Potential therapeutic uses of *Moringa stenopetala*: a scoping review

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ABSTRACT

Anecdotal claims about the therapeutic “miracles” of the plant *Moringa stenopetala* to various human diseases are widespread in Ethiopia. However, there are no existing published systematic reviews to support or refute these assertions. This scoping review aimed to systematically examine and summarize the range and nature of the literature on potential and actual therapeutic uses of *M. stenopetala* in order to identify research gaps and inform researchers and policymakers. The scoping review used the methodological framework of Arksey & O’Malley for scoping reviews and recommendations by Levac and colleagues. We searched the Cochrane Library, PubMed, WorldCat, Epistemonikos, and Google Scholar. To ensure the search was as comprehensive as possible, we also searched grey literature sources such as OpenGrey. We included studies that attempted to evaluate the therapeutic value of *M. stenopetala* on any health outcome in any context. We excluded reports about the effects of *M. stenopetala* on non-human health and non-research reports. We screened 2,946 records and included 56 studies. We found antibacterial, antifungal, antiparasitic, antidiabetic, antioxidants, antihypertensive, anti-inflammatory and analgesic, antidyslipidemia, safety (toxicity, and teratogenic effects), anticancer and fertility studies. All except 4 studies reported the potential therapeutic effects of *M. stenopetala* on either one or more infections or ailments. Two studies reported the absence of antibacterial and antiparasitic activities and 2 studies reported safety concerns; 1 reported cytotoxic effect while the other reported the teratogenic effect of the plant at higher doses. No clinical trials were found. The review found that many claims accorded to *M. stenopetala* have scientific bases and that the plant has potential as a possible source of herbal medicinal products. Further studies on the toxicity of the plant, randomized trials, and pre-requisites for randomized trials such as good manufacturing practices should be addressed in the future to tap into the therapeutic potential of the plant.

Keywords: Moringa; Cabbage tree; Antihypertensive agents; Antifungal agents; Antioxidants; Phytotherapy
INTRODUCTION

*Moringa stenopetala* (Bak. f.) Cufod commonly known as Moringa belongs to a single genus of the family *Moringaceae* whose center of endemism is in northeast tropical Africa. The genus has 14 species in the tropics and subtropics.1 *M. stenopetala* is a tree indigenous to Ethiopia, Kenya, and Somalia. In Ethiopia it is known by different vernacular names: ‘Haleko’ in Gofa and Wolayta areas, ‘Shelagta’ in the Konso language, ‘Shiferaw’ in Amharic.2 *M. stenopetala* is cultivated in terraced fields, gardens, and small towns in Ethiopia, it also grows naturally in riverine and Acacia-Commiphora woodlands.2,3 It is cultivated mainly for its leaves which are boiled and eaten like cabbage (hence sometimes called ‘cabbage tree’) and is available for sale in local markets.2,4

Traditional claims to the uses of *M. stenopetala* are many and diverse ranging from serving as food for human consumption (cabbage), animal feed, and to a being medicinal plant for a range of human and animal diseases. Over 5 million people depend on *M. stenopetala* as a vegetable source in southern Ethiopia.5 The Turkana (a Nilotic) people native to the Turkana district in northwest Kenya take an infusion of the leaves orally as a remedy for leprosy. The Njemps, a tribe in the Rift Valley province in Kenya, chew the bark to relieve coughs and use bark extracts to accelerate the expulsion of the placenta in both humans and domestic animals. The Konso people (an ethnic group in south-central Ethiopia) use it to prevent colds and anemia; the Dimasa and Busije people in southern Ethiopia use it to relieve indigestion and for treating dysentery.3,5 Around Arba Minch, a town in southern Ethiopia, the decoction of leaflets and roots of *M. stenopetala* is used for treating malaria, diabetes, hypertension, asthma, common cold, wound, stomach problem, to expel retained placenta.6 Other uses of the plant among others include soil conservation, providing shade and acting as a windbreaker, fuelwood, fence material, and also serving as an ornamental tree.2

