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Knowledge and uses of common traditional natural products (*Nigella sativa* seed and honey): A comparative study in Mauritius

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ABSTRACT

Aim: This study was designed to evaluate the knowledge, consumption pattern, and medicinal uses of *Nigella sativa* seed (NSS) and honey among Mauritians in relation to their general attitude towards natural medicines.

Methods: A semi-structured questionnaire was distributed to 90 Mauritians, using equal-quota sampling method, among i) three age groups [(young adults (18–30 years), middle-aged adults (31–55 years), and old adults (above 55 years)] and ii) rural and urban residents.

Results: Mauritians displayed better knowledge, consumption, and medicinal use of honey compared to NSS. Young adults and urban residents showed significantly greater knowledge of NSS compared to old adults and rural residents, respectively ($p < 0.05$). No significant difference ($p > 0.05$) was observed among the three age groups regarding the consumption and medicinal use of NSS and honey. However, a significantly higher score was observed for the consumption and medicinal use of honey among rural population compared to urban population ($p < 0.05$). Furthermore, no significant difference ($p > 0.05$) was observed among age groups concerning the usage and faith in the curative capability of natural medicines, although a slightly higher score was observed among older adults. On the other hand, participants from rural areas showed significantly greater faith in the curative capability and usage of natural medicines compared to urban residents ($p < 0.05$).

Conclusion: Data amassed from this study may be of particular interest for health professionals to propose future therapeutic interventions to maintain the medical importance of NSS and honey.

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KEYWORDS

Nigella sativa seed; honey; consumption pattern; medicinal use; natural medicine; conventional medicine; Black seed

Introduction

Over the past 100 years, the industrial revolution and the development and mass production of synthetic chemical drugs have modernized health care in most parts of the world [1]. However, there has been a recent re-growing interest in the use of natural products for therapeutic purposes due to their low cost, and because of the association of side effects to synthetic drugs. In fact, the use of natural products for therapeutic purposes is as ancient as human civilization [2]. Mauritius is a tropical multicultural island located in the southwestern Indian Ocean, 800 km east of Madagascar. The Mauritian population has a long-standing tradition in the use of natural remedies. Commercially, extracts from several exotic, endemic, and indigenous plants are sold as "tisane" or decoction across the island [3]. Nonetheless, there is still a dearth of documented information on the knowledge and uses of specific natural products available in Mauritius.

Nigella sativa L. (NS) belongs to the Ranunculaceae family and is cultivated in various regions such as Southern Europe, North Africa, Middle Eastern and Mediterranean, and the Southern regions of Asia

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Table 1. Traditional uses of NS and honey (in combination) across the world.

Country	Method of preparation	Ailment/Medicinal use	References
Iran	Mix NSS with honey, infusion	Aphrodisiac gestational diabetes and hypertension, menstruation additive, abortion, and parturition uterus pain	[13]
Algeria	Mix NSS powder with honey	Anemia, respiratory infection, flatulence, anxiety, skin care, and allergy	[14]
Morocco	NSS are mixed with seeds of *Pimpinella anisum* and *Allium cepa* L., resin of *Pistacia lentiscus* and honey. Take the mixture orally	Asthma	[15]
	Mix NSS powder with honey. Take orally	Tonic	
Palestine	Add salt to 1/2 cup of *Olea europaea* L. oil. Add 250 mg of grinded seeds of NS with 250 mg of olive oil to 500 mg of honey. Take two teaspoons daily until recovery	Cancer	[16]
	Mix 1 kg of honey with two large teaspoons of NS, *Sesamum indicum* L. seeds, and nuts. Take large spoon before breakfast daily		
	Prepare a decoction from the aerial parts of *Teucrium capitatum* L. by adding one teaspoon of the plant to boiled water. Mix 1 kg of honey with 100 mg of Ginseng and NS. Take one teaspoon three times daily		
Jordan	Mix NSS powder with honey and take 2–3 times a day	Sexual impotence, arthritis, cough, skin disease, and general weakness	[17]
	Mix NSS with honey 1:1 or 2:1. Eat 1 tsp/day	Diabetes, and antihypertensive	[18]
Iraq	Mix NSS 1:2 with honey, eat one tsp in morning and one at night	Cancer, pneumonia, tonsilitis, hyperlipidemia, and blood circulation	
	Mix NSS 1:1 with one tsp honey, eat 1 time/day		
	Mix 5 g NSS with honey, eat in morning before breakfast	Immune system stimulant	
Turkey	Eat NSS alone or mix with honey and/or garlic	Heart disorders, emmenagogue menstrual regulator, enhancing breast milk production, diuretic, antiedemic, and sore throat	[19]

including Syria, Turkey, India, Pakistan, and Saudi Arabia [4,5]. To the best of our knowledge, NS plant is not cultivated in Mauritius but the seeds and oil are imported from countries such as India, Pakistan, and Saudi Arabia. NS plant grows to 20–90 cm tall, with linear lanceolate leaves and flowers of white, pink, yellow, pale blue, or pale purple color [4]. Inside of the fruit are numerous seeds commonly known as black seeds (English), habbat al-sauda (Arabic), and kalonji in South Asia [6]. The seeds are black colored, funnel shaped, flattened, angular, 0.2 cm long, and 0.1 cm wide [7].

Honey is a natural product made by bees from nectar through a process of regurgitation and evaporation which is subsequently stored in wax honeycombs as a primary food source for the bees inside the beehive [8]. Honey is regarded as the world's oldest sweetener which was replaced by industrial sugar production after 1800 [9]. In Mauritius and its neighbouring Island, Rodrigues Island, total honey production is about 75 tons with about 400 beekeepers and 2,000 hives altogether [10]. The main melliferous plants in Mauritius are longan, tamarind, wild pepper, campeche, litchi, and eucalyptus [11]. However, due to loss of interest by apiarist, Mauritius is not self-sufficient in the production of honey and hence, imports honey from different countries [12].

Nigella sativa seed (NSS) and honey have been used traditionally in combination by several ethnic groups in the management of several ailments (see Table 1). Nevertheless, to the best of our knowledge, information about their knowledge and uses in Mauritius has not been reported so far. The present study therefore endeavors to document the knowledge, consumption pattern, and medicinal uses of NSS and honey among Mauritians in relation to their attitudes towards natural medicines, aiming to identify any association of age and place of residence. Indeed, failure to record such knowledge may lead to losses in their traditional uses in the treatment and/or management of diseases. The research questions of this study were:

1. Do Mauritians tend to be more aware of honey, which is locally produced, compared to NSS, which is imported from other countries?
2. Are older populations more knowledgeable on natural remedies, including honey and

NSS, taking into consideration the recent expansion of pharmaceutical products?

