Review Article

Medicinal Plants Used for the Treatment of Erectile Dysfunction in Ethiopia: A Systematic Review

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1Introduction

Erectile dysfunction (ED) (also called impotence) is the inability to achieve or maintain an erection sufficient for satisfactory sexual performance [1]. It has remained one of the major global health issues which is usually attributed to age, diabetes mellitus, smoking, cardiovascular diseases, kidney disease, previous operations, psychological factors, and drugs [2, 3]. Previously, about 52% of ED in men was seen in the age range of 40 to 70 years [3]. However, recent studies reported that ED is becoming highly prevalent even under the age of 40 [4]. In Africa, around 71.45% of people with diabetes developed ED [5]. In Ethiopia, about 60.4% of diabetic patients were reported with varying degrees of ED and the
majority of the patients did not receive any medications [6]. More terribly, if this is not halted as early as possible, the number of ED cases globally is predicted to be 322 million by 2025 [7].

Erectile dysfunction can be managed nonpharmacologically via controlling plasma glucose levels and lipid profiles, avoiding smoking and alcohol drinking, psychological therapy, physical exercising, and external devices [8, 9]. Pharmacologically, it can be treated with different drugs including phosphodiesterase type 5 inhibitors (PDE5-Is), such as sildenafil, vardenafil, and tadalaﬁl; apomorphine; and synthetic prostaglandin E1 (alprostadil), phentolamine, and papaverine [8, 10]. Of those, PDE5-Is are the most commonly suggested and used ﬁrst-line treatment options in the world. However, the wide distribution of phosphodiesterase type 5 gene at various sites of the body led PDE5-Is to cause various adverse effects such as headache, myalgia, facial ﬂushing, heartburn, nasal congestion, and vision-related problems. Moreover, disease conditions affecting the upstream nitric oxide pathways have been found with loss of efﬁcacy [10]. Hence, it is vital to look for and ﬁnd optional agents that could solve these limitations.

Since immemorial times, plants have been used as medicines to treat a myriad of human afflications. This is because plants are a bank of bioactive compounds responsible for mitigating various disease conditions [11]. The people of Ethiopia depend heavily on medicinal plants to ease their ailments [12]. In Ethiopia, there are also more traditional healers than modern physicians [13]. Furthermore, traditional medicinal plants are considered as accessible, affordable, and acceptable in the community [14]. Around 6500 plant species are reported in the Ethiopian ﬂora; of those, approximately 12% are endemic. In those Ethiopian ﬂoras, about 1000 plant species are identiﬁed as medicinal plants. However, the majority of the plant species are not yet identiﬁed [15]. This highlights that screening of the Ethiopian plants might grant various novel structures that might be unlikely to be discovered from other sources; ultimately, they may serve as lead compounds to ﬁght various ailments including ED. Hence, documenting, compiling, and then assessing the effect of traditionally claimed plant species are worthwhile to come up with novel plant-based therapies.

2. Aim of the Study

The current study was carried out to systematically compile and document the traditional medicinal plants used for the management of ED or impotence in Ethiopia. The central thesis of this paper is therefore to encourage researchers to scientiﬁcally conﬁrm the effect of medicinal plants against the global issue of ED.

3. Methods

This review was carried out following the recommendations stated in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [16]. The search strategy ﬂow chart is presented in Figure 1.

3.1. Search Strategy. A web-based systematic research literature search strategy was conducted through various electronic databases including PubMed (Medline), Google Scholar, and grey literature to access the relevant studies. The following search terms and combinations were used to collect relevant results: erectile dysfunction, impotence, traditional medicine, medicinal plants, ethnomedicine, ethnomedicine, ethnobotany, ethnopharmacology, indigenous, folk medicine, home remedy, herbal medicine, and Ethiopia.

3.2. Study Selection

3.2.1. Inclusion Criteria. Original published articles and thesis dissertations conducted over the period from 2000 to August 2020 were only searched. The studies written in the English language were only searched. Finally, studies with Ethiopian traditional medicinal plants exclusively utilized for the treatment of ED/impotency in humans were selected.

