

Perceptions and Practices on the Use of *Moringa oleifera* Lam: A Qualitative Study amongst Elderly Mauritian

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Authors' contributions

This work was carried out in collaboration between all authors. Author KN managed the literature searches, wrote the protocol, conducted the survey and drafted the result section. Authors MCS and VSNB designed the study and wrote the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

The multifaceted properties of *Moringa oleifera* have spurred renewed interest into exploiting its nutritional values in the developing countries. In Mauritius, however, *Moringa oleifera* is fast losing its culinary value despite the predominant medicinal and nutritional values and at this pace all the indigenous knowledge regarding this plant will be lost. Thus this qualitative research aimed at investigating the eating habits, experiences and perceptions regarding *Moringa oleifera* leaves and pods in Mauritius amongst the elderly Mauritian. A qualitative cross-sectional study was performed using semi-structured interviews with 14 elderly Mauritian. The interview was conducted in "creole" and the data collected was transcribed and analysed. In general, elderly

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Mauritians perceived *Moringa oleifera* leaves and pods as tasty vegetables and enjoyed eating them. Both the leaves and pods were considered highly nutritious and good sources of energy and were cooked in a number of ways. They were deemed effective for pain relief. Additionally, the leaves were used to speed up wound healing while the pods were believed to be beneficial to diabetics. However, most of elderly Mauritians also had the perception that *Moringa* leaves and pods can raise blood pressure. This study provided ample evidence to document the food relevant traditional beliefs and practices and the immense potential of *Moringa oleifera* to improve nutrition and well-being. In addition, their current limited use due to loss of traditional ways of life as well as the perception of the adverse effect after consumption is a loss of opportunity which implies costs for our economy and society.

Keywords: Traditional plant; *Moringa*; nutritious; medicine; hypertension; elderly.

1. INTRODUCTION

Moringa oleifera Lam., also known as the “miracle tree” [1], is considered as an essential plant in India, Ethiopia, Philippines and Sudan [2]. There is a growing interest in *M. oleifera* in other parts of the world, namely West, East and South Africa, tropical Asia, Florida, the Pacific Islands, Latin America and the Caribbean [2]. It is worthy to note that *M. oleifera* is an alternative medicine that is fast becoming popular in the West and is tagged as a complete food [3,4] since its nutritional content is unparalleled by any other vegetable: it contains 5 times more vitamin C than oranges, 2 times the vitamin A in carrots, 4 times the calcium in milk, about the same amount of potassium as in bananas, almost 2 times the protein in milk and more iron than in spinach [2,5].

The particularity of this plant is that its leaves, considered as vegetables, are consumed raw, cooked or in powdered form, and can be stored for long periods without loss of nutritional value [2,6]. In India, both the leaves and the immature pods (called drumsticks) are eaten as vegetables for their taste and high protein content [7]. In Mauritius, both leaves and pods commonly called “Bred Mouroum” and “Baton Mouroum” have long standing culinary tradition as well as medicinal use. However, due to modernization and social changes that has occurred in the Mauritian society, it can be seen that its use as a food has declined and this vegetable plant is being underexploited despite its prolific growth on the tropical island. In addition, the prevalent perceptions that “Bred Mouroum” and “Baton Mouroum” increased blood pressure [8] following consumption has contributed to the decrease use of this food.

Among the reasons behind this is the cultural diversity of Mauritius [8]. Mauritius was an

uninhabited island until people from different continents made it their home [9]. These people brought in their traditions, cultures and cuisine and shared these beliefs and experiences with each other. Hence, as the people of different ethnic origins mingled in the society, the interchanging of folk food beliefs took place [8]. That may be the reason why, in contrast to scientific findings, Mauritian adults strongly believe that *M. oleifera* has hypertensive effects [8].

