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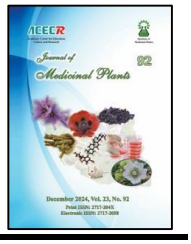

Research Article

Rural communities' perception on *Monsonia angustifolia* E. Mey. ex. A. Rich.: its value, benefits and uses in South Africa

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ABSTRACT

Background: South Africa is endowed with an abundance of diverse medicinal plant species and in the Limpopo Province, Bapedi people continue to use *Monsonia angustifolia* as a tea and herb to cure ailments such as fertility problems in both women and men by traditional healers. **Objective:** There is a need to document rural communities' perspective on the value, benefits and uses of *M. angustifolia* and further assess its commercialisation potential. **Methods:** A study was conducted in three study areas namely Botlokwa and Zebediela situated in Capricorn district and Mohlalaotwane in Sekhukhune district in the province. The study utilised phenomenography as a design and 31 participants were recruited from each of the three study arears for individual interviews and six to ten for focus group discussions. Descriptive statistics and Interpretative Phenomenological Analysis were used for data analysis. **Results:** Majority of participants were unemployed youths (21-40 years) (71%) and adult male farm workers (29%). *Monsonia angustifolia* is highly valued and used mostly by traditional healers, men of all ages and in church especially as herbal tea to help with issues of fertility. The herbal tea was noted to have many therapeutic properties but has not yet been formally commercialised. **Conclusion:** Sale of *M. angustifolia* as herbal tea to stimulate male and female libido is on the increase and might lead to unsustainable harvesting of wild plant populations if proper conservation strategies are not implemented and the environmental laws are not adhered to by community members or implemented by the local authorities.

1. Introduction

For a very long time, humans have used plants as a source of food [1], medicine [2, 3], pesticide and stimulant for sexual behaviour [4]. *Monsonia angustifolia* E. Mey. ex. A. Rich., is widely distributed in natural vegetation (Fig. 1) and it belongs to the order Geraniales, family Geraniaceae and the genus *Monsonia* comprises of 39 species that are found in most parts in Africa and southwestern Asia [5-8]. The plant is

Abbreviations: AD, Alzheimer's disease; BK, Botlawa; DEA, Department of Environmental Affairs; IPA - Interpretative Phenological Analysis; MT, Mohlalaotwane, SANBI, South African National Biodiversity Institute; UNISA, University of South Africa; ZD, Zebediela

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used for nutritional, and therapeutic purposes in some African countries. For example, in Tanzania, *M. angustifolia* is traditionally used for food and cooked as an indigenous vegetable for daily meals [9] and in South Africa, the stem and leaves of the plant is prepared as a traditional herbal tea for human consumption in six provinces (Limpopo, Mpumalanga, Gauteng, Free State, Eastern Cape and KwaZulu-Natal) [4].

Generally, several plants were reported to have phytochemicals with therapeutic properties and were used in treatments of several ailments (dysentery, typhoid fever, intestinal hemorrhage, pain, and diarrhea) [9]. However, only few plants (*Fadogia agrestis*, *Piper guineensis*, *Afromonium melegueta*, *Lepidium meyenii*, and some *Bulbine* spp.) and some species of *Monsonia* were reported to have aphrodisiac properties [4]. In particular, results of a study on the effect of 60% EtOH extract of *M. angustifolia* seems to suggest that there is potential for development of a plant-based treatment of Alzheimer's disease (AD), a neurodegenerative disorder [10]. In another study, the data suggest that extract of *M. angustifolia* could be a natural acaricide source (its ethno-veterinary potential) for combatting *Rhipicephalus turanius* and other cattle tick species [11]. Previously, Fouche et al. [4] had reported the potential of *M. angustifolia* leaf extract as a sexual behaviour stimulant in male Wister rats.

