

Traditional medicines for common dermatological disorders in Mauritius

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ABSTRACT

This study has been geared to document primary information on common complementary and alternative medicines (CAM) used to treat and/or manage common dermatological disorders in Mauritius, a tropical multicultural island in the Indian Ocean. Data from 355 key informants was collected via a semi-structured questionnaire. Pearson correlation and Chi-squared test were performed to delineate any association. Quantitative indexes including the Importance Value (IV) and fidelity value were calculated. Results tend to indicate that cultural reasons were behind the use of CAM among Mauritians and traditional knowledge was mainly acquired either from parents/relatives or from self-experience. Among the medicinal plants mentioned, *Azadiracta indica* (IV = 0.78) and *Paederia tomentosa* (IV = 0.70) were found to be most used plants. *Calendula officinalis* (IV = 0.15), *Centella asiatica* (IV = 0.22) and *Agauria salicifolia* (IV = 0.11) were also recorded to be used for common dermatological disorders though greatly under-utilised. Animal products were mentioned by 38.0% respondents and cow ghee was found to be commonly used in the management of measles (IV = 0.88). Spiritual healing was found to be used mainly for measles and warts. Given the plethora of novel information documented from the present survey, it can be suggested that the Mauritian population still relies to a great extent on CAM which needs to be preserved and used sustainably. Nonetheless, further investigation is required to probe the possible active constituents that could be the basis of an evidence based investigation to discover new drugs.

Keywords complementary and alternative medicines, herbal medicine, traditional knowledge, Mauritius, dermatological disorders

INTRODUCTION

Dermatological disorders (DD) affect all ages from the neonate to the elderly and cause harm in a number of ways. It has been estimated that DD amount to as high as 34% of all occupational diseases (Abbasi et al., 2010). Amplification in chronic and malignant diseases that are difficult to treat, high cost of new technologies, increasing suspicions of patients on current treatment methods and the high prevalence of side-effects and antibiotic resistance experienced with conventional medicines has led to an increasing interest in complementary and alternative medicines (CAM) (Eser et al., 2010).

CAM include an extensive scope of forms, such as herbal therapy, zootherapy, religious beliefs and healing with hands, for instance, acupuncture, massage and so on. According to the WHO, the terms "complementary medicine" or "alternative medicine" are used inter-changeably with traditional medicine in some countries. They refer to a broad set of health care practices that are not part of that country's own tradition and are not integrated into the dominant health care system (Eser et al., 2010). Several diverse lines of evidence indicate that medicinal plants represent the oldest and most widespread forms of medication. Until the last century, most medicines were derived directly from plant or animal sources. Today, globally, about 85% of all medications for primary health care originate from

plants (Abbasi et al., 2010; Eser et al., 2010).

Medicinal plants forms an integral part of CAM and have provided a source of inspiration for novel drug compounds, as plant-derived medicines have made large contributions to human health and well-being. Their role in the development of new drugs could be either by serving as a natural blueprint, or directly as phytomedicine to be used in the treatment or management of diseases. Many commercially proven drugs used in conventional medicine were initially used as crude forms in folklore healing methods (Dawit, 1996). The traditional practice of topically treating DD with plant-derived therapeutic preparations predates the cultures of ancient Egypt and remains vital today in our life (Jones et al., 1999). However, contradictorily to general beliefs, CAM is not utterly safe. In fact, the list of undesired side-effects of these traditional remedies is long, for instance, many of the plants employed contain pharmacologically active substances but potentially toxic components also which are capable of adversely interacting with other drugs (Corazza et al., 2009). Furthermore, The Beijing Declaration, published by the WHO (2008), calls for a partnership between conventional and CAM to help bridge the equity gap in public health and highlights the importance of research to support the development of CAM in delivering appropriate, safe and effective treatments (Picking et al., 2011).

