodrigues to treat and/or manage common NCD.

Materials and methods: Data was collected *via* face-to-face interviews with MP users ($n=113$) and TMP ($n=9$). Seven quantitative ethnopharmacological indices, namely family use value (FUV), use value (UV), informant agreement ratio (IAR), relative frequency of citation (RFC), fidelity level (FL), relative importance (RI) and ethnobotanicity index (EI) were calculated.

Results: Hundred and three plants belonging to 55 families were recorded for the treatment and/or management of 27 different NCD. Three of the MP (*Terminalia bentzoë* (L.) L.F, *Sarcostemma cf. adontolepis* Balf.f. and *Clerodendrum laciniatum* Balf.f.) recorded are endemic to Rodrigues and 2 (*Carissa xylopicron* Thouars., *Phyllanthus casticum* Willemet f.) endemic to the Mascarene Islands. The most solicited MP family was Asteraceae with a total of 8 species. *Citrus aurantifolia* (Christm.) Swingle scored the highest RFC (RFC=1.02) value. Ten plants were found to score 100% FL and the highest IAR (0.98) was observed for the disease category of certain conditions originating in the perinatal period. Arecaceae scored the highest FUV value and *Ayapana triplinervis* (Vahl) R.M. King et H.Rob highest UV (UV= 2.72).

Conclusion: Given the dearth of updated information on traditional medicine of Rodrigues, this study can provide an opportunity to establish valuable primary information on the different MP used by the local people and hence can open new perspectives for further pharmacological research.

1. Introduction

According to recent statistics from the World Health Organisation (WHO, 2015), non-communicable diseases (NCD) accounts for 38 million of deaths annually with a staggering 82% of deaths caused predominantly by cardiovascular diseases, cancers, chronic respiratory and diabetes (WHO, 2015). NCD are the leading causes of death globally, killing more people each year than all other causes combined. The annual NCD deaths are projected to rise worldwide, and the greatest increase is expected to be seen in low- and middle-income regions. Developing countries have unfortunately not been spared and the WHO global status report on NCD 2010 has shown that NCD 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 NCD (11%) (WHO, 2014). Additionally, the Republic of Mauritius including Rodrigues has also one of the highest prevalence of diabetes 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 and Rodriguans have reached the pre-diabetic stage (Mootoosamy and Mahomoodally, 2013). Enormous advances have been made in medical care and there are a range of conventional medicines and

Abbreviations: NCD, non-communicable diseases; FUV, family use value; UV, use value; IAR, informant agreement ratio; RFC, relative frequency of citation; FL, fidelity level; RI, relative importance; EI, ethnobotanicity index; IPNI, International Plant Name Index; IUCN, international union for conservation of nature; UV, use value; MP, medicinal plants; MOHQL, Ministry of Health and Quality of Life; TM, traditional medicine; WHO, World Health Organization

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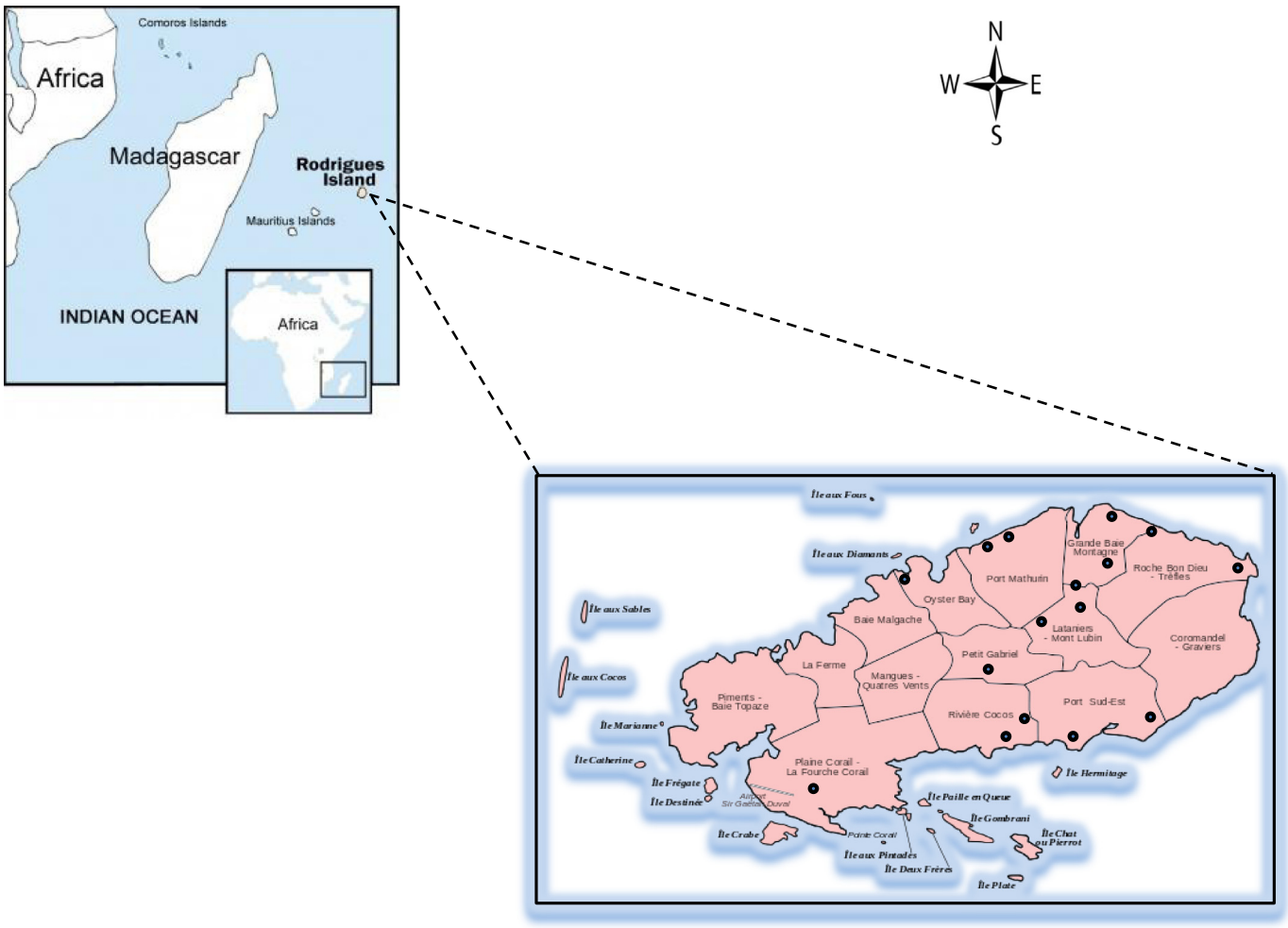

Fig. 1. Location of Rodrigues Island in the Indian Ocean and study areas represented by black dots (Google maps, 2015; cms.batconservation.org).

preventative strategies available against the NCD but the management of NCD remains grossly unsatisfactory. Indeed, NCD is a devastating scourge and despite the recent surge in new conventional drugs to treat and/or prevent the condition, NCD prevalence continues to soar. Therefore, the last past decades has witnessed a renewed interest in the potential of traditional medicine such as herbal medicine to manage NCD.

Rodrigues Island is part of Sub-Saharan Africa and one of three islands that constitute the Mascarene archipelago. It is also an autonomous outer island that constitute the Republic of Mauritius with the former comprising of several islands including Mauritius (Main Island), Rodrigues, Agalega, St. Brandon and a panoply of outlying smaller islands, all located in the south of the Indian Ocean (Fig. 1). Due to its volcanic origin, Mascarene Islands have a diverse flora and have been endorsed by international authorities as a centre for plant biodiversity. The local flora bears its essence from the floristic heritage of the Mascarenes and regroups a wide array of endemic, indigenous and native or highly specialised species that have evolved because of the variation in topography, climate and the geographical isolation of the islands from the nearby landmass, Madagascar. Rodrigues has approximately 145 native plant species among which more than 30 are endemic.

Interestingly, the local inhabitants of Rodrigues hold an inherent use of medicinal plants (MP) emanating from their ancestors for decades for the management and/or treatment of various diseases. A major portion of this flora is exploited for its medicinal properties by the local people to treat and/or manage common human ailments. Nonetheless, there is currently a dearth of updated scientific validation and compilation of MP from Rodrigues that is in common use. Although the availability and number of ethnopharmacological reports are rapidly growing from Mauritius (Chintamunnee and Mahomoodally, 2012; Mootoosamy and Mahomoodally, 2013; Nunkoo and Mahomoodally, 2012; Sreekeesoon and Mahomoodally, 2014), there is still a paucity of updated compilation of quantitative ethnopharmacological data and concerns about the rationale use of MP persist from Rodrigues Island.

The present study therefore endeavours to collect, analyse and document MP that are traditionally and commonly used in the management and/or treatment of common NCD. Indeed, failure to document such knowledge can result in losses in both the use of such remedies and in the scientific documentation of the cultural traditions of MP used in the treatment and/or management of a plethora of human diseases. Therefore, the main aim of the present study is to collect, analyse and properly document traditionally used MP against NCD from patients and traditional medicine practitioners (TMP) in the tropical island of Rodrigues.

2. Methodology

2.1. Study area

Rodrigues, the smallest of the Mascarene archipelago is situated in the Indian Ocean, at latitude 19°43′ S and longitude

63°25′ E. Originated from volcanic activity between 1.3 and 1.5 million years ago, the island has a length of 18 km, width of 8 km, and a surface area of 108 km^2. Rodrigues is located 650 km to the northeast of Mauritius and about 1450 km to the east coast of Madagascar (Fig. 1). Discovered in 1528, Rodrigues Island bears the name of its "official" discoverer, Portuguese navigator Don Diego Rodriguez. Rodrigues has an autonomous status within the Republic of Mauritius since 2002 and is divided into 14 zones (Anon, 2014). As of 2014, the island's population was about 41,669 (20,529 males and 21,140 females) according to Population and Vital Statistics of January–June 2014. Most of the inhabitants are of mixed African and French descent. The main economic activities of Rodrigues includes fishing, farming, cultivation (mainly onions, garlic and chilli), handicrafts (such as basketwork and embroidery), processing of agricultural products (including honey, pickles of lemon, chilli etc.) and a developing tourism sector. Maize was formerly the basic food but currently this has been substituted by rice. However, the island has a relatively poor economy which is partly explained by the fact that the revenue obtained from the export of cattle, sea products and food crops is significantly less as compared to the expenses on the imported products (Anon, 2014). The main religion is Roman Catholicism with small minorities of other religions including Hindus, Muslims, and Buddhists among others. The island possesses a comfortable tropical climate with temperatures varying between 28 °C and 35 °C during the Southern summer, which coincides with the cyclonic season (November–April) and between 18 and 27 °C in winter (Anon, 2014).

2.2. Questionnaire design

The questionnaire used in the present study was adapted from previous studies (Chintamunnee and Mahomoodally, 2012; Mootoosamy and Mahomoodally, 2013; Nunkoo and Mahomoodally, 2012; Sreekeesoon and Mahomoodally, 2014). The questionnaire consisted of both close and open-ended questions. The questionnaire developed was anonymous, confidential and non-compulsory. The questionnaire was divided into 5 main sections: A, B, C, D, and E.