Fig. 1. *Monsonia angustifolia* plant growing along the road side (Herbarium number: 3925000, Source: PlantZAfrica-SANBI.com website)

The practice of using plants for medicinal purpose is common among rural communities in most African countries including South Africa. Due to increased ailments in rural communities in South Africa and the high prevalence of poverty, there is an increasing demand for cheaper plant-based products to treat common diseases such as dysentery, typhoid fever, intestinal hemorrhage, and diarrhea [3]. Among rural people in Limpopo province, *M. angustifolia* is used by different communities as herbal tea to stimulate male and female libido although with less knowledge of its benefits and side effects. This claim was validated by findings reported by Fouche et al. [4], when they administered crude extracts of the aerial parts of

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M. angustifolia to test its effect on the sexual behaviour of rats. Their results showed significant effects of administering 300 mg/kg body weight of *M. angustifolia* crude extracts on the frequencies of male rats' mounts, intromission and ejaculation, and increased serum hormone concentrations [4]. However, *M. angustifolia* was not included among plants listed by Semenya et al. [12], when documenting Bapedi traditional healers' ethnobotanical knowledge on medicinal plants used for treating and managing reproductive ailments in the Limpopo Province. A total of 36 medicinal plant species belonging to 35 genera and 20 families were documented by the authors. Clearly, there is paucity of literature on the effects of *M. angustifolia* on the sexual behaviour of human beings and therefore, there is a need to document rural communities' perspective on the value, benefits and uses of the plant and further assess the potential of commercialising products of *M. angustifolia*.

Furthermore, there is a need to evaluate the conservation strategies used by rural people to sustain a continuous supply of the plant's products in line with increased demand due to increased population, ailments and poverty. In addition, the plant naturally grows in different ecologies and is found in several countries in southern Africa including South Africa, Lesotho, Swaziland, Namibia and Mozambique. *M. angustifolia* has been studied for its phytochemistry and medicinal properties and there are claims by local communities that the plant can be used to treat conditions like erectile dysfunction, enhance libido, as an aphrodisiac, and as a blood cleanser [3, 4]. Therefore, the aim of this study was to ascertain the local communities' perspective on the benefits and uses of *M. angustifolia* in Limpopo Province, North of South Africa and determine the possibilities of commercialising the plants' products based on its value, demands, benefits and uses. The specific objectives were as follows; a) to ascertain the local communities' perspective on the benefits and uses of *M. angustifolia*, b) to explore the value of *M. angustifolia* among different age groups (youths and adults) in the communities in Botlokwa and Zebediela (Capricorn district) and Mohlalaotwane (Sekhukhune district) in Limpopo Province and c) to identify conservation strategies used by rural people to protect *M. angustifolia* in their communities.

2. Material and methods

2.1. Study area

The study area is situated in the Limpopo province (23.4013 S, 29.4179 E), which is in the northern part of South Africa. The province is rich in natural and botanical resources and the major vegetation is Polokwane Plateau Bushveld. The study was conducted in three study areas namely Botlokwa and Zebediela situated in Capricorn district and Mohlalaotwane in Sekhukhune district in the province (Fig. 2). These three study areas are inhabited by Bapedi people. The areas are chosen because the people living in those areas are still reliant on medicinal plants for their livelihood and everyday use.

A photograph of *M. angustifolia* plant was taken at the study area for identification by participants in the study (Fig. 1C). A plant specimen (sample) was also collected from natural vegetation in each of the three study areas (Botlokwa, Zebediela and Mohlalaotwane) and sent to the South African Biodiversity Institute for proper identification. The identified specimen (with Botanical Herbarium Number: 392500) together with photographs were used to help participant recognise the plant of interest (*M. angustifolia*) in the study.

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Fig. 2. Map of study areas (Zebediela (24.3073° S, 29.2669° E), & Botlokwa (23.3956° S, 28.9747° E) and Mohlalaotwane) in the Capricorn and Sekhukhune districts in Limpopo Province (23.4013 S, 29.4179 E) (Source: www.googlemap.com).