3.2.2. Exclusion Criteria. Articles pertaining outside Ethiopia, pharmacological studies, ethnoveterinary studies, and reviewed papers were excluded. Besides, the studies failed to mention the scientiﬁc name of the plant and the plant parts used were excluded from this study.

3.3. Data Retrieval. Studies that have possessed the required information are extracted. The required information was the family name, scientiﬁc name, local name (if available), habitat, parts used, method(s) of preparation (if available), and mode of administration. In case of missed information in some studies, especially the habitat of the plants, family name, and misspelled scientiﬁc name, information was retrieved from the Global Plants Journal of Storage (JSTOR) database [17].

3.4. Data Analysis. Microsoft Excel 2016 was employed to analyze the frequency distribution of families, plant parts, routes of administration, and habits. Besides, the distribution in regions where the medicinal plants were reported was analyzed. The results were depicted in charts and tables.

4. Results and Discussion

4.1. Distribution of Medicinal Plants. The regions of Ethiopia that showed the highest ethnobotanical records were Oromia (35%) and Amhara (27%) that constituted about two-thirds (62%) of the total ethnobotanical records against ED (Figure 2). Several medicinal plants have been found in the Oromia region, according to most studies. This may be because, in addition to having a large number of traditional healers, those regions are also Ethiopia’s most populous [18]. However, studies on the prevalence of ED in different regions of Ethiopia are limited.

4.2. Diversity of Medicinal Plants. As shown in Table 1, the current review reported 70 Ethiopian plant species that have traditionally been used to treat ED. The top recorded families were Fabaceae (6 species), Asteraceae (5 species), Malvaceae (5 species), Convolvulaceae (4 species), Solanaceae (4 species), and Euphorbiaceae (3 species) (Figure 3). Alike this study, Semenya and Potgieter [19] reported that Fabaceae
and Asteraceae were among the commonly used families for ED. Ajao et al. [20] also stated that medicinal plants under Fabaceae were the top species used for the management of ED in Sub-Saharan Africa. Moreover, the root of *Eriosema kraussianum* N. E. Br., Fabaceae, displayed a promising effect for ED in experimental rat models [21]. According to a recent study in Ethiopia, plants in the Fabaceae family are the most commonly used traditional medicinal plants [18]. As a result, these studies highlight the screening of plant species belonging to the Fabaceae family that could be important candidates to bring lead compounds to be used for future optional agents.

4.3. Frequently Used Medicinal Plants. The plant species that represented the highest number of citations were *Asparagus africanus* Lam. (8 citations), *Ricinus communis* L. (6 citations), and *Carissa spinarum* L. (4 citations), as well as *Ferula communis* L., *Aloe macrocarpa* Tod., and *Tragia brevipes* Pax with three citations each. Congruent to the present study, the people of Nigeria also traditionally use the root of *Asparagus africanus* Lam. for the management of ED [75]. The usage of this plant for the treatment of ED might be due to the presence of saponins [76], because plant species with saponins as their major constituent displayed significant promotion of erection [77]. The second most cited plant species is *Ricinus communis* L. (also known as castor bean). Recent in vivo studies of *Ricinus communis* L. have confirmed that it increases serum testosterone levels and multiple majors of sexual activity, supporting the current conventional claim [78]. The third cited plant, *Carissa spinarum* L., alike the Ethiopian people, the people of South and Central Benin use its roots for the treatment of sexual weakness. As a result, scientific evaluation of these claimed species is needed in order to uncover important leads in the fight against ED.

Plant species like *Syzygium aromaticum* L., *Zingiber officinale* Roscoe, and *Gloriosa superba* L. are traditionally claimed in Ethiopia; they scientifically displayed significant

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**Figure 1:** Study flow diagram.