3. Do populations residing in rural regions, which are less industrialized and modernized compared to urban, tend to be more concerned on the use of traditional remedies including NSS and honey?
4. Is there any association between the use of NSS and honey and the general attitudes of the population towards natural medicines?

Methodology

Study area

Mauritius is a subtropical island located in the southwest of the Indian Ocean, 800 km east of Madagascar, with latitude and longitude 20.1625°S, 58.2903°E. The island is 61 km long, 47 km wide, and has a total surface area of 1,865 km^2, with a population of 1,221,975 according to latest estimates in 2017 [3,20,21]. The population comprises of Indo-Mauritians, people of mixed European and African origin, and Sino-Mauritians. Mauritius consists of nine districts namely: Port Louis, Pamplemousses, Riviere du Rempart, Flacq, Grand Port, Savanne, Black River, Plaines Wilhems, and Moka (Fig. 1).

Data collection

This project was approved by the Department of Agricultural and Food Science, Faculty of Agriculture, University of Mauritius, Mauritius. Data were gathered from 90 Mauritians via face-to-face interviews using a semi-structured questionnaire during the period in 2017. Face-to-face interview was performed since it is most convenient to obtain better response [22]. Guidelines for conducting and reporting field studies were followed [23–25]. Participants were approached on the road, home, office, and shops. They were provided with information on the objective of the survey and were assured that their responses would be treated with confidentiality. Vernacular language (Mauritian Creole) was employed to collect accurate data from the participants. Equal-quota sampling method was conducted for i) age group; information was sought from 30 people of the three age groups [young adults (18–30 years), middle-aged adults (31–55 years), and old adults (above 55 years)], and ii) place of residence; information was obtained from 45 people living in rural and urban regions, respectively. The investigation sites were urban areas including Port Louis, and cities of the Plaine Wilhems district such as Quatre Bornes, Vacoas, Reduit (see red dots on Figure 1), and rural regions (see blue dots on Figure 1) including Long Mountain, Calebasse, Riviere du Rempart, Brisee Verdiere, Sebastopol, La Flora, and Surinam.

Questionnaire design

A pilot test was conducted with 20 people to ensure that all the questions were well formulated and easily understood by the respondents. Any criticism obtained from the participants was considered. These 20 participants were excluded from the results. The questionnaire comprised of both open and closed questions, consisting of five sections. Section A included demographic data such as age category, gender, residence, and highest level of education. Section B enquired about the knowledge of NSS and honey, whether participants have ever heard of them and the source of knowledge. Section C investigated into the consumption pattern of NSS and honey, involving questions on whether participants consume them, the frequency, and reasons behind their consumption. Section D dealt specifically with the medicinal use of NSS and honey, enquiring about the ailments for which the products were used, method of preparation, frequency and duration of use, outcome of the treatment, whether used as single therapy or in combination with conventional drugs, whether any side effect was experienced, and the efficacy of NSS and honey compared to the conventional medicine. Finally, Section E was based on the attitudes of participants towards natural medicines, involving questions on their faith in the curative capability of natural medicine, whether they use natural medicine or conventional medicine more often and the reasons behind it, which was partly adapted from the study of Mahomoodally and Ramalingum [26]. Natural medicine was defined as any product from terrestrial or marine sources with medicinal properties, including plants, animals (e.g., milk, bee products), and microorganisms (e.g., yogurt, vinegar). Conventional medicine was defined as any pharmaceutical medications which involve man-made synthesis in the laboratory even if it contains isolated compounds of natural origin.

Data analysis

All data presented in this study were analyzed using Microsoft Excel 2010, Minitab version 16, and SPSS Package version 16.0. Descriptive statistics were used to calculate frequency counts and

