



Research article

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

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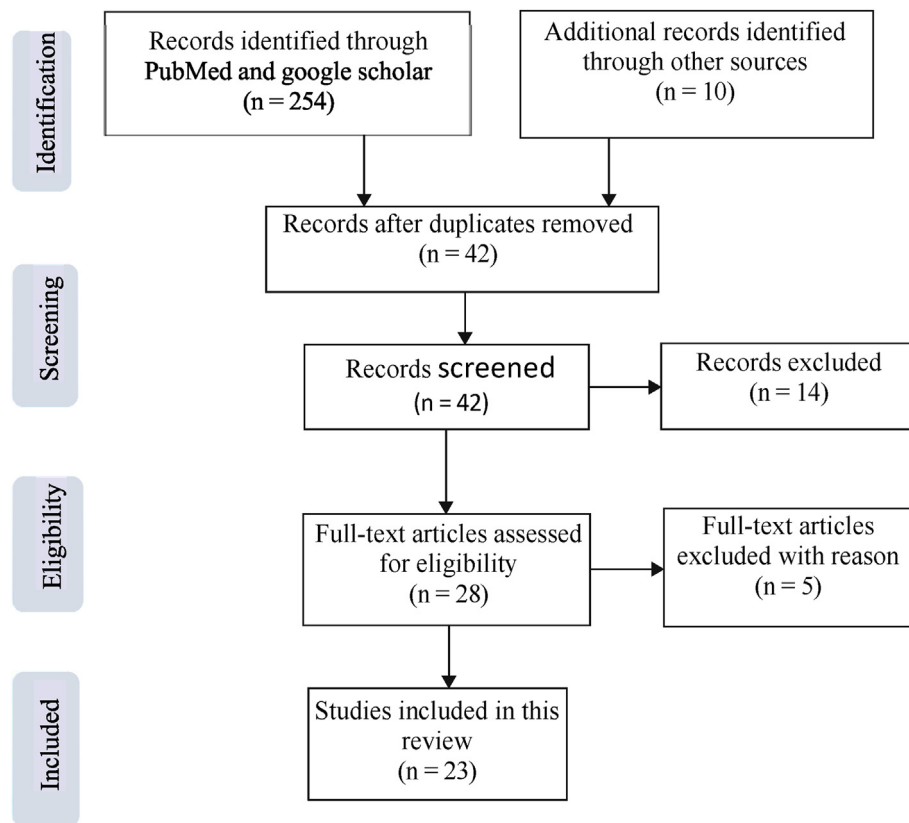


Figure 1. Flow diagram of articles searching, screening and selection process.

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	Reconnaissance survey, cross-sectional 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 practioners	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
Teklehaymanot 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
Limelih 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 & Shimekit [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 enclosing 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, Crassulaceae, Lamiaceae, Lamiaceae, Malvaceae, 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 korarima* (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, venotonic, 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, Malvaceae, 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

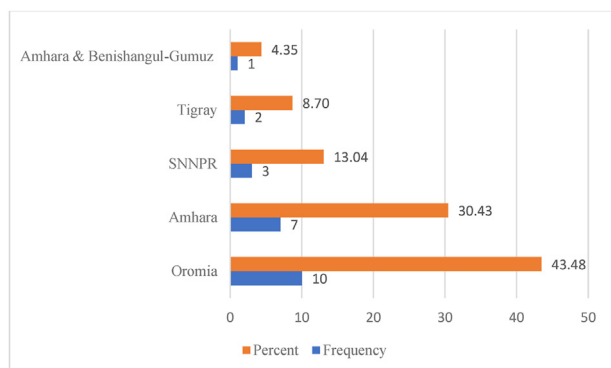


Figure 2. Regional distribution of the studies included in this systematic review.

Table 2. Medicinal plants used for management of hemorrhoids in Ethiopia.