**Figure 2:** Distribution of medicinal plants across regions of Ethiopia.
| S. no. | Scientific name                        | Family name | Local name   | Habit | PU | Method of preparation                                                                 | ROA   | References       |
|-------|----------------------------------------|-------------|--------------|-------|----|---------------------------------------------------------------------------------------|-------|------------------|
| 1     | *Acacia mellifera* Benth. Fabaceae     | Kontir grar (Ha) | T Root       |       |    | Taken with the root and barks of *Amaranthus cruentus*                                  | Oral  | [22, 23]        |
| 2     | *Acacia senegal* (L.) Wild Fabaceae    | Not mentioned | T Root       |       |    | Not mentioned                                                                         | Oral, topical | [24]            |
| 3     | *Achyranthes aspera* L. Amaranthaceae  | Dargua (Or)  | H Root       |       |    | Crush, mix with honey, and eat the mixture before break fast                           | Oral  | [25]            |
| 4     | *Adansonia digitata* L. Bombacaceae    | Dima (Tg)    | T Root       |       |    | The latex is mixed with butter and use it to stain the whole part of the penis and heat it with fire for continuous days | Oral  | [26]            |
| 5     | *Ake macrocarpa* Tod. Aloaceae         | Ret/eret (Am) | Su Latex     |       |    | Smearing penis with exudate                                                            | Topical | [27–29]         |
| 6     | *Aloe megalacantha* Baker Aloaceae     | Kasta ansti (Tg), Sariti, Yeset qest (Am) | S Root/leaf | (i) Roots are pound into powder, mixed with meat soup and vegetable, and then taken every evening for a month (ii) Leaf powder is mixed with butter and drank for 3 days before sexual intercourse (iii) The root together with roots of *Premna schimperi* and *Olea europaea* are pound and given to the victim with one cup of “tella” (local alcohol) 2–3 hrs before sexual works | Oral  | [25, 28, 31–36] |
| 7     | *Asparagus africam* Lam. Asparagaceae  | Kasta ansti (Tg), Sariti, Yeset qest (Am) | S Root/leaf |       |    | Root tip is chewed and the juice is drank with an alcoholic drink                       | Oral  | [24]            |
| 8     | *Cadaba farinosa* Forssk. Capparidaceae | Not mentioned | S Root       |       |    | Crushed, powdered, mixed with water, fermented overnight, and drank                    | Oral  | [37, 38]        |
| 9     | *Calpurnia aurea* (Aiti) Benth. Fabaceae | Cakataa (Sd)  | S Root/seeds |       |    | Powder paste with butter applied on the penis (glans)                                  | Topical | [39]            |
| 10    | *Capparis tomentosa* Lam. Capparidaceae | Gimer (Am)    | S Root       |       |    | Fruit is eaten                                                                         | Oral  | [36]            |
| 11    | *Capsicum annuum* L. Solanaceae        | Mixxamixxoa (Ko) | H Fruit     |       |    |                                                                                       |       |                  |
| 12    | *Carissa spinarum* L. Apocynaceae      | Hagamsa (Or)  | S Root/bark  |       |    | It is crushed and pounded with the whole parts of *Trajia cinerea* and the root of *Hibiscus eriospermus* and then stirred in a local beer and drank in one cup of coffee until recovery | Oral  | [25, 40–42]     |
| 13    | *Carthamus lanatus* L. Asteraceae      | Not mentioned | H Leaf       |       |    |                                                                                       |       |                  |
| 14    | *Catha edulis* (Vahl) Forssk. Celastraceae | Chat (Am)    | S Leaf       |       |    |                                                                                       | Not mentioned | [25, 39]        |
| 15    | *Caylula abyssinica* (Fresen.) Fisch. & Mey. Resedaceae | Reenci (Or)   | H Root       |       |    | Drinking the powdered root with water and/or using it for toothbrush daily             | Oral  | [32, 35]        |
