Medicinal plants used for management of hemorrhoids in Ethiopia: A systematic review

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ABSTRACT

Background: Hemorrhoids have been reported to beset human beings since the earliest history of mankind. Utilization of herbal medicines is ever increasing as the demand for natural remedies is growing. In Ethiopia, many patients commonly use herbal medicines for hemorrhoids management despite lack of organized information at country level. This systematic review was aimed to document reports about utilization of medicinal plants for hemorrhoids management in Ethiopia.

Method: A web-based systematic literature search was carried out through electronic databases like PubMed, Google Scholar, Web of Sciences, Science Direct, and websites of different organizations. All studies with complete ethnobotanical information were included in this review without regard to methodology and publication year.

Results: A total of 23 articles were included in this systematic review. Majority (41.7%) of studies were reported from Oromia region followed by Amhara (33.3%) regional state. A total of 50 medicinal plants have been reported where Fabaceae and Solanaceae represent the most commonly used families. Herbs were the most (38%) commonly used medicinal plants followed by shrubs (34%) and trees (26%). Leaf (44%) and root (24%) were the first and second most commonly used plant parts, respectively. Most of the medicinal remedies (36%) were prepared by pounding the fresh part of the plant. Besides, 56.1% of the herbal preparations were administered through topical route.

Conclusion and recommendations: Numerous medicinal plants from various families have been documented in this review as anti-hemorrhoidal remedies. Further studies could be anticipated in the search for new, effective, and safe plant-based medications from medicinal plants discussed in this review.

1. Introduction

Hemorrhoids are very common anorectal conditions defined as symptomatic swelling and distal displacement of the natural anal cushions, and they are a fairly frequent anorectal disease. As a disease entity, hemorrhoids have been reported to beset human beings since the earliest history of mankind. Hemorrhoids are a common disease in adults; more than half of men and women over the age of 50 may experience hemorrhoid symptoms at some point in their lives [1, 2]. According to a study done at Ayder Referral Hospital, internal hemorrhoids was the third most common (7.5%) colonoscopic finding [3]. Another study conducted at University of Gondar comprehensive specialized hospital showed that 13.1% of adult patients who visited the surgical outpatient department had hemorrhoids [4]. Abdissa et al. [5] also showed that constipation due to hemorrhoids was responsible for one-fourth (24.4%) of the patients in the obstetric ward of Jimma University medical center to seek nursing cares.

Hemorrhoids are generally classified on the basis of their location and degree of prolapse. Based on location, hemorrhoids may be either internal, external, or mixed [2, 6]. Goligher’s classification is commonly used grading system of Hemorrhoids which categorizes the disease based...
on the degree of prolapse as Grade I to Grade IV [7, 8]. The symptoms of hemorrhoids depend on their type, and in most cases will resolve within a few days. Unlike external hemorrhoids, internal hemorrhoids are rarely uncomfortable until they become thrombosed or necrotic [9]. Patients with hemorrhoids often complain of bleeding during or after defecation, frequently exacerbated by straining. Bleeding, is more commonly associated with internal hemorrhoids [2].

Treatment of hemorrhoids includes dietary and lifestyle modification, pharmacological treatment and surgical interventions, depending on the intensity and extent of the symptoms. Conservative treatment options are required to improve symptoms and prevent progression to higher degrees and complications. An operation is indicated when non-operative approaches have failed or complications have occurred [2, 8]. Topical agents like creams, lotions, and suppositories, which contain various ingredients (local anesthetics, corticosteroids, antibiotics, and anti-inflammatory drugs) have been employed for hemorrhoids management [8]. Although these agents help in improving symptoms, strong evidences supporting their true efficacy are lacking [2, 9].

Currently, herbal medicines are becoming the major alternatives for management of different diseases. Nearly 90% of Ethiopians depend on traditional medicine, mainly herbal medicine, for managing their illnesses [10]. Hemorrhoids was reported as the fourth most commonly treated disease by traditional healers in Addis Ababa, Ethiopia [11]. The aim of this systematic review was; therefore, to organize and document reports about management of hemorrhoids with herbal medicines in Ethiopia.