Mauritius has a venerable tradition in the use of CAM. Being a tropical island, Mauritius has a very rich and diverse flora and many of the plant species are used for their medicinal virtues. However, despite this large panoply of available data, few plant species of Mauritius have been explored for their possible medicinal applications (Mahomoodally et al., 2010).

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Table 1. Demographic data of respondents

Description		Number (%)
Number of participants		355 (100.0)
Gender	Males	156 (43.9)
	Females	199 (56.1)
Age in years	≤ 60	155 (43.7)
	> 60	200 (56.3)
Residence	Urban	139 (39.1)
	Rural	216 (60.9)
Education Level	None	18 (5.1)
	Primary	199 (56.0)
	Secondary	121 (34.1)
	Tertiary	17 (4.8)

Currently, there are no up-to-date studies carried out on traditionally used CAM to treat and/or manage common dermatological disorders in Mauritius.

This study has been geared to gather primary information on common traditional CAM used to treat and/or manage common DD 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 CAM used by the local people and hence open new perspectives for further pharmacological research.

MATERIALS AND METHODS

The methodology used in this study was adapted from Al-Qura'n (2009). The method relied mostly on informal meetings and having open discussions and observations which provided us with accurate account of the interviewees' knowledge. The participants were asked to sign a consent form in order to participate in the survey. The face-to-face interviews conducted were recorded using a suitable voice recording device and then the relevant data immediately transcribed onto the questionnaire. As reported by Telefo et al. (2011) we geared our interviews to assess different aspects such as the different types of remedies used; in case of herbal remedies, the plants used, plant sources, the preparation of the medicinal plants for use, their therapeutic uses, any associated side effects,

contraindications, their sources of such knowledge, the rationale behind the use of such remedies and any additional information from the interviewees' personal experiences.

The cross-sectional study involved stratified sampling in Mauritius. A sample size of 390 persons, from different areas of the island was targeted which was calculated using the formula: $n = [z^2 \times p \times (1 - p)] / d^2$ as reported by Kelsey et al. (1996). Where; z = set at 1.96 corresponding to 95% confidence limits. d = Degree of accuracy was specified as 0.05 and p = target population. The sample population was estimated to be around 390. Out of these, 35 (9.0%) informants refused to participate in the survey. The number of participants for the survey was thus 355.

The interviews were carried out from 2011 - 2012. Our target group involved informants over the age of 40 years for most of the traditional knowledge is obtained mainly from the elder generation (Cakilcioglu et al., 2011). Although the questionnaire was set in English language, the interviews were carried out in the common 'Creole' language and in some cases 'Bhojpuri' to suit the interviewees' convenience.

The questionnaire was set in four sub-sections (A to D) different subsections. Briefly, the first part included demographic information such as gender, age, education level and place of residence. Part A of the questionnaire also consisted of questions meant to gather information and assess the general knowledge of the interviewees on the use of CAM. Part B of the questionnaire is based mainly on the use of herbal products and is aimed to appraise the respondents' knowledge and experience on same. It also included questions to identify the sources of the medicinal plants used, dosage and their respective availabilities in Mauritius. Part C of the questionnaire was mainly concerned on the use of animal products as dermatological remedies. The final part of the questionnaire, Part D, was aimed to assess the participants' views on the use of other natural remedies, such as yoga, reiki, meditation and other religious beliefs for the treatment or management of DD.

Statistical Analysis

The statistical analyses of data, including mean values and standard deviations were calculated using SPSS (Version 16.0). Pearson Chi-square tests were performed whenever appropriate to find out whether there is a significant association between any two variables. The Importance Value (IV) measures the proportion of informants who regard a species as most important and range from 0 to 1 (Byg and Balslev, 2001; Hoffman and Gallaher, 2007). In this study, the IV for the plant(s) used was calculated as follows: $IV = nis / n$; where nis