The first section sought to document basic demographic information of the participants, including age, gender, level of education, place of residence, occupation, religion and average monthly household income. The second part of the questionnaire consisted of information about 'why' and 'when' they resorted to MP as well as the person involved in their preparations as described by Picking et al. (2011). In section C, participants were requested to elaborate on MP employed including the conditions for which they make use of these plants, the part(s) of the plant (s) used, the length of time for which the treatment is made use of, whether additives were used in the preparations to improve palatability, place and time of collection of the plant(s) for preparation. In sections D and E, the efficacy of the MP as well as any side effects encountered by the participants was recorded.

2.3. Data collection

This project was approved by the Department of Health Sciences, Faculty of Science, University of Mauritius, Mauritius. We attempted to follow the best field practise in the present ethnopharmacological survey as described by Heinrich and Verpoorte (2014) and as per the code of ethics stipulated by the International Society of Ethnobiology Code of Ethics to amass primary data from key informants and TMP.

Key informants were selected through 'purposeful' or 'criterion-based' sampling, which consists of choosing key participants according to predefined criteria (*e.g.* MP users and TMP) to get specific information to answer the key questions. At any point in time if the participants no longer wanted to pursue the interview, they were allowed to withdraw. Some of the interviews were performed during busy hours of common areas such as the traditional 'bazaars'. Personal visits were also effected to homes, herbalists and indigenous health centres. Proper data was partly collected using the participatory rural appraisal method, as the key informants also became investigators themselves, participating in interviews, informal meetings, open and group discussions, and overt observations with the questionnaire. Many of the local people helped in locating potential participants and TMP. Interviews, group discussion with knowledgeable persons and individual meetings with TMP were also organised from 2014 to early 2015 in order to collect precise primary data on common MP in use.

As far as possible, the vernacular language (*Creole*) was employed to collect accurate data from the participants when interviews, informal meetings, open and group discussions, and overt observations were performed with semi-structured questionnaire (Mootoosamy and Mahomoodally, 2013; Nunkoo and Mahomoodally, 2012). The first author was well aware of the local language and the study site, which permits the accurate recordings of ethnobotanical information during filed visits. During field survey, whenever the participant mentioned a plant species, where possible, the informant was encouraged to show a sample of the plant species, which was collected and photographed immediately. Some of the local people were asked to accompany us to the potential medicinal plants distribution area and information was collected therein (Fig. 2). The collected sample was identified with the help of their vernacular names and by a local botanist. Often photographs of plant were shown to informants to confirm

Fig. 2. Traditional healers showing plant samples used as remedy.

claims. Occasionally, specimens were taken to other survey zones, shown to people to stimulate memory and gather further information.

Ethnobotanical data collected during the survey was cross-checked (local/scientific names) according to locally published books (Gurib-Fakim, 1994) and identified/collected with help of officers and botanist from the Mauritian Wildlife Foundation (Rodrigues). The Plant List, International Plant Name Index, and Kew Botanical Garden Plant Name databases were used to validate plant scientific names as well as confirm author names (Heinrich and Verpoorte, 2014; Rivera et al., 2014). Our local repository database was updated whereby plant samples were assigned a collection number for future reference and data mining as suggested by Verpoorte (2008).

This documentation has been geared to endorse the involvement of the native people who have preserved indigenous knowledge about folk herbal remedies as well as targets to protect the community biodiversity and intellectual property rights. In addition, respondents were assured that this study does not hold any commercial purpose and serves the sole goal of information documentation, preservation and dissemination of traditional knowledge pertaining to the use of MP against NCD.

2.4. Disease reporting and classification

The definition adopted to define NCD was any medical condition or disease, which is non-infectious and non-transmissible and hence not passed from person to person (Kim and Oh, 2013; WHO, 2015). The ailments classified as NCD include diabetes mellitus, cardiovascular diseases, pain (stomach, head, knee and whole body), neonatal jaundice, acne, wound, bloating, gastritis, gout, stress, nausea, inflammation (not related to infection), cancer, mouth ulcer, liver disease, hypercholesterolaemia, prostate disease, musculoskeletal problem, agitation in children, loss of appetite and anaemia (Kim and Oh, 2013; WHO, 2015).

As far as possible the respondents were asked to give explicit details about the type of NCD they managed using MP. They were asked to indicate and describe any or current symptoms to the interviewer and encouraged to disclose under full confidentiality if they were formally diagnosed by either a medical practitioner with a specific NCD. Voluntary assistance from a medical practitioner and/or traditional healer was sought to confirm medical conditions/symptoms and to establish comparisons between the local/vernacular descriptions and standard medical terms used to describe NCD.

2.5. Quantitative ethnobotanical indexes

2.5.1. The use value (UV)

UV was used to determine the relative importance of species known locally. The UV was useful in determining the plant species that was most frequently indicated in the treatment of an ailment (Hudaib et al., 2008). The following formula was used to calculate UV: $UV = \Sigma Ui/N$; where Ui is the number of uses cited by each informant for a given species, and N is the total number of informants (Vitalini et al., 2013).

2.5.2. Relative frequency of citation (RFC)

RFC was used to demonstrate the local importance of each species. RFC was calculated as follows: $RFC = FC/N$; where, FC is the number of informants mentioning the use of the species, and N is the number of informants participating in the survey (Vitalini et al., 2013).

2.5.3. Family use value (FUV)

The FUV is an index of cultural importance, which usually applied in ethnobotany to calculate a value of biological plant taxon (Gakuubi and Wanzala, 2012). FUV was calculated in order to identify the significance of medicinal plant families and calculated as follows FUV = UVs/ns; where UVs: use values of the species, and ns: total number of species within each family (Cadena-González et al., 2013).

2.5.4. Relative importance value (RI)

RI was used to demonstrate the versatility of the plant species and calculated as follows: RI = PP + AC; where PP is the number of pharmacological properties (reported specific ailments) attributed to a species divided by the maximum number of properties attributed to the most resourceful species (species with the highest number of properties). AC is the number of ailment categories treated by a given species divided by the maximum number of ailment categories treated by the most resourceful species. The highest possible value of RI is 2.0, which indicates the highest diversity of medicinal uses of a plant (Kadir et al., 2012).

2.5.5. Fidelity level (FL)

FL was used to classify the recorded plant species based on their claimed relative effectiveness. It was calculated as follows: $FL = (Ip/Iu) \times 100$; where Ip is the number of informants who mentioned the use of a particular species for a particular purpose, and Iu is the total number of informants who mentioned the plant for any use (Nawash et al., 2013).

2.5.6. Informant agreement ratio (IAR)

IAR is used to measure the agreement between informants concerning which plants are used for specific use categories. IAR was calculated as $IAR = (Nur - Nt)/(Nur - 1)$; where Nur is the number of use records in each use category, and Nt is the number of taxa used in each use category. IAR ranges from 0 to1 and a value of 1 indicates that taxa are used by many informants, thus inferring a high level of agreement and a distinct medicinal plant tradition (Inta et al., 2013). To generate the IAR, the diseases were classified as per the International Statistical Classification of Diseases and Related Health Problems (2014).

2.5.7. Ethnobotanicity index (EI)

EI is the ratio between the number of useful medicinal species reported and the total flora in the area, expressed as a percentage. This index was adapted in the present study to verify the proportion of endemic species considered useful in traditional medicine by the Rodriguan population in relation to the total endemic flora of the area in the study. It gives a very clear idea of the importance of the endemic medicinal species in a region (Leto et al., 2013).

2.6. Statistical analysis

Data collected for the study was tabulated and analysed using Microsoft Excel 2010. Pharmacological and chemical data of different remedies were collected by probing scientific databases (Pubmed, ScienceDirect, Elsevier, and Google Scholar), local university dissertations/books and other web sources such as records from Plant Resources of Tropical Africa (PROTA), The Plant List, International Plant Name Index, Kew Botanical Garden Plant Name databases and Plant Resources of South-East Asia (PROSEA).

3. Results and discussion

3.1. Demographic profile of informants

One hundred and twenty two indigenous people (42 males, 80 females) participated in the survey (Table 1). We found that

Table 1
Demographic information of interviewee ($n=122$).

Background characteristics		Frequency	(%)
Gender	Male	42	34.4
	Female	80	65.6
Age	20–30	7	5.7
	31–40	20	16.3
	41–50	6	4.9
	51–60	36	29.5
	> 60	53	43.4
Residence	Rural	116	95.1
	Urban	6	4.9
Level of education	No formal education	72	59.0
	Primary	17	13.9
	Secondary	12	9.8
	Tertiary	21	17.2
	Others	0	0.0
Monthly household income (Rs) (1 USD=35 MRU Rupees)	< 10,000	56	45.9
	10,001–25,000	45	36.9
	25,001–50,000	17	13.9
	> 50,000	4	3.3
Occupation	Housewife	28	22.9
	Retired	30	24.6
	Government officer	12	9.8
	Non-government officer	5	4.1
	Self-employed	35	28.7
	Unemployed	3	2.5
	Traditional practitioner	9	7.4
Religion	Catholic	120	98.4
	Protestant/other Christian	2	1.6

women were the more common users of traditional remedies than men given the high level of females' participation in the study as compared to males. Literature search on traditional medicine revealed that women tend to be more frequent users of traditional remedies due to their attachment to traditional knowledge (Rachid et al., 2012). Moreover, women play a leading role in keeping families and communities healthy by providing preventive care and treatment (Abe et al., 2012). The current study showed that the elder population use more traditional remedies as compared to the younger one whereby the majority of the informants (43.4%) were aged over 60 years. According to Okoro et al. (2011), elder people rely more on biological therapies due to the inherent belief that traditional medicine is more effective and results in fewer side effects as compared to allopathic medicines. Indeed, Kayani et al. (2014) suggested that old aged people tend to have more skills and awareness regarding ethno-medicines.

Taking into account the literacy background, it was found that irrespective of their academic background the informants have a tendency to converge towards traditional medicine for the treatment and/or management of NCD. However, another study revealed that poorly educated people were predisposed to have recourse to traditional remedies for the treatment of panoply of ailments (Nunkoo and Mahomoodally, 2012). Additionally it was argued that this knowledge also decline with upsurge in education because people having higher education are not attentive in folk use of medicinal plants (Kayani et al., 2014). The main sources of income and economic activity in Rodrigues are tourism, fishing, agriculture (plants and animals) and the handicraft industry, demonstrating that a large proportion of the population is self-employed. Consequently, a total of 38 self-employed informants, representing a majority of 31.1%, were recorded and 45.9% of the informants' monthly income was found to be less than 10,000 Mauritian rupees (1 USD=35 Mauritian rupees). Most of the Rodriguans are of mixed African and French descent and the main religion practised by informants is Roman Catholicism (98.4%).