2. Methods

2.1. Review protocol

The commonly used flow diagram, Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), was followed for identification, eligibility screening, and selection of articles for this review [12].

2.2. Search strategy

The literature search was conducted from September 29, 2021 to October 20, 2021 by two authors independently using electronic databases like PubMed (Medline), Google Scholar, Web of Sciences, Scopus, and Science Direct. Besides, official websites of different organizations and universities were also accessed. Both published and unpublished articles written in English language were considered without restriction to year of publication.

Hemorrhoids, haemorrhoids, hemorrhoid disease, medicinal plant, herbal medicine, traditional medicine, folk medicine, ethnomedicine, ethnobotany, ethnopharmacology, home remedy, and Ethiopia were the search terms used. These terms were used in an advanced PubMed search to widen the search that included all fields [All fields] in records as well as Medical Subject Headings [MeSH] terms. Furthermore, Boolean operators (AND, OR) were appropriately employed for identifying research papers to be included in this review. The searching detail used for advanced search was as:

"hemorrhoids" [MeSH] OR "haemorrhoids" [MeSH] OR "hemorrhoid disease" [MeSH] AND "medicinal plant" [All fields] OR "herbal medicine" [All fields] OR "traditional medicine" [All fields] OR "folk medicine" [All fields] OR "ethnomedicine" [All fields] OR "home remedy" [All fields] OR "ethnopharmacology" [All fields] AND "Ethiopia" [All fields].

2.3. Eligibility criteria

2.3.1. Inclusion criteria

All prospective and retrospective observational studies (cross-sectional, case controls, and cohort) articles conducted in any parts of Ethiopia and written only in English language were included as long as they reported the utilization of plant-based medications for management of hemorrhoids. Both published articles and unpublished research works were considered.
### Table 1. Characteristics of the studies included in this systematic review.

| Author & Reference | Publication year | Study area | Subjects | Study design | Sample size | Sampling technique |
|--------------------|------------------|------------|----------|--------------|-------------|--------------------|
| Teklay et al. [14] | 2013             | Kilte Awulaelo District, Tigray region | traditional healers and individuals with traditional medicine knowledge | cross-sectional survey | 72 | Purposive |
| Amsalu et al. [15] | 2018             | Gozamin Wereda, Amhara Region | traditional healers and individuals with traditional medicine knowledge | cross-sectional survey, reconnaissance survey | 100 | Purposive |
| Mazengia et al. [16] | 2019            | Rural Bahir Dar kebeles, Amhara region | individuals with traditional medicine knowledge | cross-sectional survey | 72 | Purposive |
| Giday et al. [17] | 2007             | Dibatie (Benishangul-Gumuz region and Guangua) (Amhara Region) | traditional healers and individuals with traditional medicine knowledge | cross-sectional survey | 38 | Purposive |
| Gijan and Dalle [18] | 2019            | Arsi Negelle District, Oromia Region | traditional healers and individuals with traditional medicine knowledge | cross-sectional survey | 90 | Purposive + SRS |
| Misha et al. [19] | 2014             | Arsi Negelle district, Oromia Region | residents of shopa bultum kebele | cross-sectional survey | 151 | Systematic random sampling technique |
| Regassa [20] | 2013             | Hawassa city, SNNPR Region | Key informants (40) and other inhabitants (100) | cross-sectional survey | 140 | Purposive + SRS |
| Yineger et al. [21] | 2008             | Bale Mountains National Park, Oromia Region | traditional healers | cross-sectional survey | 43 | Purposive |
| Wuletaw [22] | 2020             | Simada District, Amhara Region | Key informants (24) and other inhabitants (136) | Reconnaissance survey, cross-sectional survey | 160 | Purposive + SRS |
| Mesfin et al. [23] | 2014             | Amaro Woreda, SNNPR Region | traditional medicinal practitioners | cross-sectional survey | 17 | Purposive |
| Amuamuta et al. [24] | 2015            | Zegie Peninsula, Amhara Region | traditional healers (7) and traditional medicine users (10) | In-depth interview | 17 | Purposive |
| Abebe [25] | 2011             | Debark District, Amhara Region | Key informants (24) and other inhabitants (60) | Reconnaissance survey, cross-sectional survey | 84 | Purposive + SRS |
| Teklehaimanot et al. [26] | 2007   | Debre Libanos Monastery, Oromia Region | Villagers, monks, and nuns | cross-sectional survey | 250 | SRS |
| Tadesse et al. [27] | 2018             | Guduru District, Oromia Region | Key informants (21) and other inhabitants (71) | cross-sectional survey | 92 | Purposive + SRS |
| Jima and Megersa [28] | 2018            | Berbere District, Oromia Region | Key informants (20) and other inhabitants (40) | Reconnaissance survey, cross-sectional survey | 60 | Purposive + SRS |
| Birhanu and Ayalew [29] | 2018      | Robe town, Oromia Region | traditional healers | Descriptive survey | 30 | Purposive |
| Limenih et al. [30] | 2015             | Dega Damot District, Amhara Region | traditional healers (20) and other inhabitants (50) | community based cross-sectional descriptive study | 70 | Purposive |
| Hundera [31] | 2017             | Kondala District, Oromia Region | traditional healers (20) and other inhabitants (29) | cross-sectional survey | 49 | Purposive + SRS |
| Tewelde et al. [32] | 2017             | Laelay Adi-yabo District, Tigray region | traditional healers | cross-sectional survey | 20 | Purposive |
| Sina & Degu [33] | 2015             | Hula District, SNNPR | Inhabitants with knowledge on wild edible plants | cross-sectional survey | 120 | Purposive |
| Gari et al. [34] | 2015             | Burka Jato Kebele, Nekemte town, Oromia Region | All inhabitants | descriptive cross-sectional study | 282 | Systematic random sampling |
| Taha & Shinekitt [35] | 2020            | Debre Markos Town, Amhara District | Herbalists (17), herbal medicine users (10), healthcare professionals (4) | cross-sectional survey | 29 | purposive and snowball |
| Kassa et al. [36] | 2016             | Ejere District, Oromia Region | Key informants and inhabitants | Reconnaissance survey, cross-sectional survey | 156 | Purposive and SRS |