2.2. Research design

This study utilised phenomenography as a design and adopted both quantitative and qualitative approaches. Specifically, the study used the Interpretative Phenological Analysis (IPA) [13], and with the help of these approaches, the researcher was able to engage the research subjects and learn more about how the community in rural Limpopo Province views the worth, advantages, and uses of *M. angustifolia*. The researcher was also able to view the study results in light of the participants' worldview, thanks to this methodology.

2.3. Population and sample size

The population targeted in the study were local Bapedi people resident in Limpopo Province. Participants for this study were recruited from three study areas (Botlokwa, Zebediela and Mohlalaotwane) in the Limpopo Province. The criteria for participation included; a) being a Sepedi speaking individual (youth and adult) knowledgeable about the benefits and uses of products of *M. angustifolia* in the study area and b) his/her are willingness to participate in the study.

Snowball sampling technique was adopted to recruit ten to eleven participants for individual interviews (Total of 31 participants) and six to ten for focus group interviews in each study area.

2.4. Data collection instruments and data collection

The researcher and the interview schedules served as the study's data collection tools. The study used both one-on-one and focus group interviews. Two interview schedules were developed by the researcher using relevant literature related to plant extracts and sexual behaviour, opinions of expert of the subject studied and the researcher's lived experience. The individual interview schedule had two sections. Section A for demographic information of the participants and section B presented the themes of the interview guide. A preliminary analysis (pilot) of the generated interview

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schedules was performed on subjects that matched the study's sample. The final interview schedules, which served as the instruments or methods for collecting data in the main study, were revised in response to the input from the pilot. Both sets of interviews used a semi-structured interview format, which was dictated by the timetables for each set of interviews. The interviews lasted for between 45 and 60 mins, and the focus group discussions were audio recorded.

2.5. Data analysis

Both descriptive statistics and thematic analysis were used to analyse the data collected for this study. Using descriptive statistics and SPSS statistical software (version 26), quantitative demographic data was analysed. Analysis results were displayed in tables and charts. Tesch's thematic content analysis of the qualitative data was done to produce themes utilizing open coding [14].

The audio-recorded data acquired at the focus group interviews was transcribed verbatim and processed manually using the principles of Interpretative Phenomenological Analysis framework [13, 15].

2.6. Ethical consideration

This study complied with the ethics policy of UNISA. Ethical clearance was obtained from the ethics committee of the School of Agriculture and Environmental Sciences (2020/CAES_HREC/024) and traditional leaders/healers. The researcher obtained permission to conduct the study from leaders of two local traditional authorities among the Bapedi people before carrying out the study. The research posed no risk to the researcher, participants and the environment. The researcher ensured confidentiality and anonymity according to Cohen, Manion and Morrison [16]. The participants signed consent forms to indicate their willingness to participate in the study. Furthermore, the researcher read and understood the South Africa's Bioprospecting, Access and Benefit-sharing Regulatory Framework and consulted with the Department of Environmental Affairs (DEA) for permission to carry out the study. The department made it clear as stipulated in the bioprospecting policy that a permit will not be required for this particular research.

3. Results

3.1. Demographic characteristics of study participants

In this study, the age, sex and occupation of participants were captured to analyse the demographic characteristics of the participants. According to Figure 3, majority of the participants (64.5%) were youths between the age group of 31-40 years followed by adults (16.1%) between the age brackets of 41-50 years and 13% above 51 years of age. The youngest among the participants were below 31 years (6.5%). The findings revealed that majority of the participants (71%) in the study area were youths between the age brackets of 21-40 years and was followed by adults (41-50 years) (29%).

Figure 4 clearly shows the sex distribution of participants in the study area. From the result, a good percentage of the participants (71%) in the study community were male and 29% were females. The finding implies that participation was dominated by men (71%) in the study area.