The medicinal values of both the leaves and the pods have been widely reported. They possess hypoglycemic [10,11,12,13] and hypotensive effects [14,15], a health effect which is contrasting from the Mauritian perception. *Moringa* leaves have also proven their capability to decrease lipids levels [16,17,18] and suppress formation of atherogenous plaques [16,18]. As a result, *M. oleifera* was proposed as prophylaxis against cardiovascular pathologies [19]. With the remarkable anti-inflammatory potency of the leaves and pods, they can modulate musculo-skeletal pain, and help in rheumatism, arthritis, edema and lupus [7,12,16,20,21]. Moreover, the antibacterial activity of the leaves [22] and pods [23] adds in to the multiple pharmacological effects.

Given the panoply of nutritional and health benefits attributed to *M. oleifera*, it is of particular interest to uncover the socio-cultural perceptions of elderly Mauritians concerning this plant. At the same time, an effort must be made to gather and safeguard information about the indigenous knowledge of this food plant from the elderly. The source of their knowledge regarding this plant, as well as the way it is incorporated into meals could provide fascinating details on the folk food beliefs in Mauritius. Therefore, this study will investigate the perceptions, local knowledge and eating

habits and will document these traditional information.

2. METHODOLOGY

2.1 Study Design

This cross-sectional qualitative study used semi-structured interviews which were conducted among elderly Mauritian, registered in Senior Citizen Associations around Mauritius. These interviews captured information regarding the eating habits of *M. oleifera* Lam. leaves and pods, as well as their perception on the health effects of the above-mentioned plant parts by the elderly.

2.2 Target Population

The interviews performed required participation of elderly Mauritian, aged 70 years old or more, registered in Senior Citizen Associations (SCA) around the island.

2.3 Sampling

As per the Senior Citizen Council list of Mauritius (SCC), there are 685 SCA in Mauritius. The latter are distributed over 14 regions of the island. The SCA with the largest number of members from each region was selected and their respective presidents contacted. A member either male or female, fitting the age criterion and with good communications skills, was selected by presidents from these 14 SCA for interview. The distribution of the SCA sampled and the individual interviewed are indicated in Fig. 1.

2.4 Conduct of Interviews

The interviews were carried out in October 2014. All interactions with the participants were in vernacular "creole" language. Verbal explanation was given about the aims and objectives of the study. A participation information sheet translated in creole, which gave additional details about the research and the interview, was also