3.2. Reasons for using MP in Rodrigues

We found that the main motivation for using MP was because it was part of their culture and they have been using it since childhood (Table 2). Indeed, 75.5% of the respondents agreed with this statement which correlates with a previous study conducted in Mauritius (Nunkoo and Mahomoodally, 2012). Moreover, 22.1% of the participants claimed that MP are more effective than conventional medicine. However, only 0.8% of the participants reported that the reason for using MP was that the latter are free while conventional medicines are expensive. According to Iwu et al. (1999), the primary benefit of using herbal remedies is that they are relatively safer than their synthetic analogues, offering profound therapeutic benefits and more affordable treatment.

3.3. Medicinal plant diversity in Rodrigues

The Island of Rodrigues is endowed with a rich floral biodiversity comprising of a vast array of endemic and indigenous plants species. We found that phytomedicines play a fundamental role towards the well-being of the local population in Rodrigues who relies primarily on herbal remedies for their primary treatment. During field visit, we found that traditional medicine in Rodrigues is an effective tool for the treatment and/or management of panoply of diseases whereby the indigenous population still makes use of the traditional mortar and pestle-based preparation of herbal remedies.

A total of 103 MP belonging to 55 families were catalogued as traditionally used against NCD in Rodrigues. The information gathered during filed trip is summarised in Table 3. The MP documented are arranged in alphabetical order according to the botanical family to which they belong. MP were used to treat and/or manage 27 different types of ailments including hypertension, diabetes mellitus, anaemia, inflammation, pain (head, knee, abdomen and whole body), bloating, cancer, gastritis, liver disease, wound, acne, prostate disease, gout, cardiovascular disease, haemorrhage, agitation in children, loss of appetite, neonatal jaundice, fracture, insect bite, mouth ulcer and stress.

The most relevant families much contributing to the medicinal flora of Rodrigues are the Asteraceae family (6 species), Poaceae family (6 species) followed by Lamiaceae (5 species), Apocynaceae, Moraceae, Rubiaceae and Euphorbiaceae (4 species each). In accordance with the present findings, Chintamunnee and Mahomoodally (2012) also reported Asteraceae as being the most represented family used to treat NCD. Gurib-Fakim (2006) has also

Table 2
Assessment of different reasons behind the use of MP.

Reason behind use	Response (n)[a]
Part of culture and has been used since childhood	97
MP are free while conventional medicine is expensive	1
Belief that some diseases cannot be cured using western medicine	2
More effective than conventional medicine	27
Conventional medicine result in too many side effects	20

[a] Multiple answers were allowed.

reported Asteraceae as being one of the more important botanical families that have contributed to molecules/drugs of medical importance. One factor that may explain the widespread use of the Asteraceae family is the large number of species belonging to it; having a worldwide geographical distribution with around 25,000 species, distributed across 1620 genera and 12 subfamilies (Gurib-Fakim, 2006; Stevens, 2001). The prevalence of Asteraceae in medicinal use is not a new finding as previous studies across several other countries have reported similar findings (Kadir et al., 2014; Cruz and Andrade-Cetto, 2015; Kichu et al., 2015).

The leaves were observed to be the most frequently used plant parts in MP preparations which correlate with the study of Carrió and Vallès (2012). Leaves were mostly used in the preparation of herbal remedy since they are easily collected than underground parts, flowers and fruits (Giday et al., 2009). Use of leaves as remedy is generally considered as sustainable for the survival of plants since their harvest does not induce the irreversible destruction of plants like that of roots or whole plant a approach towards harvesting (Shah et al., 2015).

Moreover, according to Ghorbani (2005), leaves are active in photosynthesis and the production of pharmacologically active phytochemicals, which are responsible for their curative effects. According to Dennehy and Tsourounis (2007), the medicinal use of plants is attributed to the presence of active ingredients with physiological activity. Each bioactive ingredient impart a certain physiological action on a given organ or biological activity.

3.4. Method of preparation and administration

The method used in the preparation and the route of administration of a given herbal remedy varies according to the kind of ailment they were geared to treat and/or manage. From the present study, we found that the most commonly employed method of preparation of herbal remedies was infusion (51.2%) followed by decoction (28.6%), poultice (10.7%), raw (6.0%), (taken as raw and plant part prepared as pickles) and cooked (3.5%). Infusions are prepared by soaking the plant part in very hot water while decoctions are prepared by boiling the plant parts in water until the volume of the water reduces to the required amount. MP were also found to be used topically in the form of poultrice where the plant materials are crushed and applied to the affected area (fracture and wound). Most of the herbal remedies reported were administered orally which is in agreement with the study conducted by Ayyanar and Ignacimuthu (2011) in India.The majority of the participants claimed that they prepare their MP. However some respondents reported that some MP require special skills during their preparations and therefore they refer to either a traditional medicine practitioner or a more knowledgeable person for the preparation of the herbal remedy. Most of the participants (75.4%) reported to have inherited traditional knowledge from their parents and grandparents. This is supported by the findings of Nadembega et al. (2011) whereby traditional knowledge on medicinal plants has been passed from one generation to the next verbally. Furthermore, 26.2% of the participants had acquired the knowledge of preparations from neighbours, colleagues or friends and few (9.8%) acquired traditional knowledge from traditional medicine practitioners.

In the preparation of herbal remedies, water was the most common solvent reported to be used as depicted in Fig. 3. This is mainly due to the fact that most herbal remedies were prepared by infusion and decoction. In addition, a plausible explanation could be due to the fact that water is a universal solvent and is most easily accessible and cheap. The second highest additive used was honey (83.6%). Informants also reported that honey was used not only to enhance the taste of the herbal preparation but also due to its medicinal virtues. In the current study, we found that

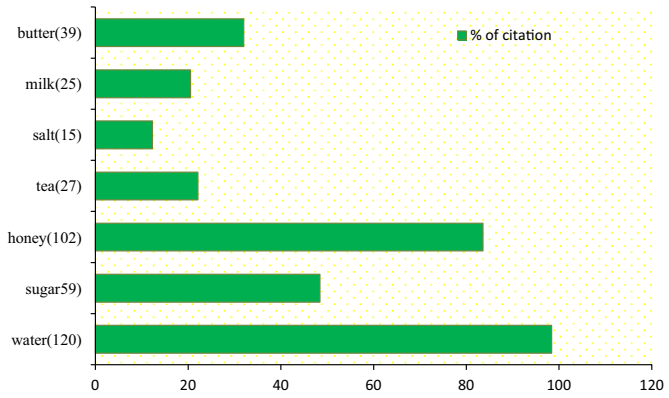

Fig. 3. Additives in MP preparations.

honey was mainly used in MP preparations for the treatment of acne and cough. Indeed, since ancient times honey has been used to treat panoply of ailments such as gastric disturbances, ulcers, wounds and burns, through ingestion or topical application (Molan, 1998). In the study conducted by Lai Moon Dor and Mahomoodally (2014), honey samples from Rodrigues Island was found to have antimicrobial properties where the undiluted samples of honey inhibited the growth of several pathogenic microorganisms. Moreover, Paul et al. (2007) reported that honey possesses wound healing and cough reliefing properties. According to another study conducted by Mandal and Mandal (2011), the wound healing property of honey is associated with its antibacterial activity. Furthermore, since honey is highly viscous in nature, it provides a protective barrier to prevent infection. The antimicrobial activity of honey has been associated with either the enzymatic production of hydrogen peroxide or due its high sugar content (high osmolarity) which help in inhibiting the growth of microbes.

3.5. Collection and sources of MP

In relation to collection and sources of MP, participants responded that MP were collected from the wild, homegardens and some were purchased. The majority of the participants (72.5%) reported that MP were collected between 6 a.m and 6 p.m. This was mainly due to their cultural belief and some claimed that it was a sign of respect towards nature. Our result is in line with the study conducted by Wodah and Asase (2012) whereby traditional healers collected plant materials in the morning. Furthermore, Mafimisebi and Oguntade (2010) reported that the forces that produce the active ingredients and hence make the plant potent and efficacious are inactive after 6 p.m.

3.6. Quantitative ethnobotanical analysis

In this study, seven quantitative ethnobotanical indexes were used to study and analyse the main MP species used by the local people against non-communicable diseases. The ethnobotanicity index of endemic plants used to manage NCD in Rodrigues was 4.26%

3.6.1. Use value (UV)

UV determines the relative prominence of species having more frequent reports documented from local informants (Table 2). *Ayapana triplinervis* (2.72) and *Citrus aurantifolia* (1.85) were found to have the highest UV whereas *Rosmarinus officinalis* (0.02) and *Oxalis latifolia* (0.02) were found to have low UVs. According to a study conducted by Ullah et al. (2014), high UVs of plants can be corroborated to their widespread distribution and the knowledge of traditional healers who have a high preference for using these

Table 3
Documented plants in the treatment of NCD in Rodrigues.