S.No	Local name	Botanical name (Family)	Growth habit	Parts used	Method of preparation and administration	References
1	Seraw (T)	<i>Acacia etbaica</i> Schweinf (Fabaceae)	Tree	Stem	The stem is heated slightly and placed topically	[14]
2	Telenj (A)	<i>Achyranthes aspera</i> L. (Amaranthaceae)	Herb	Root	Fresh roots are pounded and applied into the anus	[15]
				Leaf	The leaf is pounded, squeezed and then creamed into the anus	[16]
3	Merenz (A)	<i>Acokanthera schimperi</i> Schweinf (Apocynaceae)	Tree	Leaf	The leaf is pounded and applied into the anus	[17]
4	Qachaa (O)	<i>Agave sisalana</i> Perrine (Agavaceae)	Shrub	Leaf	The leaves are crushed & mixed with water and taken orally	[18]
5	Qarceee (O)	<i>Albizia gummifera</i> (J.F.Gmel.) CA Sm. (Fabaceae)	Tree	Leaf & Root	The leaves & roots are crushed & mixed with water ½ cup of tea and taken orally	[18]
6	Kulubiadi (O)	<i>Allium sativum</i> Linn. (Alliaceae)	Bulb	Flower	Pounded bulb is boiled with tea and drunk	[19]
				Bulb	Dry or fresh is fermented with <i>Afromum korarima</i> , and one full spoon is taken orally	[20]
7	Hargissa (O) Wondie Eret (A)	<i>Aloe macrocarpa</i> Tod. (Aloaceae)	Shrub	Stem	Concocted, crushed, powdered stem is mixed with olive oil and applied topically	[21]
				Latex	Fresh latex is applied on the topically	[22]
8	Hargeesa (K)	<i>Aloe pirottae</i> Berger. (Xanthorrhoeaceae)	Shrub	Leaf	Shade-dried leaves are mixed with coconut oil and applied topically	[23]
9	Abalo (A)	<i>Brucea antidysenterica</i> 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)	<i>Calotropis procera</i> (Aiton) Dryand. (Asclepiadaceae)	Shrub	Leaf	The affected area is covered by latex of young leaf and repeating every 2 days until recovery	[25]
				Latex	Latex administered anally	[17]
11	Hitsawts (T)	<i>Calpurnia aurea</i> (Ait.) Benth. (Fabaceae)	Tree	Seed	Ground seeds are mixed with honey and milk, and eaten	[14]
12	Yeazo hareg (A)	<i>Clematis hirsute</i> Perr. & Guill. (Ranunculaceae)	Climber	Leaf	Aqueous paste is dressed topically	[26]
				Fruit	The fruit is applied anally	[17]
13	Fiyele feje (A)	<i>Clutia lanceolata</i> Forssk. (Euphorbiaceae)	Shrub	Leaf, 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	Bakkanisa (O) Bisana (A)	<i>Croton macrostachyus</i> Hochst. (Euphorbiaceae)	Tree	Bark	bark is crushed and cooked with meat then 1 to 2 spoon soup is taken orally	[27, 28]