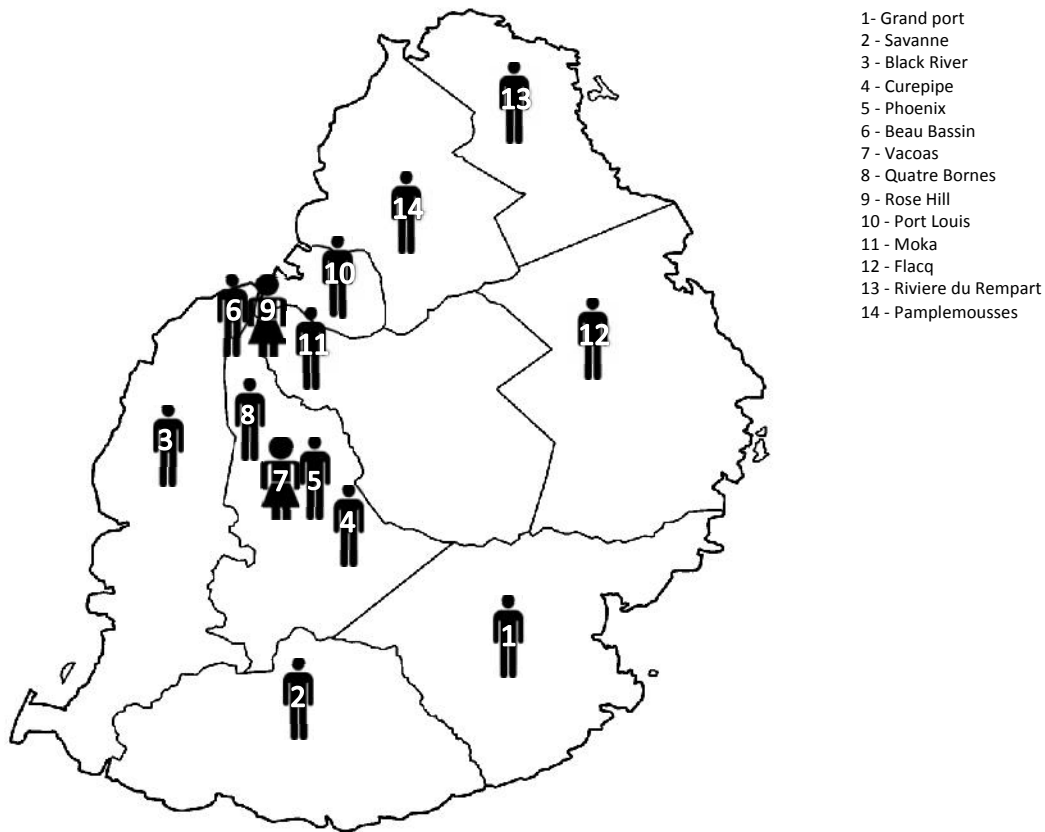


Fig. 1. Distribution of participants from different SCA across the island of Mauritius

handed over to each interviewee. Emphasis was put on the voluntary nature of their participation and the possibility to decline to take part in the study without any liability to them. Each participant was reassured concerning the anonymity and confidentiality of each discussion. Therefore, each participant was assigned a number by order of interview conducted, and no mention of his or her name or corresponding association was made. After obtaining verbal consent for the interview, for written and audio recording the conversation, each participant was asked to sign a creole-translated version of the consent form.

Face to face interviews were conducted using semi-structured questions from an interview protocol form. Further probing questions were asked depending on the answers obtained. The whole conversation was audio-recorded and at

the same time additional written notes were taken, if required.

2.5 Interview Protocol Form

A self-designed interview protocol form was used for the interviews (Fig. 2). A trial interview was conducted before finalising the interview protocol questions, and consequently, improvements were made. As mentioned all questions were asked in creole.

2.6 Data Analysis

The audio-recorded interviews were analysed. Transcription was done in the following way: the research investigator listened to each audio recording (in Creole language) individually, and typed each conversation into a Microsoft® word document after proper English translation.

Interview Protocol

The interview is divided in 3 parts:

1. Introduction

- *The participant is familiarised with the topic to be discussed about and the sequence of questions to be asked.*

2. Questions on *Moringa oleifera* Lam. Leaves

It consisted of 5 questions:

- *“First of all, tell me what you think about eating *Moringa oleifera* Lam. leaves.”*
- *“Now, can you tell me how people used to prepare *Moringa oleifera* Lam. leaves for eating?”*
- *“What can you tell me about the effects of eating *Moringa oleifera* Lam. leaves on health?”*
- *“Was that a personal experience or a reported experience? Please elaborate on this experience.”*
- *“According to you, why does the current generation not eat *Moringa oleifera* Lam. leaves anymore?”*

3. Questions on *Moringa oleifera* Lam. pods

It consisted of 5 questions:

- *“What do you think about eating *Moringa oleifera* Lam pods?”*
- *“Can you tell me how people used to prepare *Moringa oleifera* Lam pods for eating?”*
- *“What can you tell me about the effects of eating *Moringa oleifera* Lam pods on health?”*
- *“Was that a personal experience or a reported experience? Please elaborate on this experience.”*
- *“According to you, why does the current generation not eat *Moringa oleifera* Lam pods anymore?”*

Fig. 2. Interview questions in this study

Each transcript was then printed and read through a first time to get a general overview of the data collected. A second reading of each transcript was done whereby all relevant information were highlighted manually and categorised into themes according to research objectives. Analysis of the information from the 14 interviews yielded major themes, which were further subdivided into several minor themes. These themes denoted the different patterns of eating habits and perceptions regarding *M. oleifera* Lam. leaves and pods.