As a result of the medicinal and nutritional claims accorded to *M. stenopetala* and due to the positive preliminary results obtained from various scientific experiments the attention given to *M. stenopetala* by entrepreneurs,7 non-governmental organizations,8 academia,9,10 the mass media,11,12 civil societies,13 and policy makers14 has intensified. The Ethiopian government is providing funding for research and development of *M. stenopetala* for therapeutic usage. There are now sachets of *M. stenopetala* powder sold in supermarkets in Ethiopia as a purported treatment for hypertension, hypotension, poor circulation, headaches, excess cholesterol, intestinal parasites, gastritis, lung problems, asthma, and 300 other conditions. A similar claim is made about its sister plant, *Moringa oleifera*, a tree that is indigenous to India.16 There are now studies that report patients take *M. stenopetala* leaf powder for treating hypertension may be as a result of the attention given to this plant.17

To inform the public, donors, academia, policymakers, and other stakeholders and to make effective, judicious use of the available evidence regarding *M. stenopetala* and provide future research direction, the scientific evidence regarding the plant should be summarized, analyzed and presented in an easily accessible format.

METHODS

The scoping review used the methodological framework of Arksey & O’Malley for scoping reviews and recommendations on the framework by Levac and colleagues.19 A protocol was developed before the start of the review.
Ethics approval
Since this review involves collecting, reviewing, and summarizing data that is already in the public domain, it did not require ethics approval from an Institutional Review Board (IRB).

Identifying relevant studies
The following databases were searched to find relevant studies: the Cochrane Library, PubMed, WorldCat, Epistemonikos, and Google Scholar. To ensure the search is as comprehensive as possible, grey literature sources such as OpenGrey, databases of relevant organizations such as the World Health Organization (WHO), Food and Agricultural Organization (FAO), United Nations International Children’s Emergency Fund (UNICEF), and Addis Ababa University electronic library were included. There were no, language, publication type or date limits. A search string broad enough, M. stenopetala, was used in all databases not to miss any potentially relevant study. The first search was undertaken on 22nd October 2018; it was updated on 19th May 2020.

Study selection
Studies that attempt to evaluate the therapeutic potential of M. stenopetala on any human health outcome in any context were considered for inclusion. All types of experiments: studies on human subjects, animal models, and in vitro studies were included. Any form of plant preparation regardless of the type of extraction, type of solvents, doses, type of plant parts (leaf, root, bark, and wood) were included. All publications lacking scientific design and publications on non-human ailments and infections were excluded.

Two authors (MH and YG) independently screened the titles and abstracts of all search results and determined eligibility as determined by the inclusion criteria mentioned above. Full texts of all potentially eligible were retrieved. The first author did the screening of the full-text articles; the team was consulted whenever there is any doubt regarding the legitimacy of a study.

Data extraction
Relevant information from selected studies was extracted using a form developed by the team. The data collection form included the following information: author(s), year of publication, study location, aim(s) of study, study design, type and duration of intervention, type of comparator, study population, clinical setting, study population, and key findings as they relate to the scoping review question. Data were extracted by MH with a consultation with the team.

RESULTS
The search results and selection process are summarized in Fig. 1. The searches from all the databases yielded 2,946 records. After removing duplicates and screening the titles and abstracts we excluded 2,888 studies. Excluded studies comprised more duplicates that escaped the first screening of duplicates due to indexing differences, and studies which are beyond the scope of the scoping review like water clarification of M. stenopetala and agronomic studies of the plant. Full articles of 58 potentially eligible studies were retrieved for further screening; out of which 2 studies were excluded. Studies excluded and the reasons for excluding them are summarized in Table 1.20,21
Description of included studies

All included studies were carried between 1980 and 2020. The interest in *M. stenopetala* research has increased overtime especially since 2011. All studies were preclinical; animal or *in vitro* studies except one which was an observational study on humans. The majority of the studies were conducted on *M. stenopetala* collected from Ethiopia mainly from southern Ethiopia; only a few studies were from Kenya and one from Sudan.

Scope of included studies

The range of experiments on potential therapeutic uses of *M. stenopetala* includes antibacterial, antifungal, antiparasitic, antidiabetic, antioxidants, antihypertensive (diuretic), anti-inflammatory and analgesic, antidyslipidemia, safety (toxicity), anticancer, teratogenic and fertility studies. The overwhelming majority of studies were conducted on the leaves.