15	Yemidr embuay (A)	<i>Cucumis prophetarum</i> L. (Cucurbitaceae)	Herb	Root	The boiled root is applied on topically	[29]
16	Maxxannee (O)	<i>Cynoglossum lanceolatum</i> Forssk. (Boraginaceae)	Herb	Leaf & Root	The leaves & roots are crushed & mixed with water and applied topically	[18]
17	Asternagir (Lefliif) (A)	<i>Datura stramonium</i> L. (Solanaceae)	Herb	Leaf	The leaf is applied anally	[17]
18	Maraaroo (O)	<i>Discopodium penninervum</i> Hochst (Solanaceae)	Shrub	Leaf	The leaves are crushed & mixed with water and applied topically	[18]
19	Ktkitta (A)	<i>Dodonaea angustifolia</i> L. f. (Sapindaceae)	Tree	Root	Dry root powder mixed with butter is applied topically	[37]
20	Dander (T) Kebericho (A)	<i>Echinops kebericho</i> Mesfin (Asteraceae)	Shrub	Stem	A slightly heated stem is applied topically while it is hot	[14]
21	Qulqwal (A), Hadami (O)	<i>Euphorbia abyssinica</i> 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	[26, 30]
22	Kinchib (T)	<i>Euphorbia tirucali</i> L. (Euphorbiaceae)	Shrub	Latex	Latex is applied topically	[14]
23	Odaa (O)	<i>Ficus sycomor</i> L. (Moraceae)	Shrub	Bark	Bark grinded & mixed with fresh butter is applied topically	[31]
24	Beles (T)	<i>Ficus palmata</i> Forssk (Moraceae)	Shrub	Latex	The latex is smeared on the affected site until cure	[32]
25	Warka (A)	<i>Ficus vasta</i> Forssk. (Moraceae)	Tree	Fruit	Its sap mixed with powdered root of <i>Pterolobium stellatum</i> are creamed and given anally	[27, 33]
26	Akenchira (A)	<i>Galisoga parviflora</i> Cav. (Asteraceae)	Herb	Leaf	The leaf is applied anally	[17]
27	Tseba dimu (T)	<i>Gomphocarpus purpurascens</i> 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)	<i>Grewia ferruginea</i> Hochst. (Malvaceae)	Shrub	Bark	Crushed bark is mixed with water and applied topically	[18]
29	Garanbaa (O)	<i>Hypericum quartianum</i> A.Rich. (Hypericaceae)	Shrub	Leaf	Crushed leaves are mixed with water and taken orally	[18]
30	Bosoqqee (O)	<i>Kalanchoe densiflora</i> A. Rich. (Crassulaceae)	Herb	Stem	Fresh stem is heated slightly and applied into the anus	[34]
31	Andahula (A)	<i>Kalanchoe lanceolata</i> (Forssk.) Pers. (Crassulaceae)	Herb	Root	The diseased part is rubbed with pounded root	[35]
32	Shimfa (T)	<i>Lepidium sativum</i> L. (Brassicaceae)	Herb	Seed	A slightly heated seed is applied topically while it is hot	[14]
33	Appilii (O)	<i>Malus sylvestris</i> (L.) Mill. (Rosaceae)	Tree	Fruit	Its fruit is eaten	[19]