2.7 Ethical Clearance

The project was carried out following the approval of the ethics committee of the Ministry of Health and Quality of Life of Mauritius. Ethical Clearance was obtained on the 16th September 2014.

3. RESULTS

Analysis of the information from the 14 interview transcripts, 2 female and 12 male generated 7 general themes namely general opinion, nutritive value, beneficial and adverse health effects, reasons for consuming, preparation and reluctance within the youth to consume

M. oleifera (Fig. 3). Each of the general themes produced a multitude of responses.

The general themes showed a pattern of overarching themes mainly general opinion, eating habits and health effects. The eating habits concerned mainly how the leaves and pods were prepared, the main reasons for consuming and not consuming the latter particularly among the younger generations. Whilst the health effects regarding consumption of both the leaves and pods was mostly centered around its nutritive value, beneficial and adverse health effects.

3.1 General Opinion about Bred Mouroum and Baton Mouroum

The majority of interviewees had a positive opinion on *Moringa* leaves and pods consumption.

Interviewee: It is definitely a good thing. Personally, I enjoy eating Bred Mouroum (Moringa leaves)

Most of them assert that their consumption are good for health.

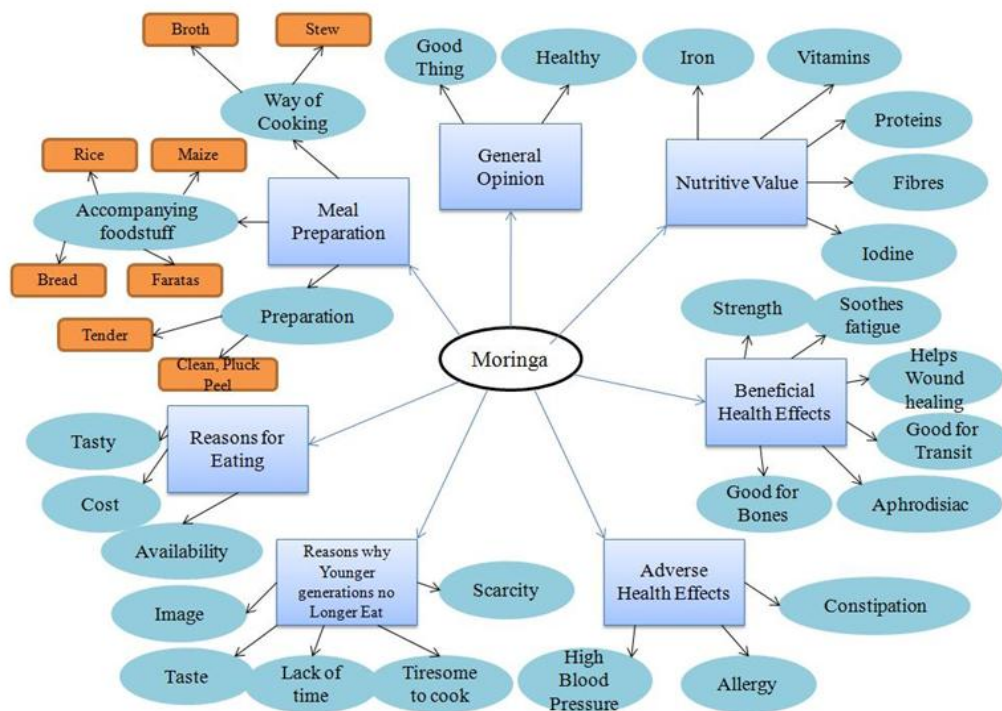


Fig. 3. General themes identified after transcribing the interviews

3.1.1 Eating habits

The major theme, eating habit, comprises of 3 minor themes namely, meal preparation, reasons for eating and reasons why younger generations no longer eat.

3.1.1.1 Meal preparation

There are several ways of cooking the *M. oleifera* leaves. The most recurrent responses were cooking as a stew or as a broth.

Interviewee: There are 2 ways to cook the leaves: ...you can stew it... The second way that people used to eat it was as a broth.