Studies on antibacterial and antifungal activities

Twelve studies have reported *in vitro* antimicrobial and antifungal activity of *M. stenopetala* on common human pathogens. Various extracts were used from different parts of the plant.
Table 2. Summary of studies on antibacterial and antifungal activities of M. stenopetala

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Extract</th>
<th>Pathogen</th>
<th>Main finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walter et al.</td>
<td>2011</td>
<td>Methanol and n-hexane extracts of seeds</td>
<td>S. typhi, V. cholerae, and E. coli</td>
<td>For methanol extract, the highest inhibitions were observed on E. coli, S. typhi, and V. cholerae respectively; while for n-hexane extract, a higher inhibition was seen on S. typhi than on V. cholerae and E. coli.</td>
</tr>
<tr>
<td>Eliit et al.</td>
<td>2005</td>
<td>Methanolic and aqueous extracts of bark and leaf</td>
<td>S. aureus, S. agalactiae, and S. dysgalactiae</td>
<td>Both extracts have potent microbial growth inhibition effects.</td>
</tr>
<tr>
<td>Mitiku and Yilma</td>
<td>2017</td>
<td>Silver nanoparticles from aqueous extract of leaves</td>
<td>E. coli and S. aureus</td>
<td>Synthesized nanoparticles from aqueous extract have antibacterial activity.</td>
</tr>
<tr>
<td>Chekesa and Mekonnen</td>
<td>2015</td>
<td>Leaves, stem bark, root bark and seed extracts of methanol, ethyl acetate, and chloroform</td>
<td>S. aureus, P. aeruginosa, E. coli, and S. boydii</td>
<td>S. aureus was found to be the most susceptible bacteria to crude 80% methanol extract of seeds, chloroform fraction, and ethyl acetate extract of root barks. P. aeruginosa was the most resistant bacteria to all crude extracts.</td>
</tr>
<tr>
<td>Eliert et al.</td>
<td>1981</td>
<td>Ethyl acetate fraction of the aqueous extract of seeds</td>
<td>Bacillus spp., Serratia spp., S. aureus, Mycobacterium spp., and fungi spp.</td>
<td>(a-L-Rhamnosyl)benzyl isothiocyanate was identified as an active antimicrobial agent form seed of M. oleifera and M. stenopetala. The compound acts on several bacteria and fungi.</td>
</tr>
<tr>
<td>Sahilu</td>
<td>2010</td>
<td>Crude water extract of seeds</td>
<td>E. coli, P. aeruginosa, S. boydii, S. aureus, and S. pneumoniae</td>
<td>The crude water extract of M. stenopetala has antibacterial activity.</td>
</tr>
<tr>
<td>Tesemma et al.</td>
<td>2013</td>
<td>Crude petroleum ether, chloroform, acetone, methanol, and water extracts of root wood</td>
<td>S. aureus, E. coli, P. aeruginosa, and S. typhimurium</td>
<td>M. stenopetala has antibacterial activity; acetone extract being the most active.</td>
</tr>
<tr>
<td>Raghavendra et al.</td>
<td>2016</td>
<td>Methanol extract of leaves</td>
<td>S. aureus and Bacillus subtilis, P. aeruginosa, E. coli and Ralstonia solanacearum</td>
<td>M. stenopetala has antimicrobial activity.</td>
</tr>
<tr>
<td>Manilal et al.</td>
<td>2020</td>
<td>Diethyl ether, ethyl acetate, methanol, and ethanolic extracts of leaves</td>
<td>Methicillin-resistant S. aureus</td>
<td>M. stenopetala exhibited significant antibacterial activity.</td>
</tr>
<tr>
<td>Seleshe and Kang</td>
<td>2019</td>
<td>Chloroform, methanol, ethanol and water extract of leaves</td>
<td>K. pneumoniae, B. cereus, S. pneumoniae, S. aureus, L. monocytogenes, E. coli, S. typhimurium, C. albicans, and A. niger</td>
<td>M. stenopetala leaves have great potential in the development of food preservatives and antibiotic drugs.</td>
</tr>
<tr>
<td>Adane et al.</td>
<td>2019</td>
<td>Petroleum ether, chloroform, and acetone extracts of root bark. The acetone crude extract was subjected to column chromatographic separation</td>
<td>S. aureus, E. coli, P. aeruginosa, and S. typhimurium</td>
<td>Four compounds: stigmastanol, ursoic acid, tasnemoxide, and oleic acid were isolated from acetone extracts of root barks of M. stenopetala. The compounds showed comparable antibacterial activities to each other.</td>
</tr>
</tbody>
</table>

All the studies (except one) have shown activities on target pathogens. Table 2 summarizes the main aspects of the studies.22-33