| 16    | *Chlorophytum lusum* R. Br Liliaceae   | Munna (Sh)   | H Tuber      |       |    | Tuber is eaten cooked                                                                  | Oral  | [44]            |
| 17    | *Clausena anisata* (Wild.) Benth. Rutaceae | Ulumayii (Or) | S Root       |       |    | Not mentioned                                                                         | Oral  | [25]            |
| 18    | *Convolvulus arvensis* L. Convolvulaceae | Este filastot (Am) | H Root       |       |    | Crush and powder then drink with GIN (areki)                                          | Oral  | [28]            |
| S. no. | Scientific name                  | Family name | Local name | Habit | PU | Method of preparation                                                                 | ROA   | References |
|-------|---------------------------------|-------------|------------|-------|----|---------------------------------------------------------------------------------------|-------|------------|
| 19    | *Crotalaria spinosa* Hochst. ex Benth. | Fabaceae    | Chifrig (Tg) | H     | Root | Crushing, mixing and eat                                                              | Oral  | [26]       |
| 20    | *Drymaria cordata* (L.) Schultes. | Caryophyllaceae | Saydasajal (Or) | H     | Root | Cutting, with bulbs of *Zingiber officinale* and *Allium sativum* and then eating by spoon | Oral  | [45]       |
| 21    | *Euclea racemosa* Murr. subsp. Schimperi (A. DC.) F. White | Ebenaceae | Kullo (Tg) | S     | Root | Crush, add to the chicken stew, and eat with injera (local meal) for 7 days before the meal | Oral  | [26]       |
| 22    | *Euphoria tirucalli* L. | Euphorbiaceae | Kenchib (Tig) | T     | Latex | The fresh latex is mixed with butter and used to stain the whole part of the penis and heated for about 5 minutes for 3 days | Topical | [46]       |
| 23    | *Falkia canescens* C.H. Wright | Convolvulaceae | Gura hantataa (Or) | H     | Leaf | Crushed, mixed with butter, and eaten for 5 days                                      | Oral  | [47]       |
| 24    | *Ferda communis* L. | Apiaceae | Dog (Am) | H     | Root | Powderize the concoction then drinks with "tella"                                     | Oral  | [28, 48, 49] |
| 25    | *Ficus sur* Forssk. | Moraceae | Harbu (Or) | H     | Root | Not mentioned                                                                          | Oral  | [25]       |
| 26    | *Garcinia buchananii* Baker | Clusiaceae | Solosola (Sd) | T     | Bark | The bark is peeled carefully, boiled, cooled, and drunk                                | Oral  | [50]       |
| 27    | *Gloriosa superba* L. | Colchicaceae | Yebab Mashila (Am) | T     | Root | The root powder is taken with "tej" for 3 days                                         | Oral  | [51]       |
| 28    | *Gomphocarpus stenophyllas* Oliv. | Apocynaceae | Chifrig (Am) | S     | Root | Maceration, taken orally once daily for seven days                                      | Oral  | [52]       |
| 29    | *Grewia villosa* Willd. | Tiliaceae | Not mentioned | S     | Root | Not mentioned                                                                          | Oral, body wash | [24]       |
| 30    | *Hibiscus erospermus* | Malvaceae | Not mentioned | H     | Root | It is the same method and ingredient used in *C. lanatus*                             | Oral  | [43]       |
| 31    | *Kalanche pettiana* A. Rich. | Crassulaceae | Andahula (Am) | H     | Root | Milk decoction of the fresh pulverized roots and leaves                               | Oral  | [53]       |
| 32    | *Kleina abyssinica* (A. Rich.) A. Berger | Asteraceae | Abrasha (Or) | H     | Rhizome | Aphrodisiac fresh rhizome is eaten a few hours before sexual performance              | Oral  | [54]       |
| 33    | *Lobelia gibbera* Hemsl. | Lobeliaceae | Jibara (Am) | T     | Root | Crush and then mix with coffee and drink                                               | Oral  | [48]       |
| 34    | *Lagenaria sicerraria* (Molina) Standl. | Cucurbitaceae | Buqee/Kil (Or) | H     | Root/fruit | The root and fruit are ground together and drank with the first boiled coffee        | Oral  | [55]       |