SRS: simple random sampling.

### 2.3.2. Exclusion criteria

Those studies did not report our variables of interest and with incomplete ethnobotanical information (part of the plant used, method of preparation, and mode of application), and where the full text cannot be accessed were excluded from this systematic review.

### 2.4. Evaluation of articles quality

The quality of each article was evaluated by using a 14-points checklist recommended by Kmet et al. [13]. ‘High quality’ was considered when a given article has score of greater than and equal to 70%. A score between 69 and 51% and less than or equal to 50% were considered “moderate quality” and “poor quality”, respectively. Each article was scored by two authors individually and the mean score of the results was used. Fortunately, no study was excluded due to inferior quality as all articles scored greater than 50%.

### 2.5. Data extraction and analysis

A clear data extraction tool was prepared by the authors, with Microsoft Excel 2019, to collect all the required data from selected articles. Data related to characteristics of the articles such as authors’ information, year of publication, sampling technique, sample size, study subjects, study area, study period, and study design were extracted.
Ethnobotanical information (name and family of medicinal plant, parts used, method of preparation, and mode of administration) were also extracted. The data extraction was carried out by two authors (MG and DA) independently. When disagreement was encountered by the two authors, a third author (BK) was delegated to extract the data. Microsoft Excel 2019 was used to analyze the regional distribution from which the medicinal plants are reported. Moreover, frequency and percentage of families, growth forms, plant parts used, methods of preparation, and modes of administration were calculated. The results were depicted in charts and tables.

3. Results

3.1. Characteristics of the studies included

A total of 254 articles were found from enlisted research databases through advanced search (Figure 1). Moreover, ten articles were identified from websites of different organizations. After duplicates are removed, 28 articles were assessed for eligibility.

Finally, 23 (20 published and 3 unpublished) studies listed in Table 1 were found eligible and included in this review. Purposive sampling technique was employed in most (56.52%) of the studies. Mixed sampling technique (purposive and simple random sampling) was followed by 30.43% of the studies whereas simple random sampling was used by 26.09% studies. Traditional healers were taken as study subjects in 10 (43.48%) studies. Moreover, individuals with herbal medicine knowledge and residents of the study area were involved in 50% and 45.83% of the studies, respectively. Healthcare professionals were, on the other hand, interviewed only in a single study.