Table 2. Factors influencing use of CAM

Factors		Non-CAM users (%)	CAM users (%)	P value ^a
Age (years)	≤ 60	10 (3.8)	104 (40)	< 0.001
	> 60	16 (6.2)	130 (50)	
Gender	Males	11 (4.2)	100 (38.5)	< 0.001
	Females	15 (5.8)	134 (51.5)	
Education Level	None	2 (0.8)	9 (3.5)	< 0.001
	Primary	15 (5.8)	117 (45)	
	Secondary	5 (1.9)	104 (40)	
	Tertiary	4 (1.5)	4 (1.5)	
Place of Residence	Urban	3 (1.2)	108 (41.5)	> 0.05
	Rural	23 (8.8)	126 (48.5)	

a : significance value obtained from Pearson Chi-Squared tests, $p < 0.05$ represents a statistically significant factor.

= number of informants who mention the plant and n = total number of informants.

RESULTS

Table 1 depicts the demographic data of informants who participated in the present study.

Ninety five (26.8%) respondents stated that they have never suffered from any DD nor have they known anyone who had any DD. Twenty six (7.3%) of respondents stated that they had DD and relied only on Western medicine for remedy, 156 (43.9%) stated that they used both while the remaining 78 (22.0%) reported that they relied only on natural remedies to treat common DD.

Pearson Chi-Squared tests were performed to determine whether there was any association between the demographic data and the use of CAM by the respondents (Table 2). The demographic data considered were: age, gender, place of residence and education level and summarised in Table 2.

As depicted in Table 2, age, gender as well as education level were found to significantly influence the choice of the remedies used by the respondents.

The types of natural remedies used by the respondents are summarised in Table 3. All respondents stated that they used herbal medicine. A larger number of respondents (39.3%) said that they used herbal medicine only while 12.8% used all three types of natural remedies.

The respondents were asked to rate the relevance of different factors for which they chose natural remedies for DD, using a Likert scale of 1 to 4; 1 being least relevant and 4 the most relevant. An average score of the respondents' rate was calculated. Culture (average score 3.89) was shown to be the most relevant reason for the respondents' choice, followed by effectiveness (average score 3.56). Cost and frequency of side effects were rated similarly (average score 3.33) while accessibility was rated as being the least relevant reason (average score 2.78).

The main source of knowledge about these natural remedies, according to the respondents, was from parents and relatives, followed by knowledge acquired by their own experiences. Fifty four (23.1%) stated that they got the knowledge both from parents and relatives and built from their own experiences. Chi-Squared tests were performed to find whether demographic characteristics influenced the sources of

Table 3. Types of natural remedies used by the respondents

Types of natural remedies used	Number of respondents (%)
Herbal medicine only	92 (39.3)
Herbal medicine and animal products	59 (25.2)
Herbal medicine and spiritual healing	53 (22.7)
Herbal medicine, animal products and spiritual healing	30 (12.8)

knowledge of the respondents about dermatological disorders. The results are summarized in Table 4.

Several medicinal plants were mentioned by the respondents commonly used for DD and summarised in Table 5. The IV for each plant used is also included. The greater the IV, the more important is the plant. From Table 6, it can be observed that *Azadiracta indica* (Neem) is the most common plant used (IV = 0.78) for DD, followed by *Paederia tomentosa* and *Cardiospermum halicacabum* respectively. *Agauria salicifolia* is the least commonly used (IV = 0.11).

All the respondents indicated that the plants grow wild in nature and that they were easily accessible. The respondents stated that identification of the plants should be based on the height, colour as well as texture of the plants. However, unfortunately no respondent could give any detailed and comprehensive explanation on the collection techniques except quoting that they are collected manually. One respondent, a medicinal herb seller, indicated that the plants or plant parts are collected during moonless nights, a technical aspect which he learnt from his ancestors.

It was observed that none of the respondents used any polyherbal formulation. Furthermore, no respondent has been able to give a definite statement either on the amount of the plant or plant parts required for use or on the duration of the particular treatment.