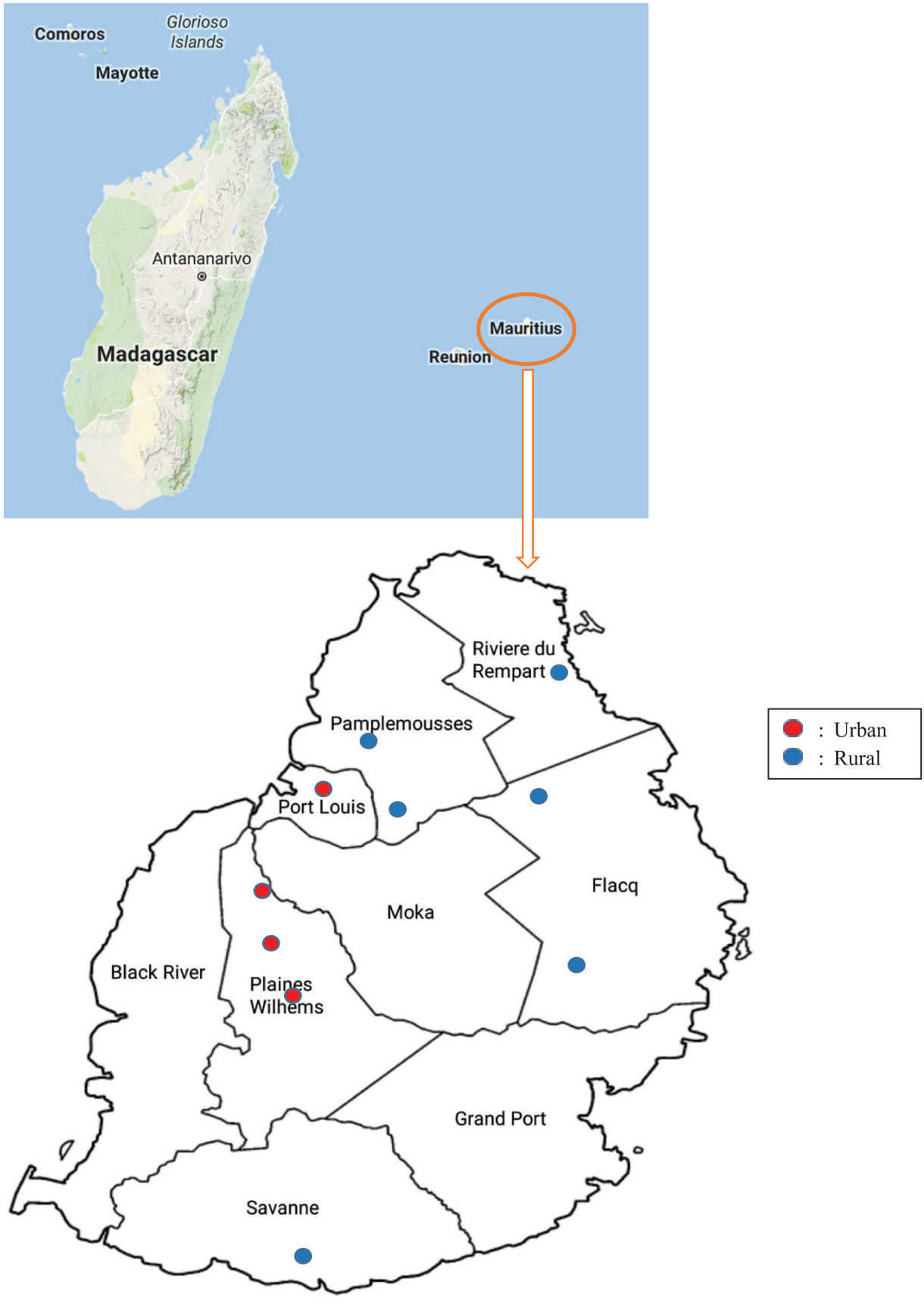

Figure 1. Investigation sites in Mauritius (Red dots indicate urban regions, blue dots indicate rural regions).

Table 2. Demographic profile of respondents.

Demographics	Category	Frequency (%)
Age (Year)	18–30 (young adults)	30 (33.3)
	31–55 (Middle-aged adults)	30 (33.3)
	>55 (old adults)	30 (33.3)
Gender	Male	52 (57.8)
	Female	38 (42.2)
Residence	Urban	45 (50)
	Rural	45 (50)
Highest level of education	No formal education	0
	Primary	1 (1.1)
	Secondary	36 (40)
	Tertiary	53 (58.9)

percentages. One way analysis of variance (Tukey's test) was used for evaluation of significant differences between the variables. $P < 0.05$ was considered as statistically significant.

Result

Demographic profile

The demographic information (gender, age, place of residence, and education level) of the participants are illustrated in Table 2. Out of the 90 Mauritians who participated in this study, males (57.8%) had higher participation rates compared to females (42.2%). In addition, individuals having tertiary education (58.9%) as highest level of education were mostly involved in the study followed by secondary education (40%). Since equal-quota sampling method was used for age group and place of residence, the frequency of participants among their parameters was equal.

Knowledge of NSS and honey

The knowledge of NSS and honey and the sources from which respondents obtained their knowledge are shown in Figures 2 and 3, respectively. All participants (100%) had knowledge of honey in contrast to NSS, where only 24.4% had knowledge of NSS (Fig. 2). The main sources of knowledge of NSS were from friends (68.2%), followed by Islamic teachings (45.5%). On the other hand, participants gained knowledge of honey mainly from their parents (100%) and grandparents (85.6%) (Fig. 3).

Consumption pattern of NSS and honey

Table 3 shows the participants' consumption pattern of NSS and honey. The consumption of honey was higher (100%) compared to that of NSS (10%). The most common reason for consuming NSS was for disease prevention and honey was mainly taken because of its taste and as a prophylactic agent. In addition, NSS was mainly taken in its raw state, while few participants consumed it cooked with other food or in juice. Similarly, all participants consumed

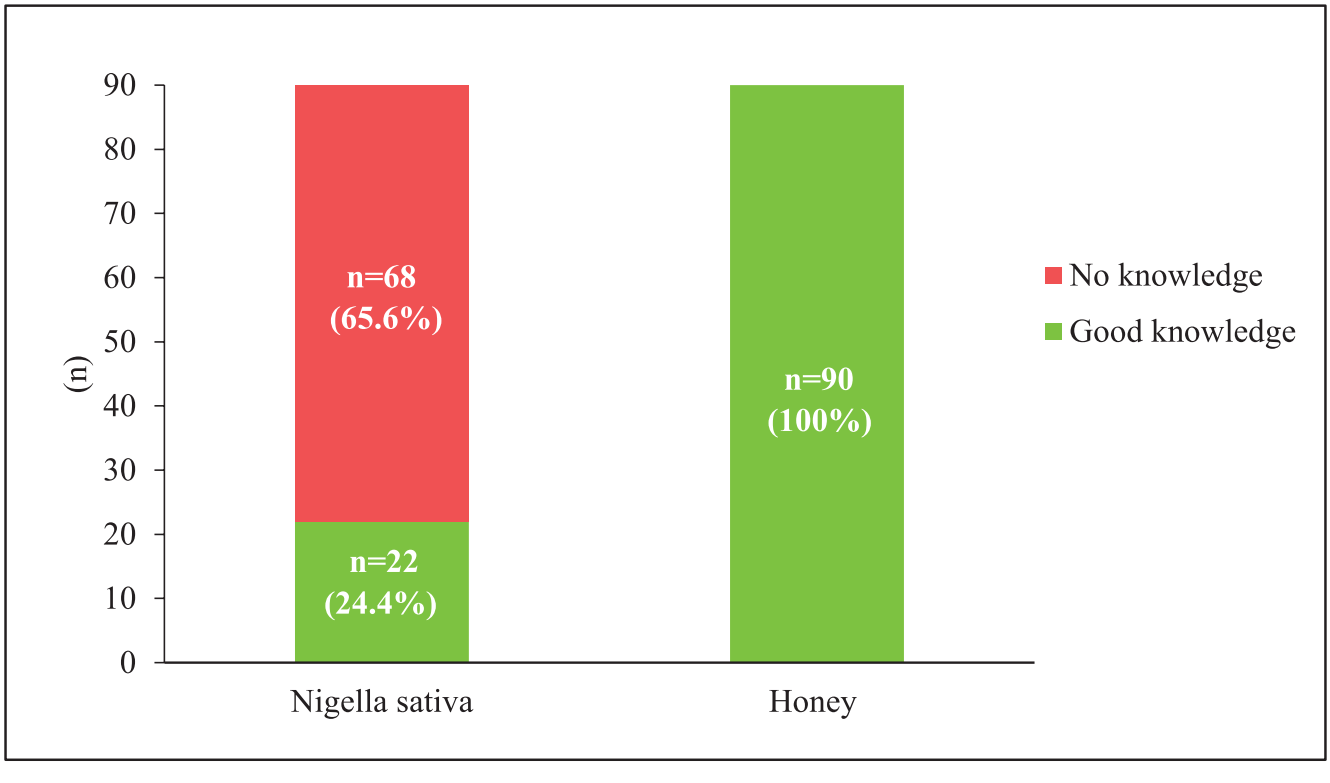

Figure 2. Participants' knowledge of NSS and honey.