3.2. Regional distribution of medicinal plants

The studies included in this systematic review were conducted in five regions of Ethiopia out of the nine regional states and two city administrations. Highest proportion of the studies were reported from Oromia Region (43.48%) followed by Amhara regional state (30.3%) (Figure 2).

3.3. Diversity of medicinal plants

In this systematic review, a total of 50 medicinal plants belonging to 33 families were reported to serve as hemorrhoids remedies. The Fabaceae and Solanaceae families were most commonly mentioned in this systematic review each enunciating four anti-hemorrhoidal plant species. Three plant species from each of Asteraceae, Euphorbiaceae, and Moraceae families were also reported. Two plant species from each of Asclepiadaceae, Cruciferaeae, Lamiaceae, Lamiaceae, Malvacceae, Oleaceae, Polygonaceae, Ranunculaceae, and Rosaceae families were reported. Olea europaea and Solanum incanum were the most frequently utilized anti-hemorrhoidal plant species where each plant is mentioned by three articles. On the other hand, two independent studies cited each of Achyranthes aspera, Aloe macrocarpa, Calotropis procera, Clematis hirsute, Croton macrostachyus, Ficus vasta, Rumex nervosus, and Plumbago zeylanica as hemorrhoids remedies (Table 2).

3.4. Growth habits and parts used

Majority (38%) of the medicinal plants were herbs followed by shrub (34%) and tree (26%). As illustrated in Figure 3, the leaves of the medicinal plants were the most widely utilized therapeutic part (42%) followed by the root (20%).

3.5. Method of preparation and mode of administration

In this systematic review, majority (36%) of the remedies were directly pounded from fresh medicinal plants and applied directly on the hemorrhoids. Remedies were also prepared by pulverizing with water (20%), mixing the pounded plant material with tea (4%), milk (4%), honey (4%), butter (2%), olive oil (2%), coconut oil (2%), or cooked with meat (2%). Fermentation of plant part along with Aframomum koratima (2%) was also reported as method of preparation. Some (10%) medicinal plants are slightly heated and placed on the hemorrhoids while it is hot. Utilization of oils extracted from plant parts as hemorrhoids regimen was also reported by some studies (4%). Most (56.1%) herbal medications are administered topically as illustrated by Figure 4. In most (92%) of the studies included in this review, the amount of herbal medicine used and the duration of administration was not clearly mentioned.

4. Discussion

Medicinal plants have long been used in the maintenance of health through prevention and treatment of diseases, particularly for chronic disease [38]. It is reported that hemorrhoids is the fourth most commonly treated disease by traditional healers in Addis Ababa [11]. Herbal medications are an important part of alternative medicine, and they are getting more popular as people seek natural solutions in today’s society [39]. Plant-based medicines are reported to improve hemorrhoids symptoms such as pain, bleeding, and itching. They also reduce the occurrence of rectal prolapse and the number of hemorrhoidal cushions, and fasten wound healing. Different mechanisms of action including anti-inflammatory, anti-nociceptive, venotoxic, venoprotective, and stool softening activities are reported by different authors [40, 41].

In this systematic review, fifty medicinal plants from 33 families were summarized as anti-hemorrhoidal agents utilized by traditional medical practitioners and local inhabitants of various regions of Ethiopia. The diversified families of medicinal plants used for hemorrhoids management in Ethiopia is not surprising as the country is home to about 6500 species of plants. A considerable proportion (12%) of these plants are also endemic to Ethiopia which makes the country among the six most diverse floristic regions of the earth [42]. Moreover, Ethiopia is known to have longstanding history as a nation and is home to numerous languages, religions, beliefs, and cultures which in turn can contribute to diverse knowledge including utilization of several herbal medicines [30, 43, 44].