| 35    | *Maytenus senegalensis* (Lam) Exell | Celastraceae | Koba (Am) | T     | Bark | Dried stem bark powder cooked with hen meat is given orally                            | Oral  | [56]       |
| 36    | *Millettia ferruginea* (Hochst.) Bak.* | Fabaceae | Birbira (Am) | T     | Root | Not mentioned                                                                          | Oral  | [49]       |
| 37    | *Nicotiana glauca* Grah. | Solanaceae | Yeareb Kitel (Am) | H     | Leaf | Chewing very small pieces of leaf and swallowed                                      | Oral  | [57]       |
| 38    | *Olea europaea* L. subsp. *cuspidata* Wall. ex G. Don | Oleaceae | Ejersa (Or) | H     | Root | The root together with roots of *Aloe macrocarpa* and *Premna schimperi* pounded in water and given to the victim with "tella" before bed for a few days | Oral  | [32, 35] |
| 39    | *Pavonia urens* Cav. | Malvaceae | Ablalit (Am) | S     | Root | Root powder is taken with "tella" orally                                               | Oral  | [58]       |
| 40    | *Periploca linearifolia* Quart.-Dill. and A. Rich. | Asclepiadaceae | Tikur Areg (Am) | H     | Root | Dried or fresh root is chopped and tied on the waist                                   | Topical | [59]       |
| S. no. | Scientific name                      | Family name | Local name | Habit | PU | Method of preparation                                                                 | ROA    | References |
|--------|-------------------------------------|-------------|------------|-------|----|--------------------------------------------------------------------------------------|--------|------------|
| 41     | Phoenix reclinata Jacq.             | Arecaceae   | Seniel (Am)| T     | Root | Not mentioned                                                                        | Oral   | [49]       |
| 42     | Plumbago zeyfiana L.                | Plumbaginaceae | Amira (Am)| S     | Leaf/root | Fresh leaf crushed and mixed with water                                             | Oral   | [60, 61]  |
| 43     | Prunus Africana (Hook. f.) Kalkm.   | Rosaceae    | Not mentioned | T     | Root | Fresh roots are crushed and soaked in water and then one cup is drunk               | Oral   | [62]       |
| 44     | Ricinus communis L.                 | Euphorbiaceae | Qobbo (Or), Gallo (Am) | S     | Leaf/seed | (i) Crushed leaves with coffee, tea, or milk are taken as a drink before copulation (ii) The dried seeds are pounded, mixed with a small quantity of latex from Aloe spp. and two coffee cups are drank before bedtime for two days | Oral   | [63–68]   |
| 45     | Rosa abyssinica Lindley             | Rosaceae    | Gora (Or) | S     | Root | Not mentioned                                                                        | Oral   | [25]       |
| 46     | Sansevieria ehrenbergii Schweinf. ex Baker | Dracaenaceae | Wondiekaka (Am) | H     | Root | Not mentioned                                                                        | Oral   | [49]       |
| 47     | Sansevieria erythraeae Mattei       | Dracaenaceae | Algeti/cheret (Am) | H     | Root | Root powder is taken with "tef" potage                                              | Oral   | [58]       |
| 48     | Seddera bagshawei Rendle            | Convolvulaceae | Not mentioned | S     | Root | Not mentioned                                                                        | Nasal  | [24]       |
| 49     | Seddera hirsute Dammer ex Hall. f.  | Convolvulaceae | Biklatafri (Af) | S     | Whole/root | (i) The fresh whole plant is pounded, mixed with sugar and goat’s milk, and drunk (ii) The root is chewed | Oral   | [24, 69]  |
| 50     | Sida schimperiana Hochst. ex A. Rich.| Malvaceae   | Chifrig (Am) | S     | Root | Roots are chewed and fluid swallowed                                                | Oral   | [70]       |
| 51     | Sida tenuicarpa Vollesen             | Malvaceae   | Chifrig (Am) | S     | Leaf | Boil leaf, mix with N. Sativa & leaf of Withania sp., A. Sativum & honey, and eat the mixture at a time of necessity | Oral   | [71]       |