Some other ways of cooking the leaves have been described by the respondents.

Interviewee: People also used to prepare a fish soup and add the leaves in it

Interviewee: My mother used to cook Moringa leaves with fresh fish head...it can also be cooked with salted fish

Interviewee: You can put the leaves in many dishes. You can add it to "Masala curry" or "dholl"

However, the participants have stressed on the fact that the leaves must be tender and that process of the plucking leaves from the twigs was a necessary step.

Interviewee: Preferably, what I know is you should use young tender leaves. I suppose that when they become mature, their vitamin content might decrease...

Interviewee: ...the leaves must be removed one by one from the twig... the twigs can get stuck in your throat.

Despite the fact that different dishes can be made with *Moringa* leaves, there were some common cooking ingredients mentioned by the respondents, like onions, ginger and garlic.

One participant explained a fascinating recipe involving maize, Bombay duck and water left over after boiling rice, known as "Maar Chonka":

Interviewee: ...My grandmother used to cook some "Maar Chonka": You use the water left

over after cooking rice. You add garlic, ginger, onions to that water and allow it to boil. Then you add fried Bombay duck to that boiled water until it becomes a broth. Then you add this broth to cooked maize and you mix it with the Moringa leaves.

Unlike the leaves, the most common ways of cooking the pods were either as a broth or to cook it with "dholl".

The interviewees also explained the need to use tender pods that must be peeled and cut in pieces.

Interviewee: The pods should not be too ripe... then you peel the pods and you cut them in pieces of about 5 to 8 cm long.

Interviewee: You need to clean the Moringa pods beforehand: you need to remove a thread-like substance and you cut it 3 to 4 cm long. The pods must be tender.

A number of ingredients can be added to the *Moringa* pods during cooking.

Interviewee: A second way to cook it is to cook a Bombay duck curry and add the "Masala", cinnamon, cloves, cardamom, garlic and mustard seed... then you add the Moringa pods.

Interviewee: You can cook it with potatoes... you cook it in oil. You add water to it... then you add the pods to the water with garlic and ginger.

Leaves and pods were often accompanied by rice, bread and "farata". Meat and fish preparations were also frequently used. Different types of chutneys mainly coconut and tomato chutneys were also cited by the interviewees.

3.1.1.2 Reasons for eating

Whilst its taste was a determining factor, poverty and accessibility to the *Moringa* tree had their role to play.

Interviewee: It was cheap. Even if you don't have a Moringa tree, you can always ask for leaves from your neighbour.

Interviewee: In every yard, there was a Moringa tree... It was within reach...

Interviewee: I have been eating Moringa leaves since childhood. We were poor and we were eating it all the time.

Interviewee: Long ago, people were poor and Moringa pods were easily available in yards. There was no need to buy it.

3.1.1.3 Reasons why younger generations no longer eat

It was interesting to note that over time, the younger generation associated the consumption of *Moringa* leaves and pods with poor status. Three of the interviewees reported the following:

Interviewee: They would say they don't want to eat that grass. They say it is a disgrace to eat it.

Interviewee: Moreover, they believe it a food reserved for the poor.

Interviewee: The youngsters do not want to consume food that people used to eat long ago.

Interviewee: They feel ashamed to tell people that they have eaten Moringa pods.

In addition, the interviewees reported that the painstaking step of cleaning and plucking the leaves deter the younger generations from cooking it

Interviewee: They won't take the trouble to clean the leaves. They lack the patience to prepare it; to pick out leaf by leaf.

It was also mentioned that it is now difficult to even obtain *Moringa* leaves and pods for cooking.

Interviewee: Nowadays, in towns it is hard to find.

Interviewee: Long ago there was a Moringa tree in every yard. Nowadays it is difficult to even obtain some.

In addition, the participants believed that one of the reason for decrease consumption of *Moringa* pods was because of the difficulty to prepare the latter and given that nowadays people do not have time to cook, *Moringa* pods are not consumed as before.