In this systematic review, the Fabaceae and Solanaceae families were by far the most widely used to treat hemorrhoids. This finding was consistent with a study conducted in Iran where Fabaceae was the most widely used family of medicinal plant for hemorrhoids management in traditional Persian medicine [45]. Euphorbiaceae, Lamiaceae, Malvacceae, Moraceae, Polygonaceae, Rosaceae, Scrophulariaceae, and Solanaceae were among plants used for hemorrhoids in Turkey consistent with findings of our study. However, Fabaceae and Solanaceae were not employed for hemorrhoids management in Turkey [46]. The discrepancies in the family and species of medicinal plants used might emanate from the availability of plants and differences in sociocultural experience among different populations. But it should not be misapprehended as
| S.No | Local name | Botanical name (Family) | Growth habit | Parts used | Method of preparation and administration | References |
|------|------------|-------------------------|--------------|------------|-----------------------------------------|------------|
| 1    | Seraw (T)  | Acacia ethbaica Schweinf. (Fabaceae) | Tree       | Stem       | The stem is heated slightly and placed topically | [14]       |
| 2    | Telenj (A) | Achyranthes aspera L. (Amaranthaceae) | Herb       | Root       | Fresh roots are pounded and applied into the anus | [15]       |
| 3    | Merenz (A) | Acokanthera schimpertii Schweinf. (Asteraceae) | Tree       | Leaf       | The leaf is pounded, squeezed and then creamed into the anus | [16]       |
| 4    | Qachaa (O) | Acrocomia sisalana Perrine (Agavaceae) | Shrub      | Leaf       | The leaves are crushed & mixed with water and taken orally | [18]       |
| 5    | Qaracee (A) | Allium sativum L. (Amaryllidaceae) | Tree       | Leaf & Root | The leaves & roots are crushed & mixed with water ½ cup of tea and taken orally | [18]       |
| 6    | Kulubiadi (O) | Allium sativum L. (Amaryllidaceae) | Bulb       | Flower     | Founded bulb is boiled with tea and drunk | [19]       |
| 7    | Hargissa (O) | Aloe ferox L. f. (Liliaceae) | Shrub      | Stem       | Concocted, crushed, powdered stem is mixed with olive oil and applied topically | [21]       |
| 8    | Hargresa (K) | Aloe plicatilis Berger. (Xanthorrhoeaceae) | Shrub     | Leaf       | Shade-dried leaves are mixed with coconut oil and applied topically | [23]       |
| 9    | Abalo (A)  | Broussonetia papyrifera J.F. Mill. (Simaroubaceae) | Tree       | Fruit or leaf | Fruit or leaf powder mixed with milk is taken orally for three days | [24]       |
| 10   | Qimbo (A)  | Calotropis procera (Aiton) Dryand. (Asclepiadaceae) | Shrub      | Leaf       | The affected area is covered by latex of young leaf and repeating every 2 days until recovery | [25]       |
| 11   | Hitawaa (T) | Calyptrum aureum (Ait.) Benth. (Fabaceae) | Tree       | Seed       | Ground seeds are mixed with honey and milk, and eaten | [14]       |
| 12   | Yeazo hareg (A) | Clerodendrum hirsutum Perr. & Guill. (Rutaceae) | Climber    | Leaf       | Aqueous paste is dressed topically | [26]       |
| 13   | Fiyele feje (A) | Clutia lansloana Forsk. (Euphorbiaceae) | Shrub      | Fruit      | The leaf is crushed, powdered, homogenized with water and one glass is taken continuously and with leaf, caster push inwards through the anal | [22]       |
| 14   | Bakkania (O) | Croton macrostachyus Hochst. (Euphorbiaceae) | Tree       | Bark       | bark is crushed and cooked with meat then 1 to 2 spoon soup is taken orally | [27, 28]   |
| 15   | Yemidir embuay (A) | Cucumis prophetorum L. (Cucurbitaceae) | Herb      | Root       | The boiled root is applied on topically | [29]       |
| 16   | Maxannnee (O) | Cyphostegia lanceolata Forsk. (Boraginaceae) | Herb      | Leaf & Root | The leaves & roots are crushed & mixed with water and applied topically | [18]       |
| 17   | Astemagir (Leffil) (A) | Datura stramonium L. (Solanaceae) | Herb      | Leaf       | The leaf is applied topically | [17]       |
| 18   | Mararoo (O) | Discopodium penniverrucum Hochst. (Solanaceae) | Shrub      | Leaf       | The leaves are crushed & mixed with water and applied topically | [18]       |
| 19   | Kikitta (A) | Dodonaea angustifolia L. f. (Sapindaceae) | Tree       | Root       | Dry root powder mixed with butter is applied topically | [37]       |
| 20   | Dander (T) Kerbericho (A) | Echinops kebericho Mesfin (Asclepiadaceae) | Shrub      | Stem       | A slightly heated stem is applied topically while it is hot | [14]       |
| 21   | Qulwqal (A), Hasami (O) | Euphorbia abysinica J.F.Gmel. (Euphorbiaceae) | Tree       | Bark or leaf | Crushed leaves or bark mixed with water are used as a rubbing and dressing. | [19, 22, 23] |
|      |             |                         |            |            | Latex Fresh latex is collected and applied topically | [28, 30]   |
| 22   | Kinchib (T) | Euphorbia tirucalli L. (Euphorbiaceae) | Shrub      | Latex      | Latex is applied topically | [14]       |
| 23   | Odaa (O)    | Ficus sycomorus L. (Moraceae) | Shrub      | Bark       | Bark grinded & mixed with fresh butter is applied topically | [31]       |
| 24   | Beles (T)   | Ficus palmata Forsk. (Moraceae) | Shrub      | Latex      | The latex is smeared on the affected site until cure | [32]       |
| 25   | Warka (A)   | Ficus vasa Forsk. (Moraceae) | Tree       | Fruit      | Its sap mixed with powdered root of Pterolobium stellatum are creamed and given anally | [27, 33]   |
| 26   | Akenshira (A) | Galinsoga parviflora Cav. (Asteraceae) | Herb      | Leaf       | The leaf is applied anally | [17]       |
| 27   | Tisaha dimu (T) | Gomphocarpus purpurascens A Rich. (Asclepiadaceae) | Herb      | Whole      | The plant is crushed and applied topically | [14]       |
|      |             |                         |            | Latex      | The latex is smeared on the affected site until cure | [32]       |
| 28   | Dhoqona (O) | Goodenia serrata Hochst. (Malvaceae) | Shrub      | Bark       | Crushed bark is mixed with water and applied topically | [18]       |
| 29   | Garaanbaa (O) | Hypericum quatinianum A.Rich. (Hypericaceae) | Shrub      | Leaf       | Crushed leaves are mixed with water and taken orally | [18]       |
| 30   | Bosuqee (O) | Kalanchoe densiflora A. Rich. (Crassulaceae) | Herb       | Stem      | Fresh stem is heated slightly and applied into the anus | [34]       |
| 31   | Andahula (A) | Kalanchoe lancelata (Forsk.) Pers. (Crassulaceae) | Herb      | Root      | The diseased part is rubbed with pounded root | [35]       |
| 32   | Shimfia (T) | Lepidium sativum L. (Brassicaceae) | Herb      | Seed      | A slightly heated seed is applied topically while it is hot | [14]       |
| 33   | Appilii (O) | Malus sylvestris (L.) Mill. (Rosaceae) | Tree       | Fruit     | Its fruit is eaten | [19]       |