According to the respondents, the relevance of factors that tend to influence the amount of medicinal plants that were needed for a patient was based on age (23.1%), body weight (20.5%), gender (11.1%), severity of disease (9.8%) and all four (35.4%).

Table 4. Factors influencing source of knowledge

Factors		Parent / Relative	Own Experiences	Parents / Relatives	Books / Magazines	Internet (%) ^a	P value ^b
		(%) ^a	(%) ^a	& Own Experiences (%) ^a	/ Journals (%) ^a		
Age in years	≤60	29 (12.4)	31 (13.2)	29 (12.4)	9 (3.8)	6 (2.6)	< 0.001
	> 60	55 (23.5)	46 (19.7)	25 (10.7)	4 (1.7)	0 (0.0)	
Gender	Males	33 (14.1)	32 (13.7)	23 (9.8)	7 (3.0)	1 (0.4)	< 0.001
	Females	51 (21.8)	45 (19.2)	31 (13.2)	6 (2.6)	5 (2.1)	
Education Level	None	5 (2.1)	2 (0.8)	2 (0.8)	0 (0.0)	0 (0.0)	< 0.001
	Primary	40 (17.1)	46 (19.7)	26 (11.1)	5 (2.1)	0 (0.0)	
	Secondary	39 (16.7)	29 (12.4)	25 (10.7)	7 (3.0)	4 (1.7)	
	Tertiary	0 (0.0)	0 (0.0)	1 (0.4)	1 (0.4)	2 (0.8)	
Residence	Urban	38 (16.2)	41 (17.5)	19 (8.1)	6 (2.6)	4 (1.7)	> 0.05
	Rural	46 (19.7)	36 (15.4)	35 (15.0)	7 (3.0)	2 (0.8)	

a : calculated over a total number of 234 users of CAM.

b : significance value obtained from Pearson Chi-Squared test, p < 0.05 represents a statistically significant factor.

Table 5. Herbal remedies used against dermatological disorders

Plant name		Uses	Plant part used : dosage form	No. of citations ^a	Importance value ^b
Common name / Vernacular name	Scientific name				
Boileau	<i>Centella asiatica</i>	Skin rash, pimples, Tambave	Entire plant : bath Leaves: infusion	52	0.22
Bois Cabris	<i>Agauria salicifolia</i>	Skin rash, pimples	Leaves: bath	26	0.11
Bois Chandelle	<i>Dracaena reflexa</i>	Tambave	Leaves: bath	70	0.30
Herbe Chatte	<i>Acalypha indica</i>	Skin rash, itching	Leaves: crush and apply topically Leaves: bath	117	0.50
Leela de Perse (Neem)	<i>Azadiracta indica</i>	Smallpox, pimples, skin rash	Leaves: bath Leaves: infusion	182	0.78
Liane Lingue	<i>Paederia tomentosa</i>	Eczema, Tambave	Leaves: bath	164	0.70
Liane Pokpok	<i>Cardiospermum halicacabum</i>	Eczema, skin rash, Tambave, pimples, wounds	Entire plant: bath	157	0.67
Mehendi	<i>Lawsonia inermis</i>	Panari, nail disorders	Leaves: crush and apply topically	138	0.59
Pissenli	<i>Calendula officinalis</i>	Eczema, skin rash, Tambave	Flowers: bath	35	0.15
Saffran Vert	<i>Curcuma longa</i>	Skin lightening, removal of dark spots, smallpox	Root: crush and apply topically Root: infusion	142	0.61

a: Number of people mentioning that particular plant

b: The importance value (IV) = (Number of respondents mentioning the species) / (total number of respondents)

No complications were ever experienced by any respondent except for five respondents who pointed out that excess consumption of Neem (*Azadiracta indica*) may lead to vision defects. Eventually, all respondents described the remedy they used as being excellent ones according to the outcome of the remedies.