Family/plant species	VN/CEN	Source	RFC, UV	Indication	Method of preparation	Plant part used	Recorded literature use
Acanthaceae							
Justicia gendarussa Burm.f. [SK1472]	Notesoli/Willow-leaved justicia	W/C	0.16, 0.16	Gastritis	Prepare an infusion of 2–3 leaves in 1 l of water. Drink 1 cup as required.	L	Hepatoprotective activity[a]
Amaranthaceae							
Spinacia oleracea L. [SK1526]	Brede epinard/ Spinach	C/P	0.25, 0.25	Anaemia	Fricassee the leaves and eat 1 serving 3 times per week.	L	Antioxidant[b]
Amaryllidaceae							
Allium porrum L. [SK1410]	Poireau/Leek	C/P	0.43, 0.43	Hypertension	Prepare an infusion of the leaves. Drink 1 cup per week.	L	NA
Allium sativum L.[SK1411]	L'ail/Garlic	C/P	0.80, 0.80	Hypertension	Prepare pickle of *Allium sativum* L. and *Citrus limonia* Osbeck. Eat daily with meals or eat 1 clove daily.	Bu	Anticarcinogenic,antiatherosclerotic, antithrombotic,antimicrobial,anti-inflammatoryandantioxidant[c]
Annonaceae							
Annona muricata L. [SK1416]	Coronsol/ Soursop	C/P	0.45, 0.74	Diabetes mellitus, preventing cancer, hypertension	Prepare an infusion with 3 leaves in 1 L of water, drink 1 cup occasionally or eat 1 fruit occasionally. Eat fruit occasionally.Prepare an infusion with 3 leaves in 1 L of water, drink 1 cup occasionally.	Fr, L	Antitumoral, antimicrobial, cytotoxicity, antiparasitic and pesticidal[d]
Annona squamosa L. [SK1417]	Zatte/ Sugarapple	C	0.84, 1.48	'Tambave' (infant eczema)	Prepare a decoction of the leaves and bathe children for 3 days. The breastfeeding mother drinks 1 cup and the child 1 tsp.	L	Antioxidant[aaaa] and anticaterial[e]
				Diabetes mellitus	Prepare an infusion with 3 leaves in 1 L of water, drink 1 cup occasionally		
				Hypertension	Prepare an infusion with 3 leaves in 1 L of water, drink 1 cup occasionally.		
Apiaceae							
Daucus carota L. [SK1452]	Carote/Carrot	C/P	0.53, 0.98	Inflammation	Prepare an infusion of the leaves, drink 1 cup occasionally.	R, L	Antibacterial, antifungal[f]
				Neonatal jaundice	Prepare an infusion of the leaves and the root of *Daucus carota*L. Breastfeeding mother drink 1 cup per day.		
Petroselium crispum (Mill.) J. Hill [SK1503]	Persil frisé/ Parsley	C/P	0.49, 0.84	Gout	Prepare an infusion of 1–2 leaves in 1 L water, drink 1 cup per week.	L	Antimicrobial,menorrhagic, anticoagulant, anti-hypertensive,antioxidanteee[g]
				Knee ache	Prepare an infusion of 1–2 leaves in 1 L water, drink 1 cup per week.		
				Gastritis	Prepare an infusion of 1–2 leaves in 1 L water, drink 1 cup per week.		
Apocynaceae							
Allamanda cathartica L. [SK1408]	Fleur jaune, Fleur lajaunice, Fleur la fièvre/ Golden trompet	C/W	0.74, 1.02	Neonatal jaundice	Prepare an infusion of 3 flowers in 1 L of water. Breastfeeding mother drink 1 cup per day.	Fl, L	Antioxidant[h]
				Acne/skin pimples	Prepare a decoction of the flowers and bathe.		
Catharanthus roseus (L.) G.Don [SK1431]	Saponnaire/ Madagascar Periwinkle	C/W	0.79, 1.07	Diabetes mellitus	Prepare an infusion of 3 flowers in 1 L water, drink 1 cup per week.	R, F	Antioxidant [i]
Gomphocarpus physocarpus E.Mey. [SK1465]	Fanore/Balloon plant	C/W	0.31, 0.31	Whole body pain, cardiac pain	Prepare an infusion of 3 flowers in 1 L water, drink 1 cup when needed.	Fl	Sedative, strengthen body[j]
*Sarcostemma cf. *adontolepis* Balf.f. [SK1521]	Liane calé/ Climbing milkweeds	W	0.15, 0.15	Inflammation	Prepare an infusion of whole plant, drink 1 cup once.	WP	–
Araceae							
Colocasia esculenta (L). Schott [SK1443]	Songe/Wild taro	C/P	0.23, 0.23	Fracture	Crush the leaves and/or add with *Curcuma longa*L. Bind onto the fracture.	L	Antibacterial[k]
Arecaceae							
Cocos nucifera L. [SK1440]	Coco/Coconut	C/P	0.84, 1.84	Inflammation	Drink 1 glass of coconut water. Prepare a decoction of small *Cocos nucifera* L.fruit, drink 1 cup once.	Fr, Fl	Malaria, fever[l]
				Healing after caesarean	Prepare a decoction of the heartwood and flowers of *Cocos nucifera* L., drink 1 cup daily.		
Asparagaceae							
Furcraea foetida (L.) Haw. [SK1464]	Aloes/Green aloe	W	0.39, 0.39	Inflammation, abdominal pain	Prepare an infusion of the root, drink 1 cup when needed.	R	Antioxidant[m]
Aspleniaceae							
Asplenium nidus L. [SK1420]	Langue de vache/Nest fern	C	0.58, 0.80	Abdominal pain, constipation	Prepare an infusion 1 leaves and the root of *Furcraea foetida* (L.) Haw. drink 1 cup per	L	Oestrogenic activity[n]

Table 3 (*continued*)

Family/plant species	VN/CEN	Source	RFC, UV	Indication	Method of preparation	Plant part used	Recorded literature use
					week.		
				Inflammation	Cut 1 leaf into 3 parts and infuse in 1 L of water. Drink 1 cup once.		
				Neonatal jaundice	Cut 1 leaf into 3 parts and infuse in 1 L of water. Administer 1 cup to breastfeeding.		
				Liver disease	Infuse one and half leaf in 1 L of water, drink 1 cup per week.		
Asteraceae							
Ageratina riparia (Regel) R.M.King et H. Rob. [SK1406]	Ortosiphon/ Mistflower	W	0.28, 0.32	Hypertension, diabetes mellitus	Prepare an infusion of 3 flowers in 1 L water, drink 1 cup per week.	L	–
Ageratum conyzoides L. [SK1407]	Herbe babouc/ Goat's weed	W	0.25, 0.34	Bloating	Prepare an infusion of 7 leaves in 1 L of water, drink 1 cup per day.	L	Stop internal bleeding, Wound healing healing, anti-ulcer[o]
				Agitation in children	Prepare an infusion of 7 leaves in 1 L of water, drink 1 cup per week.		
Ayapana triplinervis (Vahl) R.M. king et H.Rob. [SK1421]	Ayapana/ Ayapana	C/P	0.94, 2.72	Bloating Wound healing	Prepare an infusion of 1–2 leaves, drink 1 cup. Crush the leaves, add salt and apply to the wound until healing.	L	Fever, high blood pressure, flu, vomiting, nausea[p]
Bidens pilosa L. [SK1424]	Laville bague/ Black-jack	W	0.75, 0.75	Wound healing	Prepare an infusion of 1–2 leaves, drink 1 cup. OrPrepare a decoction with 3 whole plants of *Bidens pilosa* L. and 3 whole plants of *Ageratum conyzoides* L., drink 1 cup per day.	L, W	Antitumour, anti-inflammatory, antidiabetic, antihyperglycemic, antioxidant[q]
Elephantopus mollis Kunth [SK1456]	Tabac marron/ Elephant's foot	W	0.17, 0.17	Wound healing	Crush the leaves, add oil and apply to the wound until healing.	L	Cytotoxic, apoptotic and anti a-glucosidase activities[cccc]
Parthenium hysterophorus L. [SK1499]	Herbe blanche/ Santa maria feverfew	W	0.59, 0.79	Loss of appetite	Prepare an infusion of the flowers drink 1 cup when needed.	L	Antioxidant[r]
Siegesbeckia orientalis L. [SK1524]	Herbe cange/ Eastern St Paul's wort	W	0.34, 0.45	Abdominal pain	Prepare a decoction of the leaves and bathe (inhale the vapour for 30 min).	L	Anti inflamatory and analgesic[s]
Vernonia cinerea (L.) Less. [SK1540]	Ayapana sauvage/Ironweed	W	0.17, 0.17	Wound healing	Crush the leaves, add salt and apply to the wound.	L	Anti-inflammatory[t]
Balsaminaceae							Anti-gastric[u]
Impatiens balsamina L. [SK1468]	Belsamine/Garden balsam	C	0.34, 0.34	Wound healing	Crush the leaves, add salt and apply to the wound.	L	
Basellaceae							
Basella alba L. [SK1423]	Brede gandole/ Vine spinach	C/P	0.34, 0.58	Diabetes mellitus	Prepare a decoction of		
				Hypertension, inflammation	the leaves, drink 1 cup 1–2 times per week. Or Fricassee the leaves and eat 1 serving 1–2 times per week.	L	Antitimor and antioxidant[v]
Boranginaceae							
Heliotropium indicum L. [SK1466]	Herbe papillon/ Indian heliotrope	W	0.21, 0.30	Bloating, loss of appetite	Prepare a decoction of the leaves, drink 1 cup when needed.	L	Anthelmintic activity[w]
Brassicaceae							
Coronopus didymus (L.) Sm. [SK1446]	Cressonette/ Lesser swine-cress	W	0.29, 0.44	Headache	Bind the leaves around the neck.		Anti-inflammatory[x]
Cactaceae							
Opuntia cochenillifera (L.) Mill. [SK1495]	Raquette/Cochineal cactus	W	0.27, 0.34	Wound healing, abscess	Remove the thorn and skin, crush and bind onto the wound or abscess.	St	–
Caesalpiniaceae							
Caesalpinia bonduc L. Roxb. [SK1426]	Cadoque/ Nickernuts	W	0.09, 0.15	Abdominal pain	Prepare a decoction of 3 seeds in 1 L of water, drink 1 cup once.	S	Antimicrobial[y]
				Kidney stone	Prepare a decoction of 3 seeds in 1 L of water, drink 1 cup per week.		
Caricaceae							
Carica papaya L. [SK1428]	Papaye/Papaya	C/P	0.62, 0.67	Constipation, stomach burn	Eat 1 serving of the ripe fruit daily.Prepare a decoction of about 5 cm of the roots in 1 L of water, drink 1 cup once.		Antioxidant, anti-inflammatory[z]
Casuarinaceae							
Casuarina equisetifolia J.R.Forst. & G.Forst. [SK1430]	Filao/Filao tree	C/W	0.17, 0.20	Abdominal pain, inflammation	Prepare a decoction of 3 seeds in 1 L of water, drink 1 cup once.		–
Combretaceae							
***Terminalia bentzoë* (L.) L.F. [SK1531]	Benzoin/NA	W	0.13, 0.16	Abdominal pain	Soak the bark in water; consume 1–2 cups per day until symptoms disappear.	Ba	–

Table 3 (*continued*)