(continued on next page)
Plants belonging to different families may possess similar phytochemicals which have anti-hemorrhoidal activity. Herbs were the most (38%) commonly used medicinal plants followed by shrubs (34%) and trees (26%). Different scholars also reported herbs and shrubs as the most commonly used growth habits for management of various human and animal ailments. This could be considered a positive practice in terms of plant conservation because herbs and shrubs take shorter time to grow and require small garden for cultivation as a positive practice in terms of plant conservation because herbs and shrubs are easily renewed and they are harvested easily without bearing threat to the plant [14]. However, the fact that some plants shed their leaves during the dry seasons may pose difficulty in harvesting particularly if wild sources are used [28, 43, 47]. Leaves and roots represent the first (42%) and second (20%) most widely utilized plant parts for hemorrhoids management in our review. Numerous ethnobotanical research conducted in different parts of Ethiopia revealed that the leaf is the most often used plant part for herbal remedy formulation, followed by the root [15, 21, 48, 49]. Utilization of leaves for medicinal purpose can be considered as a good practice as they are easily renewed and they are harvested easily without bearing threat to the plant [14]. However, the fact that some plants shed their leaves during the dry seasons may pose difficulty in harvesting particularly if the fresh part is to be used for preparation. Moreover, harvesting leaves threatens medicinal plants as their removal hinders development of flowers and fruits/seeds from vegetative forms [48, 50]. Fresh roots can be easily harvested throughout the year as they remain underground even during the long dry seasons [47]. Over utilization of roots for preparation of medications along with environmental degradation due to farm land expansion and periodic droughts, however, may endanger medicinal plants [51]. The major (36%) means of preparation and administration of herbal remedies involves pounding the fresh medicinal plant parts and applying directly on the hemorrhoids. This could pose difficulty in accessing...
sufficient quantity of medicinal plant parts wherever they are required. The most commonly used growth forms, herbs, will particularly, not be found in the dry seasons unless they are cultivated in gardens [50]. In this review, most (56.1%) herbal medications were administered through topical route. This finding was in agreement with a previous report on Persian medicine for hemorrhoids where topical and oral routes comprised the first and second most common routes of administration [45]. However, the amount of herbal medicine used and the duration of administration was not clearly mentioned in most (92%) of the studies. Lack of homogeneity in dosage regimen among practitioners and consumers will probably lead to ineffective treatment or toxicity [52].