According to Figure 5, majority of study participants were unemployed (48%) followed by farm workers (29%) and those who are Sangomas (traditional healers) (6.5%). Among the participants, there was only one driver (3.2%), and one each of the following occupations; brick layer (3.2%), horticulturist (3.2%), assistant teacher (3.2%) and caterer

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(3.2%), who made up others in the results (12.9%) shown in Figure 5 below. Clearly, almost half of the study participants were unemployed (48%) and about 30% of them were working in farms in the study area.

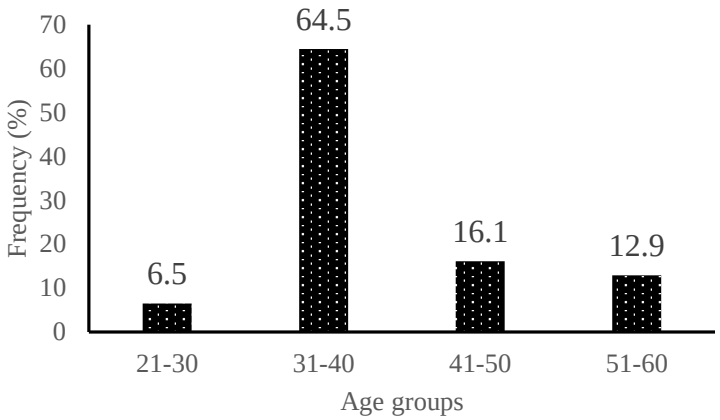

Fig. 3. Age distribution of study participants

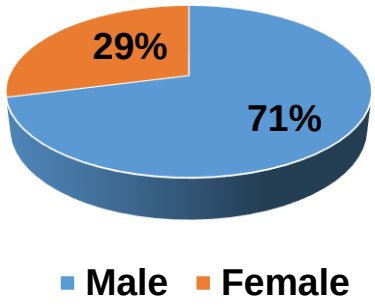

Fig. 4. Gender distribution of study participants

Fig. 5. Occupation distribution of study participants

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3.2. Data analysis

Four superordinate themes emerged from the qualitative data analysis: 1) Knowledge of *M. angustifolia*, 2) Value, benefits and uses of *M. angustifolia*, 3) Commercialisation potential of *M. angustifolia,* and 4) Conservation methods and their challenges. Each of these themes has a minimum of three sub-thematic categories. In order to supplement the discussion of the identified themes and sub-themes, excerpts from the participants' accounts of the individual interviews are used. The initials 'MT', 'ZD', and 'BK', which stand for participants from Mohlalaotwane, Zebediela and Botlawa respectively, are used at the end of each excerpt to identify their source. Additionally, these initials are followed by a number, such as (2, 1), where "2" denotes the number of individual interviews and "1" denotes the page number of the transcript from which the excerpt was taken. To help the researcher support theme-related discussions, some extracts are used in more than one section in this chapter. Such usage not only illustrates the interrelationships between ideas but also the peculiarities of human conversation. As they emerged from the study, the themes and sub-themes are presented in Table 1 and each explored below.

Table 1. Summary of themes and sub-themes

Themes	Sub-themes
Knowledge of *M. angustifolia*	• Natural plant used as herbal tea • Easy to identify, accessed and its abundant • Medicinal plant for several diseases
Value, benefits and uses of *M. angustifolia*	• Highly valued for cultural and spiritual reasons • Medicinal properties for all ages • Increase libido • Treat erectile dysfunction
Commercialisation potential of *M. angustifolia*	• Sold in local markets • A high demand • No value-added products
Conservation methods and their challenges	• SANBI laws and regulations • Grown in home gardens • Lack of enforcement of traditional and national laws

3.2.1. Knowledge of Monsonia angustifolia

A) Natural plant used as herbal tea

Participants frequently identified *M. angustifolia* as a natural plant used to produce an herbal tea. When the researcher provided a picture of the plant, all participants quickly correctly identified it as herbal tea with medicinal properties. They claim that the plant grows naturally in the study area and has been known as a blood-cleansing herbal tea for a very long time (MT 1,1).