Studies on antidiabetic activities

Twelve studies reported on antidiabetic activities of M. stenopetala (Table 3).34-45 Ten of them were animal studies on either rabbits, mice, or rats while 2 were in vitro studies. All the studies were on leaf extracts, except one which also included seeds using various solvents. All the studies have reported favorable results on reducing blood sugar and other diabetic symptoms (Table 3).34-45

Studies on antioxidant activities

Seven in vitro studies reported on the antioxidant activity of M. stenopetala leaves. Only 1 study has besides evaluated extract of seeds. All the studies have demonstrated that M. stenopetala has antioxidant activity (Table 4).34,41,46-49

Studies on antiparasitic activities

Three in vivo studies and 4 in vitro studies and 3 both in vitro and in vivo study reported on the antiparasitic activities of M. stenopetala (Table 5).6,9,50-52 Seven of the studies used extracts of...
Kassaw et al.48 2016 Methanolic extract of leaves
Hydrogen peroxide radical scavenging assays
Ethyl acetate fraction of M. stenopetala treatment resulted in a significant reduction of fasting blood glucose level.

Awoke et al.34 2019 Methanol-water extract and ethyl acetate fractionate
DPPH, 2,2-diphenyl-1-picrylhydrazyl; ABTS, 2,2′-Azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) diammonium salt; AgNP, green synthesis of silver nanoparticle.

Toma et al.36 2015 Aqueous ethanol extract and n-butanol fraction
Both extracts possess antihyperglycemic effects and alleviate streptozotocin-induced pancreatic damage in diabetic rats.

Toma et al.37 2014 Hydroalcoholic extract
M. stenopetala has beneficial biochemical effects by inhibiting intestinal α-glucosidase, pancreatic cholesterol esterase, and pancreatic lipase activities. A daily supplement intake of the leaves of M. stenopetala may help in reducing hyperglycemia.

Mitiku and Yilma24 2017 Silver nanoparticles from leaves of M. stenopetala
and methanol extracts

W/kidan35 2017 Aqueous extract
Swiss albino rats
Repeated oral administration of M. stenopetala aqueous extract has beneficial effects on hyperglycemia.

Hagos et al.47 2018 Methanol and aqueous extracts of leaves
Hydrogen peroxide radical scavenging assay
M. stenopetala is a promising source of natural antioxidants.

Mitiku and Yilma24 2017 Silver nanoparticles from leaves of M. stenopetala

Hagos et al.47 2018 Methanol and aqueous extracts of leaves

Dadi et al.46 2018 Different drying methods followed by 50% and 70% ethanol extraction; and 100% aqueous extraction of leaves

Table 3. Summary of studies on antioxidative activities of M. stenopetala

Table 4. Summary of studies on antioxidative activity of M. stenopetala

Table 5. Summary of studies on antiparasitic activities of M. stenopetala

leaves while 2 studies used roots and 1 study used the essential oil of seeds. All the studies reported that M. stenopetala has antiparasitic activities except one study which reported that the column fraction of water extract of the root of M. stenopetala did not show antiparasitic activity on Plasmodium berghei (Table 5).4,9,30-57

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Studies on antihypertensive activities