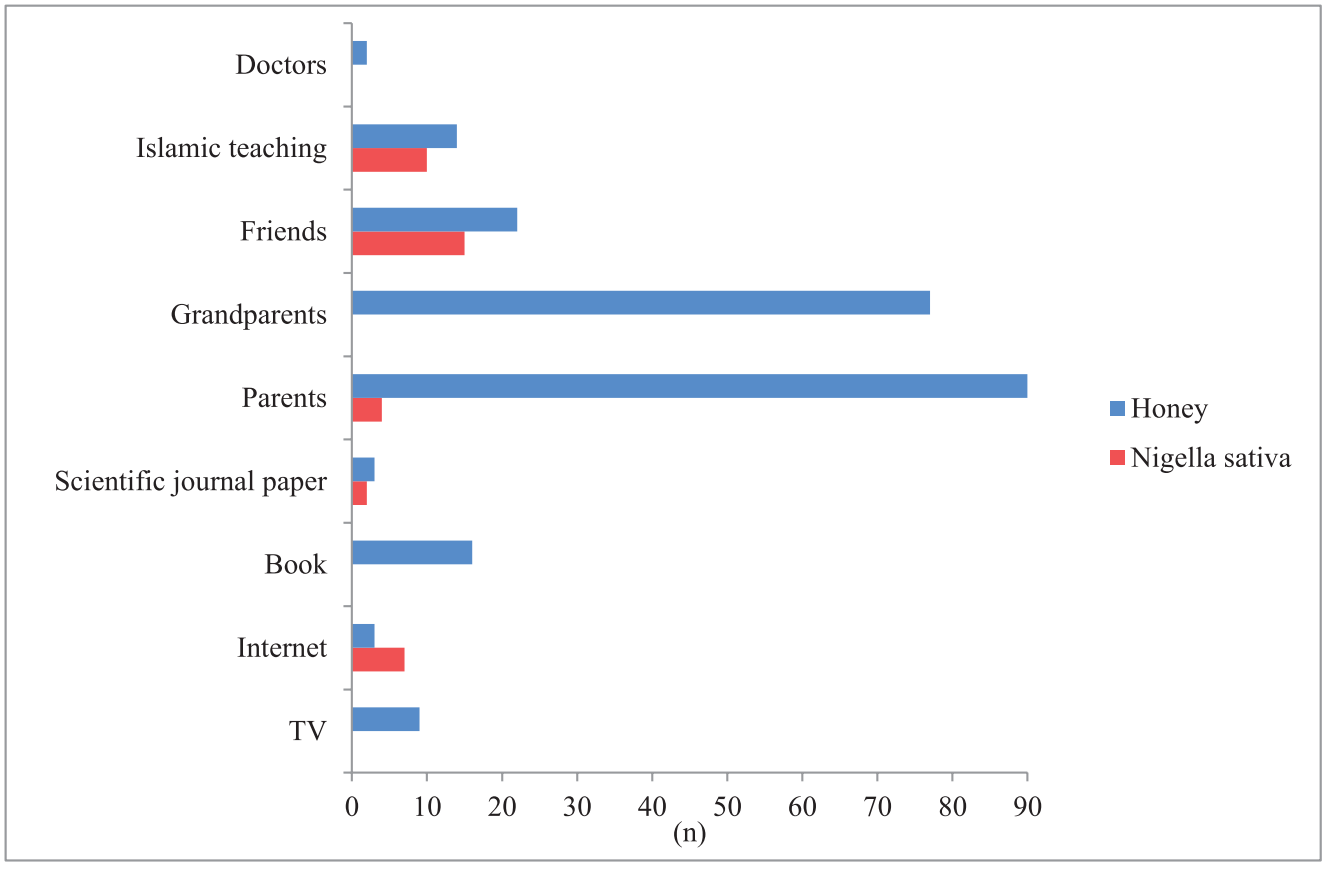

Figure 3. Participants' source of knowledge.

honey in its raw state, although few reported the consumption of honey in cooking (10%), tea (4.4%), juice (3.3%), dessert (1.1%), and milk (1.1%). Regarding the frequency of consumption, NSS was taken rarely, 1–2 times a year (66.7%), in comparison to honey which was consumed more often at least once in 2 weeks (27.8%) or 3 weeks (26.7%).

Table 3. Consumption pattern of NSS and honey.

Consume	NSS *n* (%)	Honey *n* (%)
	9 (10)	90 (100)
Reason for consumption		
like the taste	0	90 (100)
as food flavoring	2 (22)	9 (10)
for disease prevention (prophylactic)	9 (100)	84 (93.3)
as a substitute for sugar	0	8 (8.9)
Method of consumption		
Raw	9 (100)	90 (100)
Cooked with other food	2 (22.2)	9 (10)
In dessert	0	1 (1.1)
In juice	1 (11.1)	3 (3.3)
In tea	0	4 (4.4)
In milk	0	1 (1.1)
Frequency		
Daily	1 (11.1)	7 (7.8)
At least once a week	1 (11.1)	10 (11.1)
At least once in 2 weeks	0	25 (27.8)
At least once in 3 weeks	0	23 (26.7)
At least once a month	1 (11.1)	30 (33.3)
1–2 times a year	6 (66.7)	5 (5.6)