Family/plant species	VN/CEN	Source	RFC, UV	Indication	Method of preparation	Plant part used	Recorded literature use
Terminalia catappa L. [SK1532]	Bedame/Tropical almond tree	C/W	0.21, 0.31	Diabetes mellitus	Prepare an infusion of 2–3 leaves in 1 L of water, drink 1 cup once	L	Anti cancer[aa]
Commelinaceae							
Commelina benghalensis L. [SK1444]	Herbe cosson/ Bengal Day Flower	W	0.06, 0.07	Abdominal pain	Prepare an infusion of 3 leaves in 1 L of water, drink 1 cup once	L	Antioxidant[bb]
				Prostate disease	Prepare an infusion of 2–3 leaves in 1 L of water, drink 1 cup per week		
Commelina diffusa Burm.f. [SK1445]	L'herbe lamare/ Climbing dayflower	W	0.06, 0.06	Inflammation	Prepare an infusion of the leaves. Drink 1 cup once. OR Prepare an infusion of, the leaves of *Commelina diffusa* Burm.f., the roots *of Coix lacryma-jobi* L.and the bark of *Sida stipulate* Cav. Drink 1 cup once.	L	–
Convolvulaceae							
Ipomoea indica (burm.F.) Merr. [SK1469]	Guerit vite/Blue morning glory	W	0.29, 0.34	Wound healing	Crush the leaves, add salt and apply on wound.	L	–
				Cardiovascular disease	Prepare an infusion of 2–3 leaves in 1 L of water, drink 1 cup per week.		
Crassulaceae							
Kalanchoe pinnata (Lam.) Pers. [SK1470]	Soulefate/Air plant	W	0.43, 0.59	Knee ache	Prepare a decoction of the leaves and bathe. OR Crush the leaves and bind around the knee.	L	Skin diseases, wounds,scabies, stop bleeding[cc]
				Swelling	Heat the leaves and bind around the swollen area.		
Curcurbitaceae							
Lagenaria siceraria (Molina) Standl. [SK1474]	Calbasse/ Bottlegourd	C/P	0.07, 0.07	Hypertension	Prepare an infusion of 3 leaves in 1 L water, drink 1 cup per week.	L	Antidiabetic[dd]
Momordica charantia L. [SK1486]	Margoze/Bitter gourd	C/P	0.21, 0.42	Diabetes mellitus, hypercholesterolaemia	Prepare a salad with the fruit and eat 1 serving 1–2 times per week.		Anti-hyperglycemic effect[ee]
Ebanaceae							
Diospyros ebenum J. Koenig ex Retz. [SK1454]	Bois d'ébène/ Black wood	W	0.08, 0.08	Diabetes mellitus	Grate the bark and prepare an infusion, drink 1 cup 1–2 times per week.	Ba	–
Erythroxylaceae							
**Carissa xylopicron* Thouars.[SK1429]	Bois drone/NA	W	0.44, 0.52	Inflammation	Grate the bark and prepare an infusion, drink 1 cup once.	Ba	–
				Diabetes mellitus	Grate the bark and prepare an infusion, drink 1 cup once per week.		
				Prostate disease	Grate the bark and prepare an infusion, drink 1 cup 1–2 times per week.		
Euphorbiaceae							
Acalypha wilkesiana Müll. Arg. [SK1403]	Rabis rouge/ Fire dragon plant	C/W	0.07, 0.07	Bodyache	Crush the leaves and bind to the aching body part.	L	Anticancer[ff]
Manihot esculenta Crantz [SK1481]	Manioc/ Cassava	C/P	0.14, 0.14	Hypertension	Prepare an infusion of 2–3 leaves in 1 L water, drink 1 cup per week.	L	Antioxidant[gg]
**Phyllanthus casticum* Willemet f. [SK1505]	Bois castique/ NA	W	0.30, 0.23	Diabetes mellitus	Prepare an infusion of the bark, drink 1 cup per week.		–
				Inflammation	Prepare an infusion of the bark, drink 1 cup once.		
Ricinus communis L. [SK1518]	Palma cristi/ Castor oil plant	W	0.17, 0.28	Bodyache Headache	Crush the seeds, add oil and massage Add oil on the leaves and bind the head.	S, L	Anti-inflammatory and antioxidant[hh] Antioxidant[ii]
Fabaceae							
Acacia nilotica (L.) Willd. Ex Del. [SK1402]	Piquan loulou/ Gum Arabic tree	W	0.14, 0.14	Diabetes mellitus	Prepare a decoction of the root, drink 1 cup once per week.	R	
Leucaena leucocephala (Lam.) de Wit [SK1477]	Acacia/White leadtree	W	0.16, 0.41	Abdominal pain	Prepare a decoction of the bark, drink 1 cup once.	L, Ba	Anticancer[ij]
				Headache	Bind leaves around the head.		
Mimosa pudica L. [SK1485]	Sensible/ Sensitive	W	0.25, 0.38	Toothache due to tooth growth	Prepare a decoction of the leaves and bathe. OR Crush the leaves, add honey and apply on the gum daily.	L	Anticonvulsant[kk]
				Agitation in children	Prepare a decoction of the leaves and bathe for 3 days.		
Lamiaceae							
**Clerodendrum laciniatum* Balf.f. [SK1439]	Bois cabris/NA	W	0.17, 0.26	Bodyache Prostate disease	Prepare a decoction of the leaves and bathe. Prepare an infusion of the bark. Drink 1 cup per week.	L, Ba	–
Leonurus sibiricus L. [SK1476]	Armoise/Honey weed	W	0.05, 0.05	Abdominal pain	Prepare an infusion of 2–3 leaves in 1 L of water. Drink 1 cup once.	L	Antibacterial[ll]
Mentha x piperita L. [SK1484]	La menthe/ Mint	P/C	0.97, 0.97	Bloating	Prepare an infusion of 2–3 leaves in 1 cup of water. Drink 1–2 cup per day. OR Prepare an infusion of 3 leaves with 3 leaves of *Ayapana triplinervis* (Vahl) R.M. king et H.Rob. in 1 L of	L	Antiviral,antibacterial,antifungal,radioprotective,antioedema,analgesic,and antioxidant[mm]

Table 3 (*continued*)

Family/plant species	VN/CEN	Source	RFC, UV	Indication	Method of preparation	Plant part used	Recorded literature use
					water. Drink 1–2 cups per day.		
Ocimum canum Sims [SK1492]	Ti bangelique/ Hoary basil	C/P	0.70, 0.78	Bloating	Prepare an infusion of 2–3 leaves in 1 cup of water. Drink 1–2 cups per day.	L	–
				Gastritis	Prepare an infusion of 2–3 leaves in 1 cup of water. Drink 2–3 cups daily until cured.		
Ocimum gratissimum L. [SK1493]	Gros bangelique/Clove basil	C/P	0.16, 0.16	Hypertension	Prepare an infusion of 2–3 leaves in 1 cup of water. Drink 1 cup per week.		Antibacterial and modifying antibiotic[oo]
Rosemarinus officinalis L. [SK1520]	Romarin/ Rosemary	C	0.02, 0.02	Stress	Prepare an infusion of the leaves. Drink 1 cup daily.	L	Antidepressant-like effect[pp]
Lauraceae							
Litsea glutinosa (Lour.) C.B. Rob. [SK1478]	Bois z'oizeau/ Bollygum	W	0.70, 1.22	Inflammation	Prepare an infusion of the bark. Drink 1 cup once.	Ba, L	Anti-nociceptive[qq]
				Abdominal pain	Grate the bark, soak in water and drink 1–2 cups per day.		
Liliaceae							
Allium cepa L. [SK1409]	Zoignon/Onion	C/P	0.79, 1.16	Swelling caused by insect bite	Cut the bulb into two and rub onto the affected area.	Bu	Dental infections, cancer, antihypertensive[rr]
Mackinlayaceae							
Centella asiatica (L.) Urb. [SK1433]	Boileau/ Centella	W	0.17, 0.17	Inflammation	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup once.	L	Cytotoxic and anti-tumour properties[ss]
Malvaceae							
Abelmoschus esculentus (L.) Moench [SK1401]	Lalo/Okra	P	0.17, 0.17	Inflammation	Soak the fruit in water to extract the birdline. Drink 1 glass.	Fr	Antioxidant[tt]
Hibiscus rosa-sinensis L. [SK1467]	Foulsapate/Chinese Hibiscus	C	0.11, 0.16	Inflammation	Crush 2–3 leaves and soak in 1 L of water, drink 1 cup once.	L, Fl	Antioxidant and anti bacterial[uu]
				Bloating	Prepare an infusion of 1–2 flowers in 1 L of water, drink 1 cup when needed.		
Sida stipulata Cav. [SK1523]	Saindarou/Stipule fanpetals	W	0.61, 1.10	Inflammation	Prepare an infusion of 3 leaves in 1 L of water, drink 1 cup once.	L	–
Moraceae							
Artocarpus heterophyllus Lam. [SK1419]	Zak/Jackfruit	C	0.15, 0.07	Diabetes mellitus	Prepare a decoction of the fruit and drink 1 cup per week.	Fr	Anti-diabetic, hiarrhoea, fever[vv]
Ficus benghalensis L. [SK1461]	Multipliant/Indian banyan	C/W	0.25, 0.25	Inflammation	Grate the root and prepare an infusion in 1 L of water. Drink 1 cup once.	R	Antimutagenic and antioxidant[ww]
Ficus rubra Vahl [SK1463]	Laffouche a grande feuille/ The Pot belly	W	0.17, 0.17	Kidney stone	Prepare an infusion of 3 leaves in 1 L of water. Drink 1–2 cup per day until cured.	L	–
Morus alba L. [SK1489]	Myrte/White mulberry	C	0.16, 0.19	Inflammation	Prepare an infusion of 3 leaves in 1 L of water. Drink 1–2 cup once.	L	Vasodilator effect[xx]
				Hypertension	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup per week.		
Moringaceae							
Moringa oleifera Lam. [SK1488]	Brede mouroum/Moringa	C/P	0.32, 0.48	Hypertension	Prepare a decoction of the leaves in 1 L of water. Drink 1 cup per week.	L	Pain, antitumor, anti-inflammatory[yy]
				Anaemia	Prepare an infusion of 3 leaves in a cup of water. Drink 1 cup 1–2 times per week.		
				Stomach pain	Prepare an infusion of the leaves. Drink 1 cup per day.		
Musaceae							
Musa acuminata [SK1491]	Banane zinzli/ Wild banana	C	0.08, 0.12	Haemorrhage	Prepare an infusion of the leaves. Drink 1 cup once.	L,T, N	Antibacterial and antioxidant[zz]
				Burn	Bind the trunk of rotten tree on the affected region.		
				Headache	Bind the buds around the head.		
Myrtaceae							
Eugenia uniflora L. [SK1459]	Rousaille/Surinam cherry	C	0.23, 0.46	Bloating	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup once.	L, Fr	Antioxidant and antimicrobial[aaa]
				Gout	Prepare an infusion of 3 leaves in 1 L of water. Drink 1–2 cups per week.		
				Heart palpitation	Prepare an infusion of 3 leaves and 3 leaves of *Gomphocarpus physocarpus* E.Mey. in 1 L of water. Drink 1 cup per week.		
				Hypertension	Eat the fruits regularly		
Pimento racemosa (Mill.) J.W.Moore [SK1508]	Quatre epices/ Bay rum tree	C/P	0.26, 0.26	Hypertension	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup 1–2 times per week.		Anti-inflammatory[bbb]
Oleaceae							
Olea europaea Blume [SK1494]	Zolive/Olive tree	C	0.20, 0.28	Hypercholesterolaemia, hypertension	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup per week.	L	Antioxidant[ccc]
Orchidaceae							
Vanilla planifolia Jacks. ex	Vanille/Vanilla	C	0.02, 0.02	Hypertension	Prepare an infusion of the leaves. Drink 1 cup per month.	L	Anti bacterial[ddd]

Table 3 (*continued*)