Ethiopia’s medicinal plants and related ethnobotanical knowledge are in great danger due to the current ecological and socio-economic changes; anti-hemorrhoidal medicinal plants will be no exception [53, 54]. Therefore, it is crucial to prioritize the protection of such medicinal plants by safeguarding their natural habitats and encouraging locals to grow them in their own gardens [55] (in situ conservation), and in cultivated areas (ex situ conservation), and transferring knowledge [56, 57]. Utilization of aerial parts of medicinal plants as long as they are found to contain the desired active components and safe handling techniques (such as good harvesting practices) also help prevent the deterioration and eventual extinction of therapeutic plants [38].

5. Limitations

The results of this systematic review should be interpreted with consideration of the following limitations. First of all, rarely used medicinal plants may not be reported due to recall bias, as all of the studies included in this review are cross-sectional. Moreover, these studies were reported from only five regions of the country. This will substantially underestimate the medicinal plant utilization practice of different societies with variety of culture found in other six regional states. This review also failed to summarize the dosage schedule of herbal medicines as it was not reported by most of the studies. However, this systematic review gives insight on the variety of medicinal plants used for hemorrhoids management. Hence, it will serve as source of information for scholars interested to conduct phytochemical and anti-hemorrhoidal activity studies on the plants discussed above.

6. Conclusion and recommendations

This systematic review compiles and documents a total of 50 medicinal plants which have been reported as remedies for hemorrhoids management in Ethiopia. Fabaceae and Solanaceae represent the most commonly used plant families. *Esphorbica abyssinica* was the most commonly reported (four citations) medicinal plant followed by *Olea europaea* and *Solanum incanum* (both with 3 citations). Leaf and root were the first and second most commonly used plant part for hemorrhoids management. Sound scientific evidence related to safety and efficacy of these medicinal plants are, however, lacking. Moreover, problems in ensuring quality and rational use are common in herbal medicine use. Further phytochemical, toxicological, and pharmacological studies could be sought in the search for new effective and safe plant-based medications from these medicinal plants.

Declarations

**Author contribution statement**

Melese Getachew; Dehnnet Abebe: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

Anteneh Belayneh: Performed the experiments; Wrote the paper.

Bekalu Kebede: Analyzed and interpreted the data.

Yigardush Alliam: Performed the experiments.

Yalemgeta Biyazin: Contributed reagents, materials, analysis tools or data; Wrote the paper.

Abtie Abebaw: Contributed reagents, materials, analysis tools or data.

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**Data availability statement**

Data will be made available on request.

**Declaration of interests statement**

The authors declare no conflict of interest.

**Additional information**

No additional information is available for this paper.

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