Medicinal uses of NSS and honey

Regarding the medicinal uses of NSS and honey, out of the 90 respondents, only three (3.3%) were recorded to take NSS (Fig. 4). The ailments for which it was used included asthma, runny nose, and constipation (Table 4). The main method of treatment was by taking the seeds raw although other specific methods was used for each disease mentioned. The frequency of usage was mostly once or twice a day, with the duration being 1–3 days for all respondents. On the other hand, a much higher percentage of respondents (91.1%) used honey as medicine, mainly for the treatment of cough and sore throat (95%) and also for asthma. The main method of preparation for treating cough and sore throat was by mixing honey with lemon or ginger while all participants used honey alone for treating asthma. The frequency of usage was mostly once or twice a day, with the duration being 1–3 days for some respondents while 4–7 days for others. However, the frequency and duration of usage

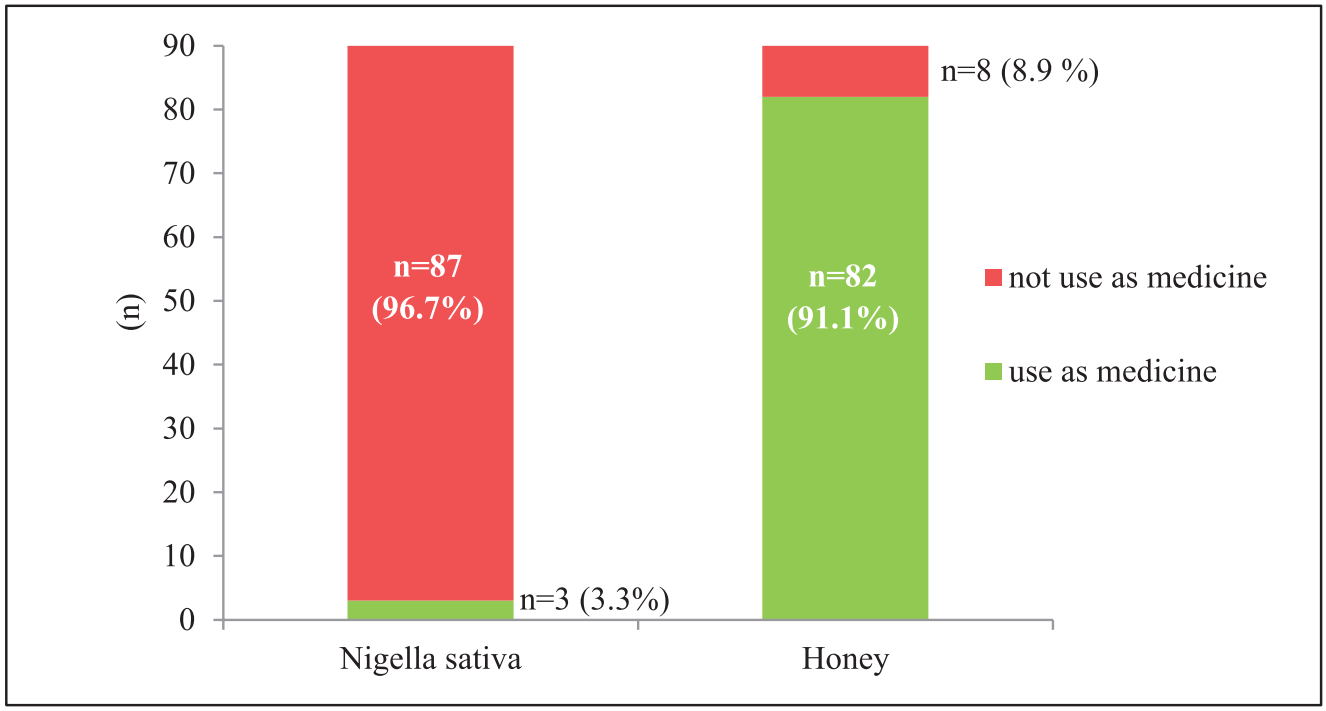

Figure 4. Participant's medicinal use of NSS and honey.

were not specified for a significant number of participants. Regarding the outcome of the treatments, all three participants felt improvement in their health after taking NSS and found it to be more effective than conventional medicines. On the other hand, of the 82 individuals taking honey as medicine, 86.6% found a positive outcome in their health. No experience of side effects was observed among participants. Comparison of the efficacy of honey with conventional medicines revealed that most participants (46.3%) found honey to be more effective, although others found it to be less

Table 4. Medicinal use of NSS and honey.

Product	Ailments/ Diseases	*n*	Method of usage	*n*	Frequency (per day)	Duration (no. of days)	*n*
NSS	Asthma	2	Take seeds raw	2	Once	1–3 days	1
					Twice	1–3 days	1
			Add drops of oil in boiling water and inhale	1	Once	1–3 days	1
	Runny nose	1	Add drops of oil in tissue paper, put under nostrils and inhale	1	Twice	1–3 days	1
	Constipation	1	Take seeds raw	1	Once	1–3 days	1
Honey	Cough and sore throat	78	Mix with lemon	39	Twice	1–3 days	7
					Twice	4–7 days	3
					Twice	Not specified	12
					Not specified	Not specified	17
			Mix with ginger	30	Once	1–3 days	5
					Once	4–7 days	1
					Once	Not specified	9
					Twice	1–3 days	3
					Twice	4–7 days	2
					Twice	Not specified	3
					Not specified	Not specified	7
			Mix with lemon, citronella, and ginger	4	Once	1–3 days	2
					Twice	1–3 days	2
			Mix in warm milk and turmeric	9	Once	1–3 days	9
	Asthma	5	Take raw	5	Once	1–3 days	4
					Twice	1–3 days	1