We have it in abundance naturally growing in our homes. It is a tea (commonly known as tee ya thaba) also used as medicine to cure many ailments and has been used by our forefathers (ancestors) from generation to generation (ZD 2,1).

B) Identifiability, accessibility and abundance

None of the participants was unable to relate their experiences about knowing the plant. They all claimed that the plant was seen almost everywhere and had always been accessible in the community from their early age.

In Limpopo where I was born and raised, it can be found in homes, along the streets, on

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places that are mountainous or full of rocks, open fields and in the forest or bushes (MT 7, 1).

Due to its abundance in the area most villagers have it in their homes. It is found on most places and openly on spaces such as pathways (BK 4,1).

C) Medicinal Plant for several diseases

All participants knew *M. angustifolia* as a natural plant with medicinal properties for several diseases. They claimed that the tea is used to treat not only certain ailments but it is believed to also improve the health of both men and women.

It is used to clean kidneys and abdomen, assist women with fertility issues, relax the mind and feel better if you are sick in the body, help with swollen feet, to heal backache and spinal cord tension (BK 7, 2).

We all know about the tea. Most us benefit from it as a medicinal tea and value it for its medicinal purposes. It is mostly valued and used by males of all ages in the area (MT 5,1).

3.2.2. Value, ALUE, Benefits and uses of Monsonia angustifolia

All participants claimed that *M. angustifolia* is highly valued by the Bapedi community because the plant has several uses and benefits to them. They have been using the plant and some of its products (dried leaf), for several reasons including culture, religion, health and aphrodisiac (fertility).

A) Highly valued for cultural and spiritual reasons

Participants reported that *M. angustifolia* is part of their cultural and spiritual ceremonies as bequeathed to them by their ancestors. It is used mostly by traditional healers and in churches that believe in healing powers of indigenous plants (MT 3,1).

Most churches that believe in the use of indigenous plants or which are rooted in culture prefer using the tea to help with issues of fertility (MT 3, 2).

We know the tea as special mostly from church, and we value it as a libido enhancer, for fertility and blood cleanser (BK 4,1).

B) Medicinal properties for all ages

M. angustifolia as an herbal tea, commonly known as tee ya thaba, was noted by all participants to have several medicinal properties that can cure several diseases across all ages. Traditional healers prepare the herb in special ways depending on the type of ailment and age group. Dried leaves can be boiled and mixed with milk and sugar to treat body pains and swollen feet in children.

It is used to help children with body and abdominal pains (BK 8, 1).

Also, the participants claimed that the roots of the plant when boiled can be used for the treatment of swollen feet, relaxation of muscular pains that causes tension and headache among youths and adults.

It is a cure for many illnesses such as body pains, swollen feet, spinal cord pains and tension in blood veins in both young and old people (BK 2,1).

C) Increase libido

All participants interviewed in this study claimed that *M. angustifolia* can be used as aphrodisiac because it can increase libido in both men and women (young and old). It was interesting to note that the youths have developed the habit of mixing the tea with other herbs compared to adults who are against mixing the tea with other products. According to the youths, mixing the tea with other herbs enhances their

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libido and endurance during sexual intercourse (BK 3,1).

Our forefathers used the plant as sexual stimulant and we have experienced the power of the tea even without mixing it with other herbs according to an old man (MT 4,1).

D) Treat erectile dysfunction

All participants claimed that the plant can be used to treat erectile dysfunction and help with fertility problems among women.

It is used to help children and youths with weak erection (ZD 6,1).

It is used as a blood cleanser and women who are barren use it to help with fertility issues (BK 5,1).

3.2.3. Commercialisation potential of M. angustifolia

The use of *M. angustifolia* is gaining popularity among youths in the Limpopo Province. Participants claimed that the value of the plant as food (nutrient source), beverage and medicine among local Bapedi people warrants the need for the plant to be produced in commercial farms and value-added products produced like other cash crops (rooibos, honeybush, oranges, and mangoes).