Family/plant species	VN/CEN	Source	RFC, UV	Indication	Method of preparation	Plant part used	Recorded literature use
Andrews [SK1538]							
Oxalidaceae							
Oxalis latifolia Kunth [SK1496]	L'oseille, Trefle/ Garden pink-sorrel	W	0.02, 0.02	Nausea	Prepare an infusion of 15–20 leaves in 1 L water. Drink 1–2 cups per day.	L	–
Papaveraceae							
Argemone Mexicana L. [SK1418]	Chardron/Mexican poppy	W	0.44, 0.44	Inflammation	Prepare an infusion of the root. Drink 1 cup once.	R	Anti bacterial[eee]
Passifloraceae							
Passiflora edulis Sims [SK1500]	Grenadine/Passion fruit	W/C/P	0.46, 0.52	Hypertension	Eat 1 fruit per day or prepare juice with the fruit.	F, L	Antioxidant[fff]
				Inflammation	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup once.		
Phyllanthaceae							
Phyllanthus amarus Schum & Thonn [SK1504]	Kénelli blan/ Stonebreaker	W	0.05, 0.05	Diabetes mellitus	Prepare an infusion of leaves of 1–2 branches in 1 L water, drink 1 cup per week.	L	Anti-diabetic, antioxidant[ggg]
Plantaginaceae							
Plantago major L. [SK1509]	Plantain/Broadleaf plantain	C/W	0.49, 0.86	Abdominal pain	Prepare an infusion of 3 leaves in 1 L water, drink 1 once.		Wound healing, diuretic,antioxidant, antiviral[bbbb]
Poaceae							
Coix Lacryma-jobi L. [SK1442]	Herbe zobe/ Coixseed	W	0.06, 0.06	Inflammation	Prepare an infusion the roots, drink 1 cup once.	R	Induce apoptosis in the hepatocellular carcinoma cell[hhh]
Cymbopogon excavatus (Hochst.) Stapf. [SK1450]	Citronelle sauvage/ginger grass	W	0.27, 0.27	Body ache	Prepare a decoction of the leaves and bathe.	L	–
Cynodon dactylon (L.)Pers. [SK1451]	Chiendent/ Dog's tooth grass	W	0.08, 0.08	Musculoskeletal problem in children	Prepare a decoction of the leaves and bathe the child.	L	Antidiabetic, antioxidant and hypolipidemic, immunomodulatory, hepatic antioxidant[iii]
Stenotaphrum dimidiatum (L.) Brongn. [SK1528]	L'herbe bourique/Pemba Grass	W	0.09, 0.09	Bloating	Prepare an infusion of 3 leaves in 1 L of water, drink 1 cup once.	L	–
Vetiveria zizanioides (L.) Nashn [SK1541]	Vétiver/Vetiver	W	0.22, 0.29	Musculoskeletal problem in children	Prepare a decoction of the leaves and roots and bathe the child.	R, L	Antioxidant and anti-inflammatory[jjj]
Zea mays L. [SK1543]	Maïs/Maize	C/P	0.09, 0.11	Inflammation	Prepare an infusion of the immature fruit. Drink 1 cup once.	Fr, Fl	Antioxidant[kkk]
				Bloating	Prepare an infusion of 3 flowers and 3 immature fruit in 1 L of water. Drink 1 cup per day.		
Punicacea							
Punica granatum L. [SK1515]	Grenade/ Pommegrenate	C/P	0.48, 0.68	Anaemia Abdominal pain	Eat 1 whole ripe fruit. Prepare a decoction of the 1 immature fruit in 1 L of water. Drink 1 cup once.	F	Diarrhoea[lll]
Rhamnaceae							
Ziziphus mauritiana Lam. [SK1545]	Masson/Jujube	C	0.43, 0.61	Inflammation	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup once.	L, No	Antibacterial[mmm]
				Prostate disease	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup per month.		
				Hypertension	Prepare a decoction of the buds. Drink 1 cup per week.		
Rhizophoraceae							
Rhizophora mucronata Lam [SK1517]	Manglier/ Mangrove	W/C	0.20, 0.32	Inflammation	Prepare a decoction of the root, drink 1 cup once.	R	Hepatoprotective and antioxidant[nnn]
				Diabetes mellitus	Prepare a decoction of the root, drink 1 cup per month.		
Rubiaceae							
Coffea arabica L. [SK1441]	Café/Coffee	C	0.02, 0.04	Liver disease	Prepare an infusion of 3 leaves and one and a half leaves of *Aspledium nidus* L.in 1 L of water. Drink 1 cup per week.	L	Antiproliferative, antioxidant, and antimicrobial[ooo]
				Inflammation	Prepare an infusion of 3 leaves and one and a half leaves of *Aspledium nidus* L. in 1 L of water. Drink 1 cup once.		
Morinda citrifolia L. [SK1487]	Noni/Noni	C	0.16, 0.25	Diabetes mellitus, gastritis, hypertension, preventing cancer	Crush the fruit to extract the juice, drink 1–2 cups per week.	Fr, L	ntithrombotic,antioxidant, analgesicand anti-inflammatory, xanthineoxidase inhibitory,antispasmodic[ppp]
				Bodyache	Crush the leaves and make a massage.		
Paederia foetida L. [SK1497]	Lingue or zeng zeng/	W	0.18, 0.18	Bloating	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup when needed.	L	Anti-inflammatory,antioxidant, Antithrombolytic,

Table 3 (*continued*)

Family/plant species	VN/CEN	Source	RFC, UV	Indication	Method of preparation	Plant part used	Recorded literature use
	Skunkvine						anticytotoxic, antidiabetic[qqq]
Vangueria madagascariensis J.F. Gmel. [SK1537]	Vavangue/ Spanish-tamarind	C	0.17, 0.29	Diabetes mellitus, hypertension Knee ache	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup per week. Prepare a decoction of the leaves and bathe.	L	Antioxidant,antimicrobial and anti-diabetic activity[cccc]
Rutaceae							
Citrus aurantifolia (Christm.) Swingle [SK1436]	Limon/Lemon	C/P	1.02, 1.85	Hypertension Acne Bodyache	Prepare a decoction of 2–3 immature fruits in 1 L of water. Drink 1 cup per week. Squeeze the fruit to extract the juice and on the skin, leave to stand for 20–30 min. Cut the fruit and make a massage on the aching region.	F	Antioxidant, anti-inflammatory, anti-carcinogenic activities carminative and antimicrobial effect[rrr]
Citrus medica L. [SK1438]	Citron doux/NA	C	0.26, 0.39	Hypertension	Eat 1 fruit 1–2 times per week.	Fr, R	Anti-inflammatory[sss]
Murraya koenigii (L.) Spreng. [SK1490]	Carri poulet/ Curry tree	C/P	0.18, 0.18	Hypertension	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup per week.	L	Anti-obesity and hypoglycaemic effect[ttt]
Sterculiaceae							
Melochia pyramidata L. [SK1483]	Saindarou rouge/NA	W	0.61, 1.10	Inflammation	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup once.	L	–
Solanum nigrum L. [SK1525]	Brede martin/ Blacknight shade	W/C	0.29, 0.33	Anaemia Mouth ulcer	Fricassee the leaves; eat 1 serving 1–2 times per week. Crush the leaves, add honey and apply on the mouth ulcer.	L	Antitumor[uuu]
Thymelaeceae							
Wikstroemia indica (L.) C.A. Mey. [SK1542]	Herbe touterelle/Tie bush	W	0.28, 0.28	Anaemia	Fricassee the leaves with lentils; eat 1 serving 1–2 times per week.	L	Anaemia[vvv]
Verbenaceae							
Premna obtusifolia R.Br. [SK1511]	Bois siro/ Premna	W	0.53, 0.66	Inflammation	Prepare an infusion of 3 leaves in 1 L of water. Drink 1 cup once.	L	Anti-inflammatory[www]
Stachytarpheta indica (L.) Vahl. [SK1527]	Queue de rat/ Indian snakeweed	W	0.26, 0.30	Hypertension Wound healing	Prepare a decoction of the whole plant. Drink 1 cup per month. OR Prepare a decoction of 3 whole plants with 3 leaves of *Passiflora edulis* L. and 3 leaves of *Morus alba* L. Drink 1 cup per month. Crush the leaves and apply on the wound.	WP, L	–
Xanthorrhoeaceae							
Aloe vera (L.) Burm. [SK1413]	Aloe vera/Aloe vera	C	0.25, 0.39	Inflammation	Remove the skin on the leaf and eat the gel.	L	Anti-inflammatory, analgesic[xxx]
Zingiberaceae							
Curcuma longa L. [SK1448]	Safran/ Turmeric	C/P	0.80, 0.98	Acne Wound healing	Crush the root and/or add honey. Apply on the skin and allow to stand for about 30 min. Wash with water. Crush the root in 1 cup of milk, drink 1 cup daily. OR Prepare an infusion of the root and drink one cup daily. OR Crush the root and apply on the wound.	R	wound healing activity,gastroprotective activity,immunomodulatory activity, antifungal[yyy]
Zingiber officinale (L.) Roscoe [SK1544]	Gingembre/ Ginger	C/P	0.72, 1.02	Wound healing	Crush the root with salt and apply on the wound.	R	Cough, stomach pains caused by heavy colds, carminative, digestive, improving circulation, aphrodisiac[zzz]

[a]Krishna et al. (2009); [b]Bergman et al. (2001); [c]Capasso (2013); [d]Gajalakshmi et al. (2012); [aaaa]Gupta et al. (2008); [e]Mukhlesur et al. (2005); [f]Tavare et al. (2008); [g]Mahmood et al. (2014); [h]Conrad et al. (2013); [i]Omonhinmin et al. (2013); [j]Stafford et al. (2005); [k]Nakade et al. (2013); [l]Al-Adhroey et al. (2011); [m]Mathew et al. (2012); [n]Stefano et al. (2009); [o]Nweze and Obiwulu (2009); [p]Jonville et al. (2011); [q]Bartolome et al. (2013); [r]Kheng et al. (2011); [s]Jian-Ping et al. (2011); [t]Youn et al. (2012); [u]Yuan-Chuen and Yi-Han (2012); [v]Reddy et al. (2008); [w]Kabita et al. (2014); [x]Tereza et al. (2010); [y]Tasleem et al. (2009); [z]Huang et al. (2011); [aa]Yang et al. (2010); [bb]Palanivel et al. (2014); [cc]Muzitano et al. (2011); [dd]Chintamunnee and Mahomoodally (2012); [ee]Ullah et al. (2012); [ff]Lima et al. (2011); [gg]Yi et al. (2011); [hh]Zarai et al. (2012); [ii]Kalaivani and Mathew (2010); [jj]Gamal-Eldeen et al. (2007); [kk]Bum et al. (2004); [ll]Ahmed et al. (2014);[mm]Saharkhiz et al. (2012); [oo]Aguiar et al. (2014); [pp]Machado et al. (2012); [qq]Pradeepa et al. (2013); [rr]Thakurta et al. (2007); [ss]Babu et al. (1995); [tt]Adelakun et al. (2009); [uu]Yin et al. (2013); [vv]Arung et al. (2010); [ww]Satisha et al. (2013); [xx]Neng et al. (2014); [yy]Cheenpracha et al. (2010); [zz]Karuppiah and Mustafa (2013); [aaa]Francine et al. (2012); Angeles et al. (2001) [bbb]; [ccc]Ferreira et al. (2007); [ddd]Choo et al. (2006); [eee]Bhattacharjee et al. (2006); [fff]Juliana et al. (2013); [ggg]Mahomoodally and Muthoora (2014); [bbbb]Zuhair et al. (2012); [hhh]Yun et al. (2011); [iii]Ashokkumar et al. (2013); [jjj]Su-Tze et al. (2012); [kk] Ahmed et al. (2007); [lll]Boulogne et al. (2011); [mmm]Najafi et al. (2012); [nnn]Sundaram and Murugesan (2012); [ooo]Nuhu (2014); [ppp]Gilani et al. (2010); [qqq]Ahmed et al. (2014); [cccc]Ramalingum and Mahomoodally (2014); [rrr]Murali and Saravanan (2012); [sss]Kil-Nam et al. (2013); [ttt]Tembhurne and Sakarkar (2012); [uuu]Xia et al. (2013); [vvv]Chintamunnee and Mahomoodally (2012); [www]Abdul-Wahab et al. (2012); [xxx]Devaraj and Karpagam (2011); [yyy]Çikrikçi et al. (2008); [zzz]Abbasi et al. (2010); [cccc]Ooia et al. (2011).