Five studies using leaf extracts of different solvents and tea infusion of the leaves have demonstrated the potential of *M. stenopetala* in lowering blood pressure. Four of the studies, 3 were *in vivo* studies one was an *in vitro* study. The mechanisms of lowering blood pressure include a diuretic, natriuretic, kaliuretic, and vasodilatory effects (Table 6).\(^{11,58-61}\)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Extract (other preparation of plant)</th>
<th>Lab animal</th>
<th>Main finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mengistu et al.(^a)</td>
<td>2012</td>
<td>Aqueous crude leaf extract</td>
<td>Guinea pigs for the <em>in vivo</em> study and descending thoracic aorta for the <em>in vitro</em> study</td>
<td><em>M. stenopetala</em> has blood pressure-lowering effect.</td>
</tr>
<tr>
<td>Geleta et al.(^a)</td>
<td>2016</td>
<td>Aqueous and 70% ethanol extracts of leaves</td>
<td>Wistar rats</td>
<td>Both extracts prevented blood pressure increment significantly compared to the standard drug.</td>
</tr>
<tr>
<td>Fekadu et al.(^a)</td>
<td>2017</td>
<td>Aqueous crude extract and hot tea infusion of leaves</td>
<td>Wistar rats</td>
<td>Both the aqueous crude extract as well as the hot tea infusion of the leaves possess significant ((P &lt; 0.01)) diuretic, natriuretic, and kaliuretic effects. The aqueous crude extract (125 mg/kg) and hot tea infusion (2 tsp) displayed the highest diuretic activity (100%) and 96%, respectively compared to the reference drug, furosemide (10 mg/kg).</td>
</tr>
<tr>
<td>Geleta et al.(^a)</td>
<td>2016</td>
<td>Aqueous crude, 70% ethanol crude, aqeous fraction of aqueous crude, ethyl acetate fraction of aqueous crude extracts of leaves</td>
<td>in vitro (thoracic aortic ring of a guinea pig)</td>
<td>All extracts showed a relaxant (vasodilatory) effect in pre-contracted isolated whole, spirally cut thoracic aortic strips of guinea pigs in a dose-dependent manner.</td>
</tr>
<tr>
<td>Geleta et al.(^a)</td>
<td>2015</td>
<td>Hydro-ethanol extract of leaves</td>
<td>Swiss albino mice</td>
<td>The crude hydro-ethanolic extract of <em>M. stenopetala</em> leaves possesses a diuretic activity in mice model of diuresis.</td>
</tr>
</tbody>
</table>

**Studies on analgesic and anti-inflammatory activities**

Two *in vivo* and one *in vitro* studies on the leaf extract of *M. stenopetala* leaves have shown that the plant has an analgesic and anti-inflammatory potential (Table 7).\(^{62-64}\)

**Studies on antidyslipidemia activities**

Two *in vivo* and 1 *in vitro* studies (Table 8) have reported on antidyslipidemia activities of *M. stenopetala* leaf extracts.\(^{21,36,37}\) All the extracts have shown positive results in improving lipid profiles.
Studies on anticancer activities
There was only one study on the anticancer potential of *M. stenopetala*.65 The study aimed at identifying potential anticancer agents from the seeds. Water extract of the seeds after defatting by hexane demonstrated cytotoxic activity against the liver hepatocellular HepG2a (human liver cancer cell line) and SH-SY5Y neuroblastoma cells. Subsequent analysis of the extract yielded the principal active constituent glucomoringin isothiocyanate or moringin (4α-L-rhamnosyloxy-benzyl isothiocyanate).

Studies on thyroid function
A single cross-sectional observational study66 has evaluated whether consumption of *M. stenopetala* and cassava affect the thyroid function of pregnant women as measured by thyroid-stimulating hormone (TSH), thyroxine (T4), and triiodothyronine (T3). The results did not show any significant difference between the 2 groups.

Studies on the antifertility activity
The antifertility test was carried using ethanol extract of the leaves in Swiss albino mice showing a 73.3% antifertility effect compared to a control group.6

Safety and toxicity studies
Eight *in vivo* studies and 1 *in vitro* study reported on the safety and toxicity of *M. stenopetala*. Six of the studies were on leaf extracts, and one was on seed and the other one was on leaf, root, and seed of *M. stenopetala*. Two studies have reported safety concerns while the rest of the studies have reported the absence of toxic effects (Table 9).38,67-74

DISCUSSION

Except for 2 experiments which were conducted to see the antibacterial effect of ethanol extract of leaves on pathogenic bacteria27 and the antiparasitic effect of column fractions of water extract of roots on *P. berghei*55 which reported no antibacterial and antiparasitic effects and 2 studies70,74 on the safety of the plant, all the studies have reported that *M. stenopetala* has favorable effects on various pathogens and ailments. Some of the traditional claims4-6
of the medicinal uses of *M. stenopetala* more or less were supported by the studies. The antimalarial, anti-diabetic, antibacterial (dysentery, wound healing, leprosy, cough, and antihypertension claims were proved in the laboratories. The traditional use of the plant to expel the placenta both in humans and animals is supported by the study whereby the leaf extract showed some oxytocic activity on uterus strips of guinea-pigs and mice. On the other hand, regardless of the favorable reports of the majority of studies, a study has raised concerns on the safety of *M. stenopetala* leaves and seeds when extracted with ethanol which contained toxic substances which may be extractable with organic solvents or formed during the process of extraction with these solvents.