| 52     | Sida rhombifolia L.                 | Malvaceae   | Gorgogi (Am) | S     | Root | Drink concoction with honey                                                          | Oral   | [28]       |
| 53     | Solanum anguivi Lam.                | Solanaceae  | Zerch enbey (Am) | S     | Root | Roots are chewed and fluid swallowed                                                | Oral   | [70]       |
| 54     | Stephania abyssinica (Quart.- Dill. & A. Rich.) Walp. | Menispermaceae | Harge-eyesus (Sh) | Cl    | Root | Not mentioned                                                                        | Oral   | [61]       |
| 55     | Syzygium aromaticum L. Merr. & Perry. | Myrtaceae   | Kirunfu (Am), Qurunfudii (Or) | T     | Fruit | Dried fruit is crushed, mixed with goat milk, and boiled. Then, the decoction is drank | Oral   | [66]       |
| 56     | Syzygium guineense (Willd.) DC. Subspafromontanum | Myrtaceae | Badessa (Or) | T     | Bark | Not mentioned                                                                        | Oral   | [25]       |
| 57     | Tamarindus indica L.                | Fabaceae    | Not mentioned | T     | Fruit | The fruit is chopped and taken orally with tea                                       | Oral   | [72]       |
| 58     | Tapinanthus globiferus (A. Richk.) Tieghem | Loranthaceae | Not mentioned | H     | Leaf | Not mentioned                                                                        | Oral   | [24]       |
| 59     | Thalictrum rhynchocarpum Dill. & A. Rich. | Ranunculaceae | Sire-bizu (Am) | H     | Root | Drink concoction with honey                                                          | Oral   | [28]       |
| 60     | Tragia brevipes Pax.                | Euphorbiaceae | Abelbalit (Am) | H     | Whole | (i) It is the same method and ingredient used in C. lanatus (ii) Chew and absorb the juice | Oral   | [28, 43, 48] |
| S. no. | Scientific name                  | Family name     | Local name       | Habit | PU | Method of preparation                                                                 | ROA  | References |
|--------|---------------------------------|-----------------|------------------|-------|----|---------------------------------------------------------------------------------------|------|------------|
| 61     | *Tragia uncinate* M. Gilbert    | Euphorbiaceae   | *Amae* (Tg)      | H     | Root | Roots are ground and taken orally with local soup for a week                           | Oral | [31]       |
| 62     | *Urtica simensis* Steudel.     | Urticaceae      | Doobii/Saamamaa  (Or) | H     | Root | The root is chewed and the extract is swallowed                                        | Oral | [73]       |
| 63     | *Verbascum sinaiticum* Benth. | Scrophulariaceae | *Ye Ahya joro* (Am), *Girra Harree* (Or) | H     | Root | Chopped leaf is rolled by a clean piece of cloth and tied around the male sex organ to erect it | Topical | [66]       |
| 64     | *Verbena officinalis* L.       | Verbenaceae     | *Atuch* (Am)     | H     | Root | Drink concoction with honey                                                             | Oral | [28]       |
| 65     | *Vernonia adonesis* Sch. Rip. ex Walp. | Asteraceae | *Pepa meta* (Gu), *Raskimir* (Am) | H     | Root | Root is crushed and soaked in water (maceration) and one cup is taken                  | Oral | [56, 74]  |
| 66     | *Vernonia amygdalina* Del.     | Asteraceae      | *Girawa* (Am)    | S     | Root | Drink the concoction with “tella”                                                      | Oral | [28]       |
| 67     | *Vernonia myriantha* Hook. f.  | Asteraceae      | *Kotkoto* (Am)   | S     | Root | Drink the concoction with “tella”                                                      | Oral | [28]       |
| 68     | *Withania somnifera* (L.) Dunal in DC | Solanaceae | *Giziewa* (Am)   | S     | Root | Drink the concoction with “tella”                                                      | Oral | [28]       |
| 69     | *Zehneria scabra* (