L=leaves; WP=whole plant; Fl=flowers; S=seeds; B=bark; R=root; Fr=fruit; Bu=bulbs; No=buds; VN=vernacular name; CEN=common English name; SN=scientific name. W=wild; C=cultivated; P=purchased. *Endemic to Rodrigues; **Endemic to Masacrene islands.

plants. UV of a plant species gives information not only about its versatility in medicinal uses but also on its abundance in that specific study area (Ayyanar and Ignacimuthu, 2011). In the current study *A. triplinervis* has been reported to be used against diarrhoea and nausea/vomitting. According to Gauvin-Bialecki and Marodon (2008), the extract of *A. triplinervis* has been reported to possess an array of bioactive molecules namely ayapanin (or herniarin), ayapin, daphnetin, daphnetin dimethyl ether, daphnetin-7-methyl ether, hydrangetin, and umbelliferone. Coumarins contribute to the general defence response of plants to abiotic and biotic stresses and it has been confirmed that various substituted coumarins exhibit antimicrobial or anti-inflammatory activity and act as inhibitors of numerous enzyme systems. Moreover, the high use value of *C. aurantifolia* reported in the present study may be explained by its relatively high abundance in Rodrigues. According to Arias and Ramon-Laca (2005) *C. aurantifolia* possess an array of biologically active ingredients namely β-pinene, limonene, γ-terpinene, terpinolene, α-terpineol and citral responsible for its antimicrobial activity, in particular on Gram-positive bacteria (*Staphylococcus aureus*, *Bacillus subtilis* and *Staphylococcus epidermidis*). According to a recent study conducted by Fekrazad et al. (2015), photoactivated *C. aurantifolia* essential oil lead to considerable eradication of *Candida albicans* which could be beneficial for individuals having a high risk of Candida infections due to diabetes mellitus and other health complications. Furthermore, the high level of flavonoids content present in *C. aurantifolia* are of particular relevance to human health as there is evidence that they act as free radical scavengers, antioxidants, diuretic, antiviral, antibacterial, antimicrobial, anti-inflammatory, anti-tumour, antiplatelets agents and are associated with reduced risk of cancer and cardiovascular disease. In this line a study carried out by Morton (1987), demonstrated that *C. aurantifolia* contains flavonoids which possess antimicrobial activities and hence has been used for acne treatment which can be correlated to the present study. These multiple literatures tend to support the use of *C. aurantifolia* in Rodrigues. The relatively low UV of *R. officinalis* can be explained by the fact that the plant is not native to Rodrigues and only recently some of the inhabitants started to make use of it for the preparation of herbal remedy. *O. latifolia* was reported to be used to treat nausea; its low UV can be explained by the participants' preference to use *A. triplinervis* which has a long of use for the treatment of nausea.

3.6.2. Relative frequency of citation (RFC)

RFC was used to determine the local importance of each medicinal plant species (Table 3). High values of RFC designate preference and popularity of plant species for treating particular ailments. It was evident from the study that those species most frequently cited were also those species perceived as most useful and most commonly used by the populations for therapeutic purposes. In the present study, it was found that *Mentha x piperita* had the highest RFC value. *Mentha x piperita* is famous for its use in gastrointestinal diseases (*e.g.* bloating) and studies confirm antispasmodic effect of the peppermint oil on the digestive and

Table 4
Fidelity level of MP cited by at least 30 informants.

Scientific name of plant	Illness treated	Ip	Iu	FL (%)
Ageratina riparia (Regel) R.M.King et H. Rob.	Hypertension	30	34	88.2
Ageratum conyzoides L.	Agitation in children	20	31	64.5
Allium porrum L.	Hypertension	53	53	100
Allium sativum L.	Hypertension	98	98	100
Ananas bracteatus (Lindl.) Schult.f.	Hypercholesterolaemia	80	80	100
Annona muricata L.	Diabetes mellitus	53	55	96.3
Annona squamosa L.	Infant eczema	76	103	73.8
Argemone mexicana L.	Inflammation	54	54	100
Asplenium nidus L.	Neonatal jaundice	27	71	38.0
Basella alba L.	Diabetes mellitus	32	41	78.0
Bidens pilosa L.	Bloating	91	91	100
Carica papaya L.	Stomach pain	7	76	9.21
Carissa xylopicron Thouars.	Diabetes mellitus	22	54	40.7
Catharanthus roseus (L.) G.Don	Diabetes mellitus	52	96	54.2
Citrus aurantifolia (Christm.) Swingle	Hypertension	51	124	41.1
Citrus medica L.	Hypertension	27	32	84.4
Curcuma longa L.	Acne	95	98	96.9
Furcraea foetida (L.) Haw.	Abdominal pain	31	48	64.6
Gomphocarpus physocarpus E.Mey.	Wound healing	42	42	100
Impatiens balsamina L.	Wound healing	42	42	100
Ipomoea indica (burm.F.) Merr.	Cardiovascular disease	18	35	51.4
Kalanchoe pinnata (Lam.) Pers.	Knee ache	10	52	19.2
Mentha x piperita L.	Bloating	118	118	100
Moringa oleifera Lam.	Hypertension	35	39	89.7
Ocimum canum Sims	Bloating	75	85	88.2
Opuntia cochenillifera (L.) Mill.	Abscess	13	31	93.9
Passiflora edulis Sims	Inflammation	8	56	14.3
Petroselium crispum (Mill.) J. Hill	Gastritis	56	60	93.3
Pimento racemosa (Mill.) J.W.Moore	Hypertension	32	32	100
Plantago major L.	Abdominal pain	12	60	20.0
Siegesbeckia orientalis L.	Abdominal pain	37	41	90.2
Solanum nigrum L.	Anaemia	32	35	91.4
Stachytarpheta indica (L.) Vahl.	Hypertension	28	32	87.5
Wikstroemia indica (L.) C.A. Mey.	Anaemia	34	34	100
Zingiber officinale (L.) Roscoe	Wound healing	76	88	86.4
Ziziphus mauritiana Lam.	Hypertension	51	52	98.1

Ip = number of informants who mentioned the use of a particular species for a particular purpose. Iu = number of informants who mentioned the plant for any use. FL = (Ip/Iu) × 100 (Nawash et al., 2013).

vascular systems (Alankar, 2009). *Mentha x piperita* produces a variety of metabolites including terpenes, tannins, flavonoids and phenolic acids; it is also rich in menthol, menthone, and methyl acetate. Increasing evidence shows that menthol stimulates the secretion of digestive enzymes and bile and acts as a mild anaesthetic (Vidal et al., 2006). According to a study by Fonseka-Kruel and Fernandes (2003), *Mentha x piperita* was found to be useful in the treatment of nausea, flatulence, vomiting, indigestion, stomach cramps, menstrual cramps and parasitosis, which support findings from the present study. It reported to be used after meals to reduce indigestion and colonic spasms by dampening the gastrocolic reflex. In addition, menthol acts as a pain reliever when applied externally. *Mentha x piperita* has been reported to inhibit muscle spasm initiated by serotonin, increases the pain threshold through activation of the endogenous opiate system and may have a mild sedative effect on the central nervous system (Jamison, 2009).

3.6.3. Fidelity level (FL)

FL was used to classify the recorded plant species based on their claimed relative effectiveness. As illustrated in Table 4, 10 plant species were found to score 100% FL which included *Allium sativum* for hypertension; *Allium porrum* for hypertension; *Bidens pilosa* for bloating; *Gomphocarpus physocarpus* for wound healing; *Impatiens balsamina* for wound healing; *Ananas bracteatus* for hypercholesterolaemia; *Mentha x piperita* for bloating; *Pimento racemosa* for hypertension; *Argemone mexicana* for inflammation and *Wikstroemia indica* for anaemia. Low FL indicated less-preferred species for treating specific ailments. According to Hassan-Abdallah et al. (2013) plant species with notably high fidelity level values are considered potential candidates for further pharmacological investigations and deserve priority attention. Consequently, high FLs for specific species suggested that the plants might contain valuable phytochemical compounds. These traditional medicines handed down have high FLs because of their efficacy and safety (Abe et al., 2012). According to Ried and Fakler (2014), garlic-derived polysulfides stimulate the production of the vascular gasotransmitter hydrogen sulphide and enhance the regulation of endothelial nitric oxide, which induce smooth muscle cell relaxation, vasodilation, and blood pressure reduction. Moreover, Nwokocha et al. (2011) showed that garlic extract caused a reduction in blood pressure and heart rates in hypertensive rat models.

3.6.4. Relative importance value (RI)

RI was used to demonstrate the versatility of the plant species (Table 5). *Asplenium nidus* which was cited for 5 different ailments scored the highest (RI=2). It has been reported that *A. nidus* possesses antioxidant, tyrosine inhibiting and anti-bacterial activities (Lai et al., 2009). *Basella alba* (RI=1.35) was found to have anti-inflammatory properties by stabilising the lysosomal membrane which limits the inflammatory response by preventing the release of lysosomal constituents of activated neutrophil such as bacterial enzymes and proteases which cause further tissue inflammation and damage (Kumar et al., 2011). In another study, it was found that *B. alba* possesses antitumour and antioxidant potentials (Reddy et al., 2008).

Table 5
Relative importance value for MP used for NCD cited at least 30 times.

Scientific name of plant	PP	AC	RI
Ageratina riparia (Regel) R.M.King et H. Rob.	0.40	0.50	0.90
Ageratum conyzoides L.	0.40	0.50	0.90
Allium porrum L	0.20	0.25	0.45
Allium sativum L.	0.20	0.25	0.45
Ananas bracteatus (Lindl.) Schult.f.	0.20	0.25	0.45
Annona muricata L.	0.60	0.75	1.35
Annona squamosa L.	0.40	0.50	0.90
Argemone mexicana L.	0.20	0.25	0.45
Asplenium nidus L.	1.00	1.00	2.00
Basella alba L.	0.60	0.75	1.35
Bidens pilosa L.	0.40	0.25	0.65
Carica papaya L.	0.40	0.25	0.65
Carissa xylopicron Thouars.	0.60	0.75	1.35
Catharanthus roseus (L.) G.Don	0.20	0.25	0.45
Citrus aurantifolia (Christm.) Swingle	0.40	0.50	0.90
Citrus medica L.	0.20	0.25	0.45
Curcuma longa L.	0.40	0.5	0.90
Furcraea foetida (L.) Haw.	0.40	0.50	0.90
Gomphocarpus physocarpus E.Mey.	0.40	0.25	0.65
Impatiens balsamina L.	0.20	0.25	0.45
Ipomoea indica (burm.F.) Merr.	0.40	0.50	0.90
Kalanchoe pinnata (Lam.) Pers.	0.40	0.50	0.90
Mentha x piperita L.	0.20	0.25	0.45
Moringa oleifera Lam.	0.60	0.75	1.35
Ocimum canum Sims	0.40	0.25	0.65
Opuntia cochenillifera (L.) Mill.	0.40	0.50	0.90
Passiflora edulis Sims	0.40	0.25	0.65
Petroselium crispum (Mill.) J. Hill	0.60	0.50	1.10
Pimento racemosa (Mill.) J.W.Moore	0.20	0.25	0.45
Plantago major L.	0.20	0.25	0.45
Siegesbeckia orientalis L.	0.20	0.25	0.45
Solanum nigrum L.	0.40	0.50	0.90
Stachytarpheta indica (L.) Vahl.	0.40	0.50	0.90
Wikstroemia indica (L.) C.A. Mey.	0.20	0.25	0.45
Zingiber officinale (L.) Roscoe	0.20	0.25	0.45
Ziziphus mauritiana Lam.	0.60	0.50	1.10

PP: number of pharmacological properties (reported specific ailments) attributed to a species and AC: number of ailment categories treated by a given species.