Table 6 represents the use of animal parts or products by the 89 (38.0%) respondents. Neither the frequency of use nor the amount of animal parts/products required was stated by the respondents. However, 42 (47.2%) stated that they would continue the use of the animal products as long as required or as long as the disease persists. None of the respondents

mentioned any side effects of such treatments. The efficacies of the treatments using animal parts or products were rated excellent according to the outcomes obtained by the users.

Of the 83 (35.5%) respondents who used other natural remedies, all stated that they used spiritual healing for mainly two diseases: measles and warts. The processes of spiritual healing as described by the respondents are illustrated in Fig. 1.

However, all the respondents were reluctant to disclose the 'mantras' read during such treatment. Eventually 225 (96.2%) respondents who used natural remedies stated that it would be of good use to carry out further investigation about such CAM and standardise any relevant data for further use in medicine.

Table 6. Animal products or parts used as remedies for dermatological disorders

Disease / Use	Animal part / Product	Description	No. of citations ^a	Importance value ^b
Measles	Ghee	Apply topically over whole body	78	0.88
Dark spots / Skin lightening	Curdled cow's milk	Apply topically on face and body	62	0.70
Dark spots / Skin lightening	Honey	Apply topically on face and body	44	0.49
Wound marks / Dark spots (hyperpigmentation) / Skin lightening	Snail secretions	Apply on secretions on dark spots and wound marks	4	0.05
Localised skin infections	Maggots	Set maggots on the infected areas of the skin and wrap with a bandage	5	0.06
Skin tags	Goat meat	Rub on skin tags and throw away	24	0.27

a: expressed as percentage of those 89 respondents using animal products as remedies.

b: The importance value (IV) = (Number of respondents mentioning the species) / (total number of respondents)

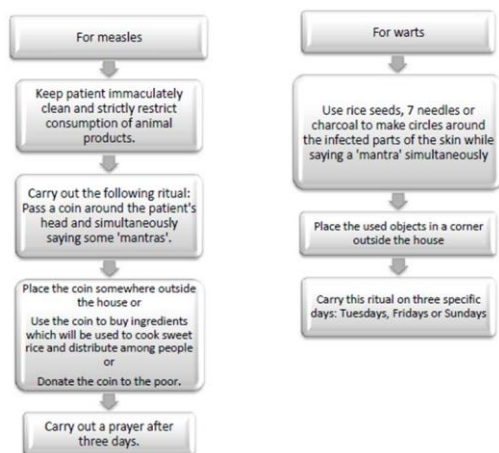


Fig. 1. Spiritual healing processes for measles and wart

DISCUSSION

Dermatological disorders (DD) and associated complications are a significant burden on the health care system of many nations. The World Health Organisation's (WHO) report on the global burden of diseases indicated that DD were associated with mortality rates of 20,000 in Sub-Saharan Africa in 2001. Successful management of DD requires accurate diagnosis, proper and prompt treatments (Atraide et al., 2011). Although modern medicine may be available worldwide, CAM has often been used for various historical, cultural, ecological and economic reasons (Mutheswaran et al., 2011). CAM includes different forms of therapies such as herbal therapy, religious beliefs and healing with hands (Eser et al., 2010). The WHO estimated that as many as 80% of the world's more than six billion people rely on animal and plant based products as therapeutics (Alves and Rosa, 2005). Our study was thus aimed to assess and document the use and prevalence of CAM against common DD in Mauritius.

Reported studies state that the prevalence of CAM in dermatology patients was 69% in the United States and England, 26.5% in Germany, 35% in Switzerland and 41% in Taiwan (Eser et al., 2010). Our study showed that 65.9% of the respondents who have experienced DD in their life made use of CAM as treatment. Demographic characteristics such as age, gender and educational level were all found to significantly influence the use of CAM in Mauritius (p < 0.001). This is similar to the findings of Corazza et al. (2009).