Interviewee: ... they don't know how to cook it. Others don't want to cook it.

Furthermore with the wide range of food available nowadays young people have a variety of food choices which are not necessarily the healthiest.

Interviewee: ... there is plenty of food to eat.... They prefer fast food.

Interviewee: They don't eat it because there is plenty of other food: meat fish, prawn and lobsters.

Interviewee:... the parents have not given their children the habit of eating Moringa leaves. They prefer to give chicken or fish rather than Moringa leaves.

3.1.2 Health effects

The major theme, health effects was subdivided into 3 minor themes namely, nutritive value, beneficial health effects and adverse health effects

3.1.2.1 Nutritive value

Most of the participants believed that *Moringa* leaves and pods were highly nutritious.

Interviewee: Since it has plenty of vitamin C, it is strengthening.

Interviewee: ... Moringa pods contain lots of iron...

Interviewee: I encourage people to eat it because there is iron in the leaves.

Interviewee: the leaves contain vitamins A and C

Additionally, certain interviewees have stated that *Moringa* leaves contain fibres and proteins.

Interviewee: It has a lot of vitamins and proteins in it.

Interviewee: There are lots of fibres in both the leaves and pods.

One participant also mentioned about presence of iodine in these leaves.

3.1.2.2 Beneficial health effects

The interviewees were aware of many beneficial health effects of *Moringa* leaves and pods, which they either experienced or which have been reported by people from their surroundings. The leaves and pods were reported as a good source of energy.

Interviewee: According to our experience, it has energy, which reinvigorates you in a certain way.

Interviewee: ...all the people I know of were indulged in hard work (labourers), and they ate Moringa leaves ... they did their work and they were fine... I suppose because of the energy and vitamins in them.

Interviewee: It gives you energy... you ate the prepared Moringa pods, on the eve and in the morning before you go to work, to get strength.

Interviewee: Long ago, elders used to give Moringa leaves broth to women who have recently delivered... It was used to revitalise them; to give them strength after they have delivered.

The antalgic effect of *Moringa* leaves was cited by many interviewees.

Interviewee: It relieves pain. If you have rheumatic pain, you can crush some coarse leaves with ginger and apply it around articulations. It also relieves headache.

Some respondents have asserted that *Moringa* pods were beneficial for the musculo-skeletal system and were effective against skeletal pains.

Interviewee: I suffer from backache. When I eat the pods frequently, the pain is relieved.

Interviewee: ... it is good for bone and for strengthening of ligaments.

Interviewee: ... when my mother had foot ache, she would prepare Moringa pods broth to relieve the pain.

The *Moringa* leaves and pods were also known to improve intestinal transit. The broth was used for its purging effects after drinking "de l'huile boire" or "botrice oil" which were given long ago to children to kill intestinal worms.

Interviewee: It is also good for the transit. Long ago, my mother used to give me "de l'huile boire". Then to pass faeces well, you had to drink Moringa leaves broth.

A participant also remembered using *Moringa* leaves to speed up healing of wounds.

Interviewee: ...when someone is injured, you can crush the raw leaves and apply to the wound. It contains iodine and hence, promotes wound healing.

It was interesting to note that *Moringa* pods increased sexual drive.

Interviewee: what I have heard from people, and experienced myself, is that it is good for libido.

Interviewee: In Singapore, I was told that it is an aphrodisiac.

The respondents also cited a number of other beneficial health effects.

Interviewee: It is even good for diabetes.... I have diabetes... When Moringa pods are available, I eat them. I think that eating the pods might help me.

3.1.2.3 Adverse health effects

The adverse health effect, which was frequently associated with *Moringa* leaves and pods, was a rise in blood pressure. This effect was mostly a reported experience from either relative or friend of the interviewee.

Interviewee: I offered a construction worker Moringa leaves but he refused, saying, "the other day I ate that and my blood pressure went up".