(continued on next page)

Table 2 (continued)

S.No	Local name	Botanical name (Family)	Growth habit	Parts used	Method of preparation and administration	References
34	Lut (A)	<i>Malva parviflora</i> L. (Rosaceae)	Herb	Leaf	The diseased part is bandaged with pounded leaf	[22]
35	Timbaho (A)	<i>Nicotiana tabacum</i> L. (Solanaceae)	Herb	Leaf	Oil extracted from fresh leaves is squeezed into the anus	[23]
36	Ejersa (O)	<i>Olea europaea</i> L. (Oleaceae)	Tree	Stem	Oil extracted burning fresh stem, mixed with camel dung Concocted, crushed, powdered, mixed with olive oil	[21, 23, 27]
37	Muna (Sh)	<i>Sauromatum venosum</i> (Ait) Kunth. (Araceae)	Herb	Tuber	It is administered either orally or anally	[17]
38	Amira (A)	<i>Plumbago zeylanica</i> L. (Plumbaginaceae)	Shrub	Root	The pounded roots are mixed with honey and then put in the anus	[17, 28]
39	Birbissa (O)	<i>Podocarpus falcatus</i> Thunb. R. Br. ex Mirb. (Podocarpaceae)	Tree	Bark	The crushed bark is mixed with water and applied topically for 7 days	[18]
40	Chocho (A)	<i>Premna schimperi</i> Engl. (Lamiaceae)	Shrub	Leaf	It is administered anally	[17]
41	Harengemmaa (O) Kontir (A)	<i>Pterolobium stellatum</i> (Forssk.) Brenan (Fabaceae)	Shrub	Root	Powdered root is mixed with sap of <i>Ficus vasta</i> and creamed and given anally	[33]
42	Kartasa (O)	<i>Ranunculus multifidus</i> Forssk (Ranunculaceae)	Herb	Root	Concocted, powdered, mixed with butter and applied topically	[21]
43	Tullet(A)	<i>Rumex nepalensis</i> Spreng. (Polygonaceae)	Herb	Leaf	Leaves are powdered and squeezed onto the anus	[23]
44	Embuacho (A)	<i>Rumex nervosus</i> Vahl. (Polygonaceae)	Herb	Root	Root powder applied topically	[26, 36]
45	Shokoksa (O)	<i>Salvia nilotica</i> Juss. (Lamiaceae)	Herb	Leaf	Milky heated leaves are dressed on diseased part	[23]
46	Yemidir hareg (A)	<i>Sida ternate</i> L. f. (Malvaceae)	Herb	Seeds	Dry seeds are powdered and applied topically	[20]
47	Yemidir Embuay (A)	<i>Solanum incanum</i> L. (Solanaceae)	Shrub	Leaf Fruit	Dried leaf powder is mixed with honey and paste is applied topically Fruit juice is applied to the affected body with honey.	[23, 36]
48	Duwancho	<i>Syzygium guineense</i> (Bambara: Kokisa) (Myrtaceae)	Tree	Whole plant	Paste of whole plant is applied to stop bleeding.	[23]
49	Tirnake (handega) (T)	<i>Verbascum sinaiticum</i> Benth. (Scrophulariaceae)	Herb	Root bark	The root is crushed, filtered, and drink	[14]
50	Chigogut (A)	<i>Xanthium strumarium</i> L. (Asteraceae)	Herb	Leaf	Fresh leaf boiled with water is taken orally	[22]

A: Amharic, K: Koorete, O: Oromifa, Sh: Shinasha, T: Tigrigna

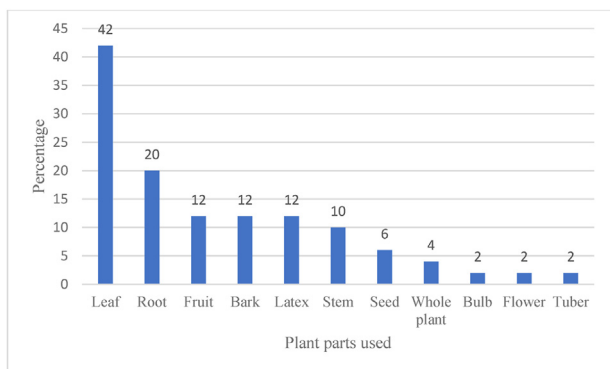


Figure 3. Medicinal plant parts used for hemorrhoids management in Ethiopia.

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 as a positive practice in terms of plant conservation because herbs and shrubs take shorter time to grow and require small garden for cultivation as compared with trees. However, seasonal herbs may, in fact, be inaccessible during some seasons 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

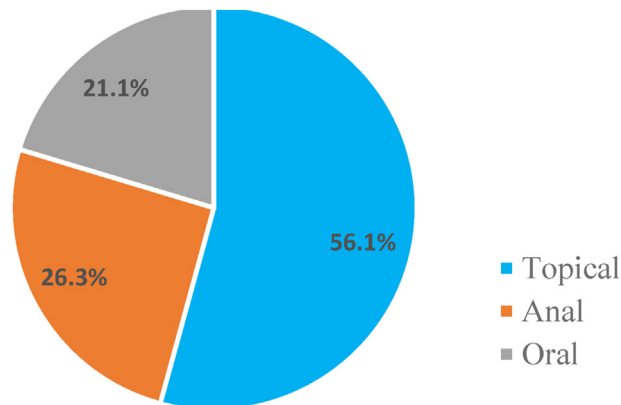


Figure 4. Routes of administration of herbal remedies for hemorrhoids.

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 whenever 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 [58].

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. *Euphorbia 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; Dehnet 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 Alimaw: 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 will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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