Many reasons have been reported for the use of CAM by patients. Studies mention fewer side-effects, the wish of trying and dissatisfaction with conventional remedies as the major reasons (Eser et al., 2009). In our study, cultural aspects were found to be the main reason behind the use of CAM, followed by the effectiveness of such natural remedies. Furthermore, our findings are concordant with the statement of Upadhyay et al. (2010) that knowledge about CAM is generally acquired verbally from one generation to another. However, personal experience was also an important source of knowledge about CAM. People tend to acquire a general knowledge about CAM from parents and relatives and then bring modifications to these through self-experiences. It is now obvious that medicinal folklore is of invaluable importance in the development of important modern medicines. Thus the need to document traditional knowledge is evident since the majority of them are being lost as the human communities are rapidly losing their socioeconomic and cultural characteristics. Furthermore, globalisation and the worldwide increasing demand for natural resources add to the importance of safekeeping traditional

knowledge.

Various active principles of herbal origin have been shown to exhibit curative effects and used as treatments for numerous skin ailments. In fact, medicinal herbs may have antioxidant, anti-inflammatory, antibacterial, antifungal, antihistaminic, immune-stimulating, and sun-blocking activity, they may also reduce burning and itching, accelerate wound healing, strengthen capillaries, and act as anti-tumour promoters. Moreover, plant extracts can also be included in cosmetic formulations designed to hydrate, moisturize, soften, cleanse, perfume, exfoliate, lighten or tan skin. Botanical ingredients are also widely used in hair care products such as hair growth stimulants, colorants and antidandruff treatments (Corazza et al., 2009).

In the present study, *Azadiracta indica* (Neem) was found to be the most popular medicinal plant used for DD. This is concordant with the findings of Upadhyay et al. (2010) who mention *Azadiracta indica* as the most widely used medicinal plant in Eastern Rajasthan, India (46.1%). *Paederia tomentosa* (Liane Lingue) and *Cardiospermum halicacabum* (Liane PokPok) are also widely used as dermatological remedies in Mauritius.

Azadiracta indica contains the different active constituents; nimbidin, nimbin, nimbinin, nimbidol and tannins and are used as antibacterial, anti-inflammatory, antiviral, antifungal and antibacterial. *Azadiracta indica* has been reported to be used in eczema, acne, bacterial and fungal infections and as antiviral in the treatment of smallpox, chickenpox and warts where it is used to bath the patient (Bhowmik et al., 2010).

One important observation is that there are many medicinal herbs which are unknown to the local people as well as to the scientific community and thus underused as dermatological remedies, such as *Agauria salicifolia* (Bois Cabris) and *Calendulla officinalis* (Pissenli) with an importance value of 0.11 and 0.15 respectively. This does not necessarily mean that these specific plants are not efficient. For instance, *Calendulla officinalis* L. has been reported to contain flavonoids (quercetin and rutin), carotenoids, essential oils, saponins, carotenes, triterpenes, glycosides, resins and also contain methone ansisomethone. It has been reported to be used in eczema, inflamed cutaneous lesions and is excellent for bruises. The flower head has been used for skin ailments and facilitate healing and reduction of inflammation (Mishra et al., 2011). The use of plants in traditional medicine (TM) is greatly diversified and this diversity varies with cultures and traditions (Abubakar et al., 2007). It can be suggested that these underused medicinal plants prove to be a more effective remedy than the most commonly used ones. Many important conventional drugs have been discovered by following leads provided by traditional knowledge and experiences (Gurib-Fakim, 2006). Screening the less commonly used medicinal plants provides a great chance of discovering important novel molecules of good medicinal use.

Many people who use traditional medicine may not understand the scientific basis behind the use of their medicine but by personal experience they know that such remedies are effective (Gurib-Fakim, 2006). Without a good scientific background, distinguishing between the different DD can be a tedious task; cases of Acne vulgaris can easily be mistaken as a case of smallpox. Furthermore, no respondent in our study was capable of giving an exact description of the determination of the posology that need to be used for the diseases mentioned, except that they mentioned age, gender, body weight and severity of disease to be the factors determining the amount of the medicinal plant that should be used. The duration of the treatment was also determined by the length of time that the

disease persists.