A) Sold in local markets

Participants ascertained that the dried or fresh plant parts are now sold in local markets and even along road sides by hawkers and petty traders. Because of the high demand, community members now see trading of *M. angustifolia* as an income generating source. The herbal tea is sold in recycled plastic bottles with no labels and instructions for dosage.

Drinking of "tee ya thaba" is common among all ages and some people complain of side effects because of lack of dosage that we see in tea from the shop (ZD 6,1).

People who work hard use this tea daily and it is believed that it is a great method for blood clots thinning (MT 7.1).

B) A high demand

Participants were of the strong view that there is a high demand for products of *M. angustifolia*, which has caused over harvesting in some parts of the districts in Limpopo.

The plant is now grown in backyard gardens of most community members because its scarce in local markets sometimes especially during draughts (MT 6,1).

It is highly and greatly used amongst men of all ages. Most of the time the men either get the tea from the bushes, church or from traditional healers (BK 6,1).

C) No value-added products

All participants claimed that there are no value-added products of *M. angustifolia* like products of *Aspalathus linearis* such as Rooibos herbal teas (with honey, lemon, ginger etc.) and Rooibos cream & oil. The plant has several medicinal properties and nutrients that community members benefit from (MT 8,1).

The herbal tea has not yet been formally commercialized but it is sold highly on black markets both raw (as an herb) and dried. In either form, it is prepared as a tea with little or no proper instruction and information for use as most are just bottled in used cold drink bottles with no branding or information, and that leads to side effects in some participants who used it and worse ended up been hospitalized (BK 8,1).

3.2.4. Conservation methods and their challenges

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Due to the high demand for the herbal tea, over harvesting methods and the fact that *M. angustifolia* is listed among the National Assessment Red List of South Africa, there is a dire need to conserve the plant.

A) South African National Biodiversity Institute (SANBI) laws and regulations

According to the participants, the SANBI laws and regulations are not adhered to by community members and therefore, *M. angustifolia* is harvested and uprooted everywhere in the community and bushes in the area.

Our traditional healers are not enforcing traditional laws anymore to protect the plant (BK 9, 1).

Community members are not aware that the plant is threatened and can be lost forever if not protected by traditional healers (MT 9,1).

B) Grown in home gardens

Participants affirmed that local community members are now growing *M. angustifolia* in their backyard gardens due to the high demand and cost of the tea in local markets. Home gardens are now used to conserve the plant and for use in times of household need.

We need to continue drinking "tee ya thaba" so we grow the plant in our gardens at home (ZD 9,1)

C) Lack of enforcement of traditional and national laws

Participants were of the view that the laws and legislations enacted for conservation of *M. angustifolia* are not fully implemented by the authorities (traditional leaders and SANBI personnel) and local community members did not adhere to the laws and regulations.

I wonder why the Limpopo local government is not protecting the plant because it is disappearing in some areas, we used to see them growing in nearby bushes but not anymore (ZD 10, 1).

4. Discussion

4.1. Locals' perspective, value and benefits of the tea (M. angustifolia)

Due to the vastness of Limpopo areas and increase in poverty, most local people rely on indigenous plants for survival. This has been a strategy used by forefathers from generation to generation. This leads to most kids growing in rural areas to be well advanced and equipped with the skill and knowledge on how to use and benefit from indigenous plants. Being deeply rooted in culture in most of these communities, and given that inhabitants of especially most communities near mountains where tea grows, they share knowledge and believe that by so doing, they equip other generations as a way to revive and keep their cultural beliefs. In particular, the Bapedi traditional healers in Limpopo Province are noted to possess vast ethnobotanical knowledge on plants with medicinal properties especially for reproductive health-related problems treatment and management [17].