Interviewee: However, people with high blood pressure should not eat large amounts of Moringa leaves... because it raises the blood pressure

The symptoms associated with this rise in high blood pressure were of different nature.

Interviewee: they feel hot. They suffer from headache.

Interviewee: They feel pain in the shoulder, vertigo, sweating

Interviewee: you feel weak. You don't want to work

Some who went to see a doctor or went to hospital were diagnosed with elevated blood pressure and had to receive treatment.

Interviewee: Once my father ate Moringa leaves and we had to bring him to hospital... the doctor found that his blood pressure had risen.

Interviewee: ...the doctor noted the rise in blood pressure... some had to be admitted and stayed overnight.

One interviewee even experienced an allergic reaction after eating Moringa leaves stew. He had to be rushed to hospital to receive treatment.

Interviewee: Personally I cannot eat Moringa leaves. I was about 15 years old... my mother stewed the leaves that day and a few hours after eating them, I started having rash, reddish in colour with a lot of itching over the body and limbs... My brother rode me... to Candos Hospital and had to stay for 2 days.

4. DISCUSSION

In view of the high nutritive values, *M. oleifera* has been considered for use in fortification campaigns to eradicate malnutrition [24]. Although the plant is heavily used to treat medical conditions [25], the full nutritional value of the latter is not being exploited. Despite the nutritional and medicinal properties of *M. oleifera*, which can confer socioeconomic opportunities for a country like Mauritius, it has been found that over the course of time, Mauritians are losing the culture of consuming as well as planting this crop. The decline of traditional ways of life and decreased *M. oleifera* food use are strongly linked as indicated by Pilgrim et al. [26] in a study with wild food use. At a time, where Mauritius has undergone a significant nutritional transition due to modernization and social changes, whereby we note an increase in the patterns of consumption that increase the risks of developing chronic diseases, it is of utmost importance to restore information on this traditionally used food.

This qualitative study indicated that there are a number of ways in which Mauritians cook the

Moringa leaves. The most common dishes are the *Moringa* leaves stew and broth while the pods were preferred in pulses. Likewise, Yameogo et al. [27] described similar ways of cooking the *Moringa* leaves whereby the young leaves cooked like spinach, or prepared in soup or in salad. The authors also indicated that in Senegal the leaves of *M. oleifera* are consumed like a sauce named "Mbum" accompanying with the couscous prepared with cereals composed by millet, corn or rice" [27]. Similarly, the pods are used in South India, to cook a variety of curries, sambars, korm [28]. In Mauritius, it was noted that both fresh and salted fish were often added to the *Moringa* leaves or used as a side dish. It was obvious that elderly Mauritians enjoy eating *Moringa* leaves. However, the fact that the leaves must be plucked one by one from the twig seems to be a hassle to their preparation.

The elderly Mauritians consumed the pods mostly because long ago, they were poor and there was not much choice of cheap vegetables. The other reasons provided for regular consumption of the *Moringa* leaves and pods were their pleasant taste, availability and accessibility to the *Moringa* tree. These factors drove people to eat them almost daily in the past.

The elderly Mauritians interviewed firmly believed that the *Moringa* leaves and pods are highly nutritious. According to them, the leaves and pods are rich in iron. This is concordant with the study of Fakankun et al. [29], which demonstrated a high level of iron of 214 mg/Kg and 150 mg/kg in the *Moringa* leaves and pods respectively. Most participants assert that the leaves and pods were rich in vitamins. This concurs with the database of the Institute of Nutrition, Mahidol University [30], which established that the leaves contain many vitamins: they have more vitamin A than carrots and more vitamin C than oranges. The elderly additionally talked about abundance of proteins and fibres in the leaves. The research work done by Makkar and Becker [31] and Promkum et al. [32] confirm the presence of digestible proteins in *Moringa* leaves and pods. Furthermore, Oduro et al. [33] also found proteins as well as fibres in these leaves.