A recent study on methanol extract of the leaves has also signaled the need for more safety studies on *M. stenopetala*. Besides, this scoping review has shown that all the studies on *M. stenopetala* are preclinical; and the information circulating in the media and on sachets containing powdered *M. stenopetala* in supermarkets in the country that *M. stenopetala* can cure 300 diseases should be taken with great caution as it could mislead the consumer by imparting unwarranted confidence to use the plant substituting prescribed drugs. The concomitant use of the plant with prescribed drugs has already been reported.
From the traditional uses and claims and preclinical evidence, the potential of *M. stenopetala* as a herbal medicine for a variety of infections and ailments is very high. In addition to the favorable results from crude extracts (Tables 2-6), the identification of moringin (4-[α-L-rhamnosylxy]-benzy isothiocyanate) from the seeds of the plant,\textsuperscript{65} a phytochemical reported to have a chemoprotective effect against cancer, together with the isolation of rutin, a bioflavonoid, with antioxidant and anti-inflammatory properties,\textsuperscript{41,75} buttresses the evidence on the potential usefulness of the plant. However, without clinical studies to evaluate the actual benefits and risks, the potential of *M. stenopetala* will remain untapped.

According to United Nations Development Programme (UNDP)/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR),\textsuperscript{76} there is a need for clear recommendations regarding data required to support clinical trials in which herbal medicines are evaluated for treatments. Pre-requisites for conducting a clinical trial of a conventional drug involves 4 sets of issues: chemical-manufacturing control (CMC) issues, non-clinical issues, clinical-issues, and ethical issues. Based on these criteria, but adapted to the particular case of traditional medicines clinical trial of herbal products is supported by international organizations.\textsuperscript{76} According to the aforementioned reference, a guidance titled ‘operational guidance: Information needed to support clinical trials of herbal products’,\textsuperscript{76} spells out the requirements to be fulfilled to conduct a clinical trial for a herbal product vis-a-vis the requirements for a clinical trial of a conventional drug. Accordingly, a clinical trial of *M. stenopetala* for a particular disease (or diseases) has a long way to go as the studies so far have not generated enough data that are pre-requisites for a clinical trial such as the absence of CMC evidence which is similar for a conventional drug: analysis of 1 or more hypothesized active ingredients for different diseases and ailments (unlike the analysis of the active pharmaceutical ingredients of a conventional drug), specifications, storage conditions, information on ‘Good Agricultural Practices’, information on Good Manufacturing Practices, etc. Besides, the safety issues raised by studies,\textsuperscript{70,74} the pre-requisites for the clinical trial have to be addressed before contemplating clinical trials.

*M. oleifera* indigenous to sub Himalayan regions of India, Pakistan, Asia Minor, Africa, and Arabia and cultivated in many tropical countries is also known for its multipurpose uses including medication for a variety of ailments like that of *M. stenopetala*.\textsuperscript{16,41} These similarities of the 2 sister plants further substantiate the potential of *M. stenopetala* as a therapeutic plant.

This review has summarized what is known and what is unknown about *M. stenopetala*, which is getting a great deal of attention as a medicinal plant for many ailments. Though the plant is a very promising candidate as a possible source of therapeutic herbal products the claims on mass media as ‘a miracle plant’ which could cure 300 diseases is wrong without the evidence from clinical studies. The review has found that traditional claims accorded to *M. stenopetala* have a scientific basis and as a result has shown that the plant has great potential as a possible source of herbal medicinal products. Further studies on the safety of the plant, high-quality evidence studies such as randomized controlled studies, and pre-requisites for clinical trials such as good manufacturing practices should be addressed in the future to tap into the therapeutic potential of the plant. Studies on the plant should be coordinated in such a way that they address the gaps to support clinical trials, instead of repeating random studies. This review could help researchers as a quick reference source. Funding agencies could use this review as a source material to select proposals for funding, which is to support studies that add value to what is already known, not studies which are repetitions. The mass media should try to look for the best available evidence (such as this review) before disseminating
unfounded information. The public should be aware that though *M. stenopetala* has a lot of potential as a therapeutic source for a lot of ailments there is no evidence supported by clinical trials. Without a national coordinating body on the development of *M. stenopetala*, to support its therapeutic, nutritional, and economic potential with scientific evidence the potential of the plant could remain untapped for the foreseeable future. Neighboring countries in the horn of Africa, where *M. stenopetala* is endemic could also benefit from this study.

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