Most local community members in the study areas knew about *M. angustifolia* as a tea commonly known as "tee ya thaba" and recently, it is regarded as "special tea" amongst youths especially when mixed with other herbs. Across all ages and gender, *M. angiustifolia* is an herb commonly used as medicinal plant to clean the abdomen, relax the mind and feel better when sick in the body, help with swollen feet, and to heal backache and spinal cord tension. It is used to clean kidneys, and as a blood cleanser (most participants who work hard use this tea daily

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because it is considered as a great method for blood clots thinning). Additionally, it is believed to also improve the health of both men and women in general [17]. For reproductive health-related problems, the roots of the plant are used to assist most women with fertility issues, and to enhance libido in both sexes. Youths prefer to mix the roots infusion of *M. angustifolia* with that of other herbs to enhance libido and sexual endurance. Majority of the participants were unemployed youths, an indication of poverty among local communities [13], which makes community members seek traditional medicine for their health-related problems [3].

Among women in rural communities, the plant can be used to treat erectile dysfunction in children and help with fertility problems. Plant parts (dry or fresh) are used mostly by traditional healers and in Churches to treat various ailments including reproductive health-related problems. Most churches which believe in the use of indigenous plants or which are rooted in culture prefer using the tea to help with fertility issues. Although, most people use it to benefit from its medicinal purpose, it is still with great concern that they use it without proper instructions and dosage. Such practices can have side effects, which could possibly lead to hospitalisation. All of the traditional healers/Sangomas (6.5% of participants) mentioned that some remedies have negative effects on humans, particularly for illnesses like diarrhea and appetite loss. The majority of these healers use traditional methods (such as consulting ancestors) to determine the efficacy of treatments, which is of most concern and necessitates a scientific examination to determine their safety and efficacy [12].

Among rural communities, *M. angustifolia* is only preferred as a tea and its preparation is as simple as boiling the tea with water. It is said that there are no specifications to prepare the tea. Freshly harvested roots are washed, chopped and boiled with water and once ready, it is taken as it is fresh from the ground with all active ingredients intact. It is believed that air drying or exposure of its organs (leaves, stem and roots) to direct sunlight changes its chemical composition thereby making its taste stronger, a taste that most young people do not like. When stronger, the youths prefer to add milk when drinking it.

In sum, the local community people are knowledgeable about the nutritional value (beverage), and medicinal properties of *M. angustifolia.* 'Below-and aboveground organs of the plant are widely used by people across gender and age largely for their therapeutic properties. In particular, they believe that it heals common ailments, clean the abdomen, relaxes the mind, treat swollen feet, heal backache and spinal cord tension as well as clean kidneys and blood' [18]. The plant is used mostly by youths in combination with other herbs to enhance sexual libido and females for fertility related problems. According to findings in the current study, the plant is noted to have numerous medicinal uses for several common ailments as reported by Roberts [19], Khorombi [20], and Fouche et al. [4], for *M. angustifolia* and by Maroyi [21] for *Drimia Elata*.

4.2. Commercialisation potential of M. angustifolia

Researchers, conservation groups, and traditional healers are concerned about the size of the trade in herbal remedies in South Africa because the harvesting practices used are not environmentally friendly. The public can now easily access traditional medicines from "muthi" shops, which are African pharmacies that sell these drugs to treat physical, spiritual, and cultural ills, as well as from vendors [22].

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Most local community members believed that due to its effectiveness they can buy it from any place despite fewer warnings they often get of buying goods from the streets that are not labelled or has less information or none of safe use. Local community members ascertained that the dried or fresh plant parts are now sold in local markets and even along road sides by hawkers and petty traders. Because of the high demand, rural community members now see trading of *M. angustifolia* as an income generating source. The plant hasn't been commercialized like the well-known rooibos (*Aspalathus linearis*) and Honeybush (*Cyclopia species*) teas, despite the fact that demand is very high in the Limpopo Province, where the current study was conducted. These teas were once solely consumed locally, but because global demand is currently on the rise, they are now being shipped to lucrative markets everywhere [22-24]. The "tee ya thaba" has a similar point like rooibos and Honeybush teas, which is related to their purported health benefits (antioxidant polyphenol content) and there is an increasing demand for such products in the worldwide wellness market.