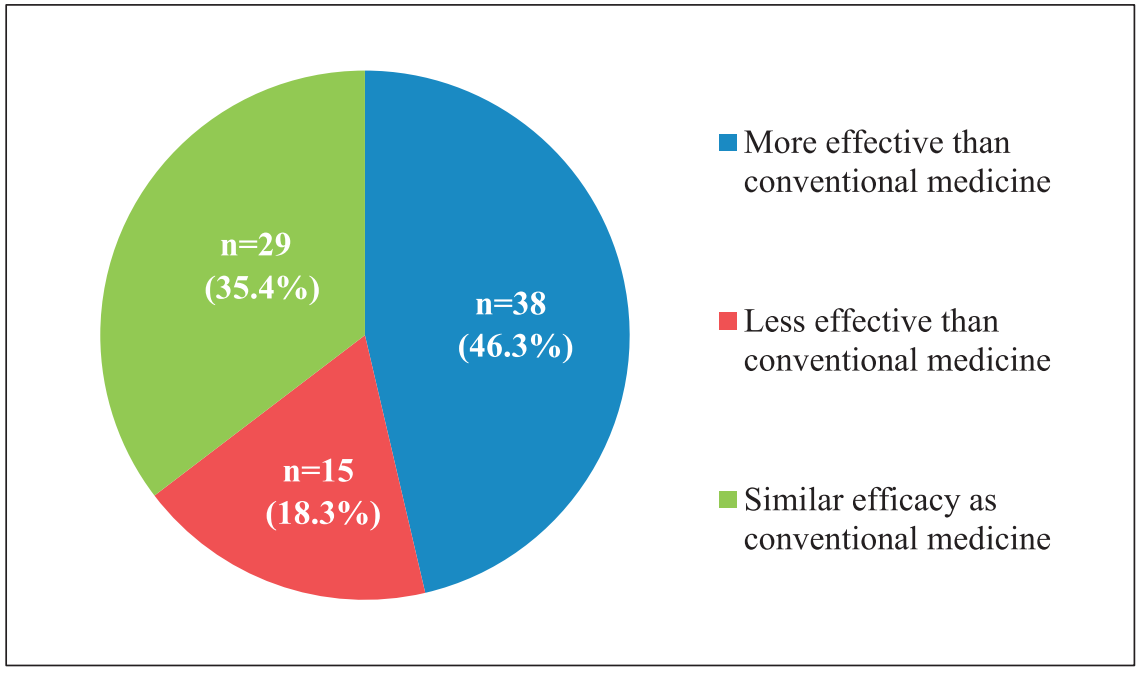

Figure 5. Participants' response on the efficacy of honey in comparison with conventional medicine.

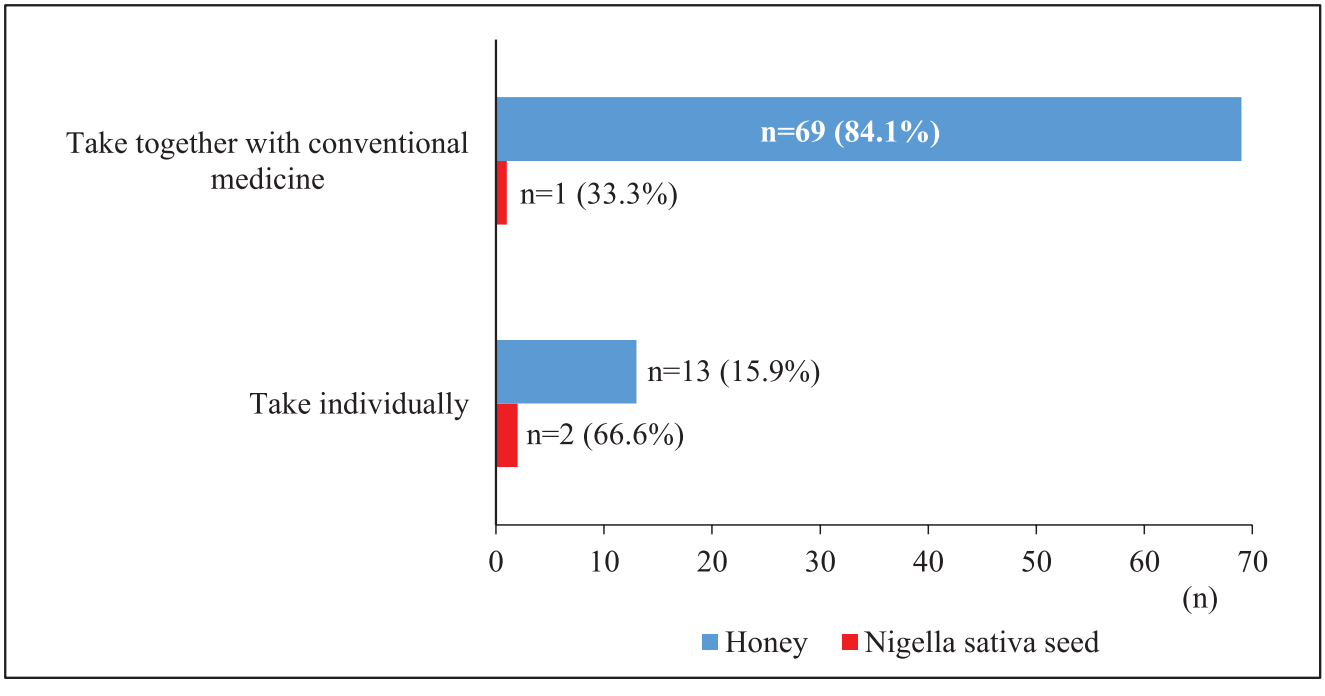

Figure 6. Participants' response on whether NSS and honey were taken individually or together with conventional medicine for medicinal purpose.

effective or having similar efficacy as conventional medicines (Fig. 5). Overall, most respondents used NSS and honey as adjunct to conventional medicines rather than taking the natural products individually (Fig. 6).

Attitudes towards natural medicines

The attitudes of the respondents towards natural medicines are displayed in Table 5. Most participants had low faith in the curative capability of natural medicines (70%). In fact, the use of natural

Table 5. Attitudes towards natural medicine.

	Frequency	(%)
Faith in curative capability of natural medicine		
High faith	27	30
Low faith	63	70
No faith	0	0
Use more often		
Natural medicine	21	23.3
Conventional medicine	69	76.7
Reasons for using more often		
(i) Natural medicine		
No side effect	21	100
More effective	2	9.5
Cheaper	9	42.9
More easily available	8	38.1
Grandparents' remedies	21	100
(ii) Conventional medicine		
No preparation needed/time saving	22	31.9
Available in exact doses for specific ailments	69	100
Scientifically tested before marketing	54	78.3
Prefer doctors' drug prescription	69	100
Lack of knowledge about health benefits of natural remedies	69	100
More effective	69	100
More easily available	69	100

medicines was found to be very low (23.3%) compared to conventional medicines (76.7%). The main reasons for using natural medicines more often were due to the belief of no association of side effects, and following of grandparents' remedies.