However, the younger generations seemed to be reluctant to consume *Moringa* leaves and pods probably due to a negative image associated

with them. They are considered as food for the destitute. This folk belief has been instilled by local song saying that “*Moringa* leaves and pods are food that poor people like to eat” [8]. Furthermore, the time consuming step of cleaning and preparing the leaves and pods also deter their consumption nowadays. Given the wide variety of other foodstuff at their disposition, young people choose fast food or ready-to-eat food over *Moringa* leaves and pods. Finally, the *Moringa* leaves have become scarce either because the tree is not grown in yards anymore or the leaves are not sold in markets.

The participants in this study affirmed that both *Moringa* leaves and pods have a revitalising effect and consisted the breakfast of labourers, in order to provide them with energy for their heavy work. Likewise, the broth was given to women in post-partum to reinvigorate them. Similarly, in Singapore, these leaves are eaten for energy [34]. This revitalising effect could be explained by the higher carbohydrate content of *Moringa* leaves as compared to other leafy vegetables [35]. According to Promkum et al. [32], 100 g of boiled *Moringa* pods can contain up to 60.5 g of carbohydrates. Yet, this “energy-providing” capacity of the pods has not been established scientifically [32].

In Mauritius, *Moringa* leaves and pods are used for pain relief. This is congruous with the work of Sulaiman et al. [36] which advocates the use of *Moringa* leaves for treating pain and inflammation since these leaves exhibit “peripherally non-opioid mediated and centrally opioid mediated antinociceptive and anti-inflammatory activities”. In India, these pods are consumed as a treatment for rheumatism [37]. It has been proven that these pods possess anti-inflammatory potential [21], which appear to be beneficial in case of pain [38]. Moreover, the respondents claim that *Moringa* leaves have laxative effect and its broth is used traditionally as a purging agent. However, Misra et al. [39] demonstrated that extracts of *Moringa* leaves reduce both the onset of copious diarrhoea and frequency of purging in rats. This contradicts the use by the interviewees in Mauritius. Nevertheless, it could be speculated that the *Moringa* broth was not the one with the purging effects since they were consumed following a purgative dose of oil. In addition, crushed *Moringa* leaves were applied to wounds to speed up healing. This is in line with a common practice

in Nigeria [6]. Besides, the wound healing capacity, as demonstrated in the excision wound, incision wound and dead space wound models, after topical application of *Moringa* leaves was confirmed in an experiment performed on male Wistar rats [40].

The elderly additionally associated an aphrodisiac effect with *Moringa* pods. One of them even claimed having increased libido after eating these pods. However, there is no relevant research work to support this statement. A respondent declared that eating *Moringa* pods helped keep his diabetes in control. The hypoglycemic effect of *Moringa* pods have indeed been elicited in diabetic rats [12]. Nonetheless, there is a lack of such experimental findings on human subjects.

This study showed that there is a strong perception among elderly Mauritians that consumption of *Moringa* raises blood pressure in normotensive and hypertensive individuals. It is noteworthy that the interviewee never experienced a rise in blood pressure but it is mainly from people within their surroundings. Bahemia and Chan Sun [8] observed this same perception among Mauritian adults in their study. In contradiction to this perception, *Moringa* leaves have revealed hypotensive properties in experiments on rats [14,41]. One interviewee also narrated having an allergic reaction following *Moringa* leaves ingestion. However, it has not been scientifically reported or proven that the leaves possess anaphylactic constituents. Such adverse health effects can significantly reduce the consumption of this highly nutritious vegetable and prompt for evidence-based clinical trials to validate such claims.

5. CONCLUSION

Traditional knowledge of culinary and medicinal plant species is mainly retained by elders particularly since the knowledge has been passed on to them from parents and grandparents [42]. Thus this qualitative study documents the practices and perceptions about the culinary uses of *M. oleifera* in a bid to safeguard the local folk knowledge of this underutilized vegetable. In addition, the data provides the basis for subsequent research on the locally grown *M. oleifera* from a phytochemical point of view and on potential clinical side effects of the latter following consumption.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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