Being natural products, herbs do not usually have consistent standard composition. Different parts of a plant can have different amount of different constituents and these can be influenced by different factors such as temperature, climate, methods and time of harvesting the plant, storage conditions and processing methods. Standardisation of herbal products is not a new concept. Definition of the standards of how and when to collect particular herbs, including specification of time and processing methods as well as a good definition of the posology and duration of a particular treatment for specific disease conditions should thus be established. This will not only allow a more scientific use of the medicinal plants but will also consider important safety issues. It has been reported that users of CAM consider these remedies safe because they are natural. Nevertheless, several epidemiological studies underlined the risk of adverse events associated with their use, and in some clinical settings, the use of alternative medications can be particularly dangerous (Lucenteforte et al., 2012). However, in our study, neither complications nor side-effects were mentioned by the CAM users, except for a few respondents who mentioned vision defects as a problem associated with excess Neem consumption. This partly reflects that many CAM users still consider these remedies as being safe though many scientific studies have proved this to be untrue.

Adulteration can result from misidentification of the plants involved, inappropriate storage conditions or misprocessing of the steps involved in the preparation of the medicine. This infers that identification, collection, storage conditions of the medicinal plants as well as preparation processes including important descriptions such as solvents to be used, are of fundamental importance in the preparation of herbal medicine. However, in our study, no respondents were able to give a proper description of identification methods of the plants or a good description of the preparation techniques.

Animal and animal-derived products form part of the inventory of medicinal substances used in different cultures since ancient times. Such uses still exist in TM. This method of healing of human ailments by using therapeutics based on medicines obtained from animals or ultimately derived from them is called zootherapy. The most reported ones in our study include animal-derived products such as ghee from cows in cases of measles and curdled cow's milk and honey for skin lightening and fading dark spots. Neither the frequency of use nor the amount of animal products required was described by the respondents. Nevertheless, zootherapy represents an important alternative among many other known therapies practiced worldwide. Animals, both wild and domesticated, and their by-products such as skins and bones form important ingredients in the preparation of curative, protective and preventive medicine. Chinese traditional medicine includes more than 1500 animal species of medicinal use. In India, 15 - 20% of the Ayurvedic medicine is based on animal-derived products and in Brazil over 180 medicinal animals have been recorded (Alves and Rose, 2005). There can be several reasons behind the use of animals, integrally or in parts, as medicines and these include good ecological, cultural (traditional knowledge), economic and sanitary aspects (Alves and Rosa, 2005). Honey has been used topically for centuries to accelerate wound healing. It has been reported to be helpful in treating burns, decubitus ulcers and infected wounds. It has also been shown to have antibacterial and antifungal activity in vitro and acceleration of wound healing in vivo (Bedi and Shenfelt, 2002). However, the under-utilisation of animal products as dermatological remedies in Mauritius is attributed to the

developed culture. This is not applicable only for Mauritius as Alves and Rosa (2005) reported that studies on the therapeutic uses of animals and their body parts, though of considerable importance, has generally been neglected as compared to plants.

Though the use of other natural remedies such as yoga, meditation and spiritual healing has been very common in the treatment or management of diseases such as diabetes and hypertension, the application of such alternative remedies in the treatment of skin disorders is very limited. Yoga has been reported to be beneficial in the treatment of dermatological disorders (Soni et al., 2010). It has been reported that yoga provides aeration to blood circulation and causes blood purification which has been extremely beneficial in treatment of dermatological disorders like psoriasis, eczema, allergies, leukoderma, vitiligo and acne (Soni et al., 2010). However, from our study, only spiritual healing was mentioned as being used by the respondents for two major problems : warts and measles.