Association of age groups and place of residence

The influence of age groups and place of residence on the knowledge, consumption, and medicinal use of NSS and honey and on the faith and usage of natural medicines are illustrated in Table 6. Among the three age groups, young adults had significantly better knowledge of NSS (40%) compared to old adults (13.3%) ($p < 0.05$). However, no significant difference was observed among the three age groups regarding the consumption and medicinal use of NSS. With regards to honey, all participants of the three age groups had knowledge of it. On the contrary, concerning its consumption and medicinal use, middle-aged and old adults used honey more than young adults although statistically no significant difference was observed among the three age groups ($p > 0.05$). Similarly, no significant difference ($p > 0.05$) was observed among age groups concerning the usage and strong faith in the curative capability of natural medicines, although slightly higher score was observed among old adults.

Table 6. Influence of age groups and place of residence.

	Age			Residence	
	18–30 (n = 30)	31–55 (n = 30)	>55 (n = 30)	Urban (n = 45)	Rural (n = 45)
NSS					
Knowledge	12 (40)^{a}	6 (20)^{ab}	4 (13.3)^{b}	17 (37.8)^{A}	5 (11.1)^{B}
Consumption	5 (16.7)^{a}	2 (6.7)^{a}	2 (6.7)^{a}	8 (17.8)^{A}	1 (2.2)^{B}
Medicinal use	2 (6.7)^{a}	1 (3.3)^{a}	0 (0)^{a}	2 (4.4)^{A}	1 (2.2)^{A}
Honey					
Knowledge	30 (100)^{a}	30 (100)^{a}	30 (100)^{a}	45 (100)^{A}	45 (100)^{A}
Consumption	30 (100)^{a}	30 (100)^{a}	30 (100)^{a}	45 (100)^{A}	45 (100)^{A}
Medicinal use	24 (80)^{a}	29 (96.7)^{a}	29 (96.7)^{a}	38 (84.4)^{B}	44 (97.8)^{A}
Faith in curative capability of natural medicine					
High	8 (26.7)^{a}	7 (23.3)^{a}	12 (40)^{a}	9 (20)^{B}	18 (40)^{A}
Low	22 (73.3)^{a}	23 (76.7)^{a}	18 (60)^{a}	36 (80)^{A}	27 (60)^{B}
No	0 (0)^{a}	0 (0)^{a}	0 (0)^{a}	0 (0)^{A}	0 (0)^{A}
Use more often					
Natural medicine	5 (16.7)^{a}	6 (20)^{a}	10 (33.3)^{a}	6 (13.3)^{B}	15 (33.3)^{A}
Conventional medicine	25 (83.3)^{a}	24 (80)^{a}	20 (66.7)^{a}	39 (86.7)^{A}	30 (66.7)^{B}

Different letter superscript (lowercase (a,b) for age group and uppercase (A,B) for place of residence) between columns means significantly different ($p < 0.05$). Values outside brackets indicate frequency while those within brackets refer to percentage.

With regards to the influence of place of residence, participants from urban regions displayed significantly ($p < 0.05$) better knowledge and consumption of NSS compared to those from rural regions, although no significant difference was observed regarding its medicinal usage ($p > 0.05$). Concerning honey, all participants living in urban and rural areas had knowledge of it. However, regarding its consumption and medicinal use, significant difference was observed such that respondents from rural regions showed greater usage ($p < 0.05$). Similarly, participants from rural areas showed significantly greater faith in the curative capability and usage of natural medicines compared to urban residents.

Discussion

This study is the first of its kind to document the knowledge, consumption pattern, and medicinal uses of NSS and honey in Mauritius. The present investigation indicates a deficiency in knowledge of NSS among Mauritians which might be due to the fact that NS plant is not cultivated in Mauritius. Instead, the seeds and oil are imported from countries such as India, Pakistan, and Saudi Arabia. Therefore, the higher knowledge of NSS among young adults compared to old adults might suggest that the commercialization of NSS in Mauritius was recent. Moreover, the higher knowledge and consumption of NSS among participants in urban regions might indicate less accessibility of commercial NSS to rural regions. To the best of our knowledge, there are still few importers of NSS in Mauritius. On the other hand, all participants had knowledge of honey, suggesting that information has been passed on and preserved from ancestors to the current generations, which is confirmed by the greater acquisition of knowledge of honey from parents and grandparents compared to other sources mentioned. Regarding the sources from which participants gained knowledge of NSS, the main sources were from friends, Islamic teachings, and Internet, hence, indicating a possible association of Islamic faith and the use of NSS. In fact, it is reported in the literature that Prophet Muhammad (Peace and blessings of Allah be upon him) stated that there is healing in black seed (NSS) for all diseases except death [27]. Similarly, this relationship was also observed for honey.

Furthermore, we observed that participants tend to consume NSS and honey for disease prevention which signifies a high knowledge of their medicinal properties among their users. However, the consumption of NSS and honey was not often, indicating a lack of concern for their usage or lack of accessibility as mentioned previously. In addition, although the main method of consuming honey was by eating it in its natural state, honey was also used as an additive in juice, tea, milk, dessert, and cooked food. In fact, honey is known as the world's oldest sweetener which was replaced by industrial sugar production after 1800 [9]. Indeed, in the present study, few participants have reported the usage of honey as a substitute for sugar which may be a good alternative for diabetics. Interestingly, honey has been found to be a potential antidiabetic agent provided that genuine, unadulterated, and natural honey, which normally contain higher amount of fructose than glucose, is administered at appropriate therapeutic doses [28].

Regarding the use of NSS for medicinal purpose, a low frequency of participants was observed. On the other hand, the medicinal use of honey among Mauritians tends to be higher. In fact, a number of previous studies have shown that honey was used as an additive in the preparation of herbal medicines in Mauritius [21,29–31]. Moreover, the slightly higher usage of honey among middle-aged and old adults compared to young adults may be explained by the on-going development and modernization of Mauritius resulting in a shift in the mindset of the younger generations. Indeed, societies are moving towards a greater technological advancement with greater emphasis on modern medicine [32]. In fact, the study of Samoisy and Mahomoodally [33] revealed that elder populations make use of traditional remedies more often as they tend to be more aware and skilled concerning their usage. In addition, the greater medicinal use of honey among rural populations as opposed to urban residents might be explained by the fact that most apicultural sites in Mauritius are found in rural regions (Fig. 7), indicating a greater preservation of the value of honey among rural populations. In fact, the low area of apicultural sites across Mauritius indicates a loss of interest for beekeeping among Mauritians. Indeed, Mauritius is not self-sufficient in the production of honey and hence, import honey from different countries [12]. Additionally, the wide range of method of preparations adopted by Mauritians for the medicinal use of NSS and honey might indicate the preservation of traditional systems with the passage of time although this may not imply for NSS because of its possible recent importation to Mauritius. Besides, it should be noted that

both NSS and honey have been used in several other traditional ways across the world (see Table 1).