Table 6
Family use value of MP documented.

Family	Plant species/UV	ns	FUV
Acanthaceae	*Justicia gendarussa* Burm.f./0.16	1	0.6
Amaranthaceae	*Spinacia oleracea* L./0.25	1	0.25
Amaryllidaceae	*Allium porrum* L./0.43 *Allium sativum* L/0.80	2	0.62
Annonaceae	*Annona muricata* L./0.74 *Annona squamosa* L./1.48	2	1.11
Apiaceae	*Daucus carota* L.0.98/ *Petroselium crispum* (Mill.) J. Hill/0.84	2	0.91
Apocynaceae	*Allamanda cathartica* L./1.02 *Catharanthus roseus* (L.) G.Don/1.07 *Gomphocarpus physocarpus* E.Mey./0.31 *Sarcostemma* cf. *adontolepis* Balf.f./0.15	4	0.64
Araceae	*Colocasia esculenta* (L). Schott/0.23	1	0.23
Arecaceae	*Cocos nucifera* L./1.84	1	1.84
Asparagaceae	*Furcraea foetida* (L.) Haw./0.39	1	0.39
Aspleniaceae	*Asplenium nidus* L./0.80	1	0.80
Asteraceae	*Ageratina riparia* (Regel) R.M.King et H. Rob./0.32 *Ageratum conyzoides* L./0.34 *Ayapana triplinervis* (Vahl) R.M. king et H.Rob./2.72 *Bidens pilosa* L./0.75 *Elephantopus mollis* Kunth/0.17 *Parthenium hysterophorus* L./0.79 *Siegesbeckia orientalis* L./0.45 *Vernonia cinerea* (L.) Less./0.17	8	0.71
Balsaminaceae	*Impatiens balsamina* L./0.34	1	0.34
Basellaceae	*Basella alba* L./0.58	1	0.58
Boranginaceae	*Heliotropium indicum* L./0.30	1	0.30
Brassicaceae	*Coronopus didymus* (L.) Sm./0.44	1	0.44
Cactaceae	*Opuntia cochenillifera* (L.) Mill./0.34	1	0.34
Caesalpiniaceae	*Caesalpinia bonduc* L. Roxb./0.15	1	0.15
Caricaceae	*Carica papaya* L./0.67	1	0.67
Casuarinaceae	*Casuarina equisetifolia* J.R.Forst. & G.Forst./0.20	1	0.20
Combretaceae	*Terminalia bentzoë* (L.) L.F./0.16 *Terminalia catappa* L./0.31	2	0.24
Commelinaceae	*Commelina benghalensis* L./0.07 *Commelina diffusa* Burm.f./0.06	2	0.07
Convolvulaceae	*Ipomoea indica* (burm.F.) Merr./0. 34	1	0.34
Crassulaceae	*Kalanchoe pinnata* (Lam.) Pers./0. 59		
Curcurbitaceae	*Lagenaria siceraria* (Molina) Standl./0. 07 *Momordica charantia* L./0. 42	2	0.25
Ebanaceae	*Diospyros ebenum* J.Koenig ex Retz./0.08	1	0.08
Erythroxylaceae	*Carissa xylopicron* Thouars./0.52	1	0.52
Euphorbiaceae	*Acalypha wilkesiana* Müll. Arg./0.07 *Manihot esculenta* Crantz/0.14 *Phyllanthus casticum* Willemet f./0.23 *Ricinus communis* L./0.28	4	0.18
Fabaceae	*Acacia nilotica* (L.) Willd. Ex Del./0.14 *Leucaena leucocephala* (Lam.) de Wit/0.41 *Mimosa pudica* L./0.38	3	0.31
Lamiaceae	*Clerodendrum laciniatum* Balf.f./0.26 *Leonurus sibiricus* L./0.05 *Mentha x piperita* L./0.97 *Ocimum canum* Sims/0.78 *Ocimum gratissimum* L./0.16 *Rosmarinus officinalis* L./0.02	6	0.37
Lauraceae	*Litsea glutinosa* (Lour.) C.B. Rob./1.22	1	1.22
Liliaceae	*Allium cepa* L./1.16	1	1.16
Mackinlayaceae	*Centella asiatica* (L.) Urb./0.17	1	0.17
Malvaceae	*Abelmoschus esculentus* L./0.17 *Hibiscus rosa-sinensis* L./0.16 *Sida stipulata* Cav./1.10	3	0.48
Moraceae	*Artocarpus heterophyllus* Lam./0.07 *Ficus benghalensis*L./0.25 *Ficus rubra* Vahl/0.17 *Morus alba* L./0.19	4	0.17
Moringaceae	*Moringa oleifera* Lam./0.48	1	0.48
Musaceae	*Musa acuminata* Colla./0.12	1	0.12
Myrtaceae	*Eugenia uniflora* L./0.46 *Pimento racemosa* (Mill.) J.W.Moore/0.26	2	0.36
Oleaceae	*Olea europaea* Blume/0.28	1	0.28
Orchidaceae	*Vanilla planifolia* Jacks. ex Andrews/0.02	1	0.02
Oxalidaceae	*Oxalis latifolia* Kunth/0.02	1	0.02
Papaveraceae	*Argemone Mexicana* L./0.0.44	1	0.44
Passifloraceae	*Passiflora edulis* Sims/0.52	1	0.52
Phyllanthaceae	*Phyllanthus amarus* Schum & Thonn/0.05	1	0.05

Table 6 (*continued*)

Family	Plant species/UV	ns	FUV
Plantaginacea	*Plantago major* L./0.86	1	0.86
Poaceae	*Coix Lacryma-jobi* L./0.06	6	0.15
	Cymbopogon excavatus (Hochst.) Stapf./0.27		
	Cynodon dactylon (L.)Pers./0.08		
	Stenotaphrum dimidiatum (L.) Brongn./0.09		
	Vetiveria zizanioides (L.) Nash/0.29		
	Zea mays L./0.11		
Punicaceae	*Punica granatum* L./0.68	1	0.68
Rhamnaceae	*Ziziphus mauritiana* Lam./0.61	1	0.61
Rhizophoraceae	*Rhizophora mucronata* Lam/0.32	1	0.32
Rubiaceae	*Coffea arabica* L./0.04	4	0.19
	Morinda citrifolia L./0.25		
	Paederia foetida L./0.18		
	Vangueria madagascariensis J.F.Gmel./0.29		
Rutaceae	*Citrus aurantifolia* (Christm.) Swingle/1.85	3	0.81
	Citrus medica L./0.39		
	Murraya koenigii (L.) Spreng./0.18		
Sterculiaceae	*Melochia pyramidata* L./1.10	2	0.72
	Solanum nigrum L./0.33		
Thymelaeceae	*Wikstroemia indica* (L.) C.A. Mey./0.28	1	0.28
Verbenaceae	*Premna obtusifolia* R.Br./0.66	2	0.48
	Stachytarpheta indica (L.) Vahl./0.30		
Xanthorrhoeaceae	*Aloe vera* (L.) Burm./0.39	1	0.39
Zingiberaceae	*Curcuma longa* L./0.98	2	1.00
	Zingiber officinale (L.) Roscoe/1.02		

UVs: use values of the species, ns: total number of species within each family, FUV=UVs/ns (Cadena-González et al., 2013).

3.6.5. Family use value (FUV)

The biological plant taxons with highest FUV were Arecaceae (FUV=1.84) with 1 plant species (*Cocos nucifera*), Lauraceae (FUV=1.22) and Liliaceae (FUV=1.16); each consisting of 1 plant species; *Litsea glutinosa* and *Allium cepa* respectively (Table 6). The dried extracts of *L. glutinosa* contained various phytochemical including alkaloids, glycosides, flavonoids, saponins, tannins, and phenolic compounds. The bark extract has been reported to have antibacterial and antifungal activities against Gram positive bacteria *S. aureus*, Gram negative bacteria *Pseudomonas aeruginosa*, *Salmonella typhi*, *Escherichia coli* and fungal species like *Aspergillus fumigatus* and *C. albicans* (Hosamath, 2011). These findings tend to support the plant relatively high FUV.

3.6.6. Informant agreement ratio (IAR)

The highest IAR (0.98) was observed for the disease category of certain conditions originating in the perinatal period for which 4 plant species were recorded (Table 7). Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism; Injury and poisons of external causes and the neoplasm categories had second highest IAR showing a high agreement among informants. High IAR values indicate that the plants species are used for a small number of disease categories compared to those having low IAR values which is indicative of use in multiple disease categories. The fact that most of the plants had high IAR values pinpoint to their specificity in treating particular disease categories (Inta et al., 2013).

4. Conclusion

Rodrigues Island has a rich diversity of MP knowledge among the local inhabitants and traditional medicine practitioner for the treatment/management of common NCD. The Asteraceae family was found to have the largest number of entities against NCD including hypertension, bloating, wound healing, diabetes mellitus, abdominal pain, loss of appetite and agitation in children. Given the dearth of updated information on traditional medicine of

Table 7
Informant agreement ratio for NCD.

Disease categories	Disease treated	Nur	Nt	IAR
Certain conditions originating in the perinatal period	Neonatal jaundice, healing after caesarean	184	4	0.98
Circulatory system	Hypertension, inflammation, heart palpitation, cardiac pain	1534	42	0.97
Digestive system	Gastritis, nausea, bloating, abdominal pain	729	33	0.96
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	Haemorrhage, anaemia	185	6	0.97
Endocrine, nutritional and metabolic disorders	Diabetes mellitus, loss of appetite, abscess, hypercholesterolaemia	638	24	0.96
Genitourinary system	Kidney stone, prostate disease	110	8	0.94
Injury and poisons of external causes	Wound healing, bone fracture	327	12	0.97
Musculoskeletal system and connective tissue	Knee ache, gout	165	7	0.96
Neoplasm	Preventing cancer	35	2	0.97
Nervous system	Body pain, headache, agitation in children	210	13	0.94
Skin and subcutaneous tissue	'Tambave (infant eczema)', acne	128	3	0.98

Nur=number of use records in each use category; Nt=number of taxa used in each use category. IAR=Informant agreement ratio=(Nur–Nt)/(Nur−1) (Inta et al., 2013).

Rodrigues, this work can provide an opportunity to establish valuable primary information on the different MP used by the local people. Several indigenous/endemic MP have also been documented for the first time, which warrants further consideration for *in vitro* and *in vivo* phytochemical and pharmacological studies to validate these claims and hence open new avenues for future drug discovery.

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