In the case of measles, though there is no obvious scientific reasoning behind the practices described by the respondents, the uses of such remedies remain very common among Mauritians. The patients, as described by the respondents, firstly need to be kept perfectly clean and avoid the consumption of animal products. Pure animal ghee is then applied topically on the patient's body. Furthermore, the patient is bathed with an infusion of *Azadiracta indica* L. (Neem) and *Curcuma longa* L. (Saffron/Vert). This part of the healing process can be explained by the reported therapeutic effects of the medicinal plants used and animal ghee can also possibly possess some good therapeutic effect. A coin is passed over the patient's head and a "mantra" is read simultaneously. The coin is then placed somewhere outside the house or is used to buy ingredients which is then used to cook sweet rice which will then be distributed. Eventually after three days, a prayer is then said.

Similarly for the case of warts, objects such as needles, rice seeds or straw are used to encircle the site of infection on the patient's body. The object, as mentioned by the respondents, then need to be kept in an area outside the house. Again, there are no obvious scientific explanations behind such practices but yet, this practice is quite common in the Mauritian culture. The only plausible explanation that lies behind the efficacy of these practices is the "mantras" or prayers that are said during the process. Many people state that spiritual healing is a method which seeks treatment from the Gods and the success of such treatments lies in the "God Power" only. Furthermore, the healers were very reluctant to disclose the "mantras" that are said during such healing processes saying that these knowledge should be kept confidential. They justified that sharing of such knowledge with others might result in loss of healing- a belief that is closely safeguarded.

CONCLUSION

The present investigation tends to show that CAM is being largely used in Mauritius against common DD. Herbal remedies are the most common types of traditional medicine being used by Mauritians. However, we recorded no proper description of the use of such herbal remedies for DD. Knowledge has been acquired verbally from the elder generation and in some cases modifications are made to such practices. It was found that CAM users usually do not properly understand the scientific rationale behind such uses. It was also found that posology, duration of treatment or associated contraindications and side - effects are not known to many

CAM users. This study recorded ten commonly used medicinal plants used for DD. Users of such remedies were also observed that they were not always capable of clearly identifying the specific dermatological problem and herbal medicines seem to be rather multi-usage. *Aziadiracta indica* L. (Neem), *Centella asiatica* L (Boileau) and *Calendula officinalis* L (Pissenli) for instance, are commonly used herbal remedy for DD in many countries and there is currently no updated studies carried out on these plants. They are used for any skin diseases from measles to simple allergic pimples. Our study also indicated a severe underutilization of medicinal animals and animal-derived therapeutic products in the country. The widespread practice of TM in developing countries as well as in developed countries together with the rapidly increasing demand for alternative medicinal remedies largely encourages research and development in the field of CAM. Further motivation is brought about by the Beijing Declaration published by the World Health Organisation in 2008 which calls for an integration of traditional remedies in modern medicine. The outcomes of conventional medicine are not always satisfactory in the treatment of DD. Microbial resistance, numerous side-effects associated with conventional medicine, the fear of using corticosteroids as a remedy and overall failure of conventional remedies contribute to such patients' complaints. This is why a large number of people are now turning towards TM. Medicinal plants and animals are highly expected to yield fruitful results in the discovery of new therapeutic molecules, mainly those to be used against resistant microorganisms, in inflammatory and allergic skin disorders and as cosmetics. Herbal medicines as a remedy for skin disorders also prove to be of great importance in the treatment of HIV - associated dermatological problems. Since such patients already require a large number of conventional medicines, herbal therapies prove to be of great value in avoiding unnecessary drug-drug interactions which can set up harmful allergic reactions. Given the dearth of updated information on traditional medicine of Mauritius, this work can provide an opportunity to establish useful primary information on the different traditional remedies used against DD used by the local people and hence open new perspectives for further pharmacological research. Further research is needed to probe the possible active constituents of such remedies that could be the basis of an evidence based investigation to discover new drugs for DD.

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CONFLICT OF INTEREST

None to declare.

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