Regarding the outcome of the medicinal uses of NSS and honey, an improvement in health and a greater efficacy compared to conventional medicines was observed according to most participants. However, this greater efficacy cannot be generalized due to the fact that most participants made use of conventional medicines together with NSS or honey rather than using the natural products individually. In fact, the faith in the curative capability of natural medicines was found to be low among Mauritians and they tend to use conventional medicine more often as observed in the current study. The most common reasons for the greater usage of conventional medicines were i) because of its higher effectiveness, which is in accordance with the low faith in natural medicines as observed in our study, ii) due to the preference for doctors' prescription and lack of knowledge on the health benefits of natural remedies, which is probably due to the low number of traditional healers in Mauritius, and finally iii) because of easy availability, due to the vast number of pharmacies across Mauritius. On the other hand, the belief of no association of side effects was common among participants using natural medicines more often. Nevertheless, over dosage, presence of

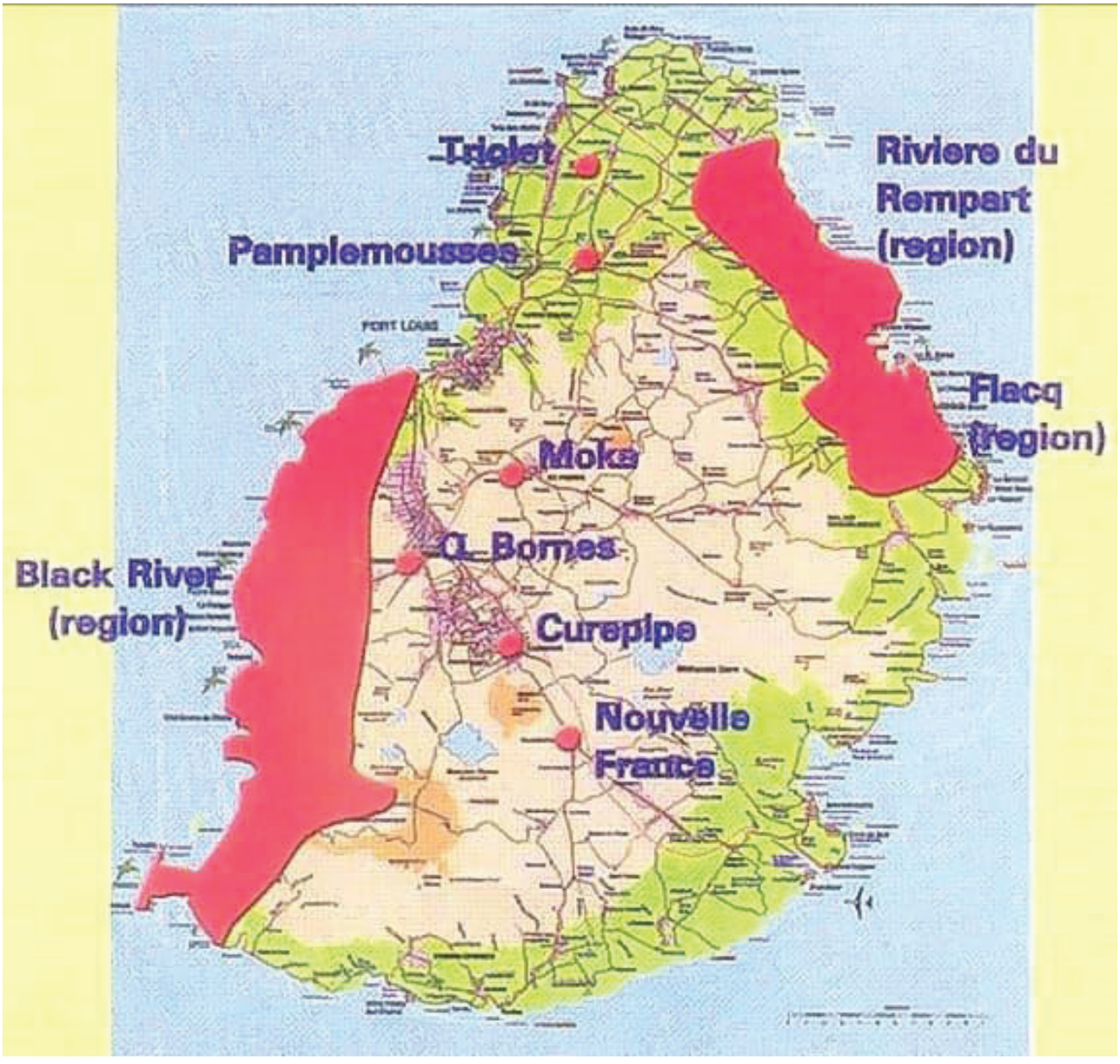

Figure 7. Apicultural sites in Mauritius (shown in red). Adapted from Ministry of Agro Industry and Food Security [11].

toxic compounds, or the interaction of herbs with drugs can result in adverse effects as observed in various studies [34–36]. However, in the study of Picking et al. [37], no experience of side effects was observed among participants when taking herbs and drugs together, which is in agreement with the present study. In fact, the use of herbs or any natural products together with conventional drugs may increase or decrease the desired effect of the drug due to interaction leading to alterations in the absorption and bioavailability of the medication [38].

Conclusion

This study is the first attempt to gather data on the knowledge, consumption pattern, and medicinal use of NSS and honey in Mauritius. From the present investigation, although a deficiency in knowledge, consumption, and medicinal use of NSS was observed, it was found that Mauritians still relies to a great extent on the use of honey which need to be preserved for future generations. Data amassed from this study may be of particular interests for health professionals, including dieticians and nutritionists, to propose future interventions to maintain the medical importance of NSS and honey as well as creating their awareness through education, social activities, and media.

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Conflict of Interest

The authors declare no conflict of interest.

Abbreviations

NS = Nigella sativa; NSS = Nigella sativa seed.

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