To enhance and optimize preparation techniques and assure adherence to quality standards for *M. angustifolia*, additional study is needed. Also, it is necessary to guarantee that the sector has access to enough plant material.

4.3. Conservation methods and their challenges

M. angustifolia is on the red list of SANBI and its conservation status is of concern to the scientific as well as the local communities in the Limpopo Province. Due to its scarcity recently, most rural people plant *M. angustifolia* in their homes as a way to preserve the tea from being extinct due to its high demand recently. When the tea is ready for harvest in rural areas they normally harvest and sell in suburbs in the city of Polokwane. In Limpopo Province, it grows almost everywhere, especially in homesteads near mountainous areas, along the streets of such areas, in rocky areas, open fields, forests or bushes. Due to the abundance and wide spread of this medicinal plant, it is quite a challenge in most of these areas to come up with new conservation strategies that will make communities abide to the South African legislations. According to the participants, there is a need to create awareness about preservation of the plant which agrees with what was reported by Rasethe and Semenya [25], that the survival of *E. groenewaldii* was dependent on awareness creation regarding the species' conservation status according to the study participants.

In this study, participants were of the view that parts of *M. angiustifolia* are normally air dried and kept in homes for later use. This is an ancient practice of preserving food and other items. It is believed that most medicinal plants work better and also release chemical compounds easily when dried up than when still fresh. Seeds, leaves, roots, barks, fruits, and flowers are all sources of dried herbs. Dried herbs have the benefit of being more durable in storage.

5. Conclusion

According to our knowledge, this is the first study to document rural communities' knowledge and value of *M. angiustifolia* in the Limpopo Province especially among Bapedi communities. In general, rural people believe that it is not everyone that should handle medicinal plants. Therefore, most people who process parts of this plant into tea or herbal infusion are trained, either in churches or through initiation as Sangoma. In fact, the communities believe in order for the latter to handle it, they ought to be registered. Whatever the case, as a

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result of incidences caused by side effects of ingesting infusions from the plants, most locals prefer to buy it from trusted sources.

It is only through using scientific procedures that proper methods that recommend safe weight/volume proportions that can be used by everyone. Also, it is through scientific approaches that a form of a teabag can be developed. Furthermore, methods that guide on the duration and temperature at which it reaches its full flavour can be developed through scientific approaches. The latter would address the inconsistency caused by each person preparing the infusions their own ways as well as recommending varying doses.

Over harvesting is also another problem. Several plant species used as herbal medicines in the Limpopo Province are threatened with extinction from overharvesting due to popularity of the species in herbal medicine markets. Therefore, there is a need to educate traditional practitioners' regarding the significance of various conservation legislations in their traditional healing practices [23].

Commercialisation would encourage domestication and commercial cultivation of the plant. Importantly, it would ensure that typical nutrition information concerning the content of plant nutrients is provided and consumers would be warned against possible allergies, date and time for it to be consumed, and other information that would benefit consumers.This study reveals that local communities such as Bapedi people in the Limpopo Province, South Africa, still depend on traditional medicines for basic healthcare; and the use of traditional medicines is still an integral part of their socio-cultural life.

There is need, therefore, to educate local communities on the contemporary environmental legislation, at the same time emphasizing the need to retain traditional knowledge on medicinal plant utilization in the Limpopo Province, South Africa.

Author contributions

MM was involved in the conception, design, execution and drafting of the manuscript. SAK involved in the conception, design, interpretation of results and editing and proofreading of the manuscript.

Conflict of interest

The authors hereby declare no conflict of interest with regards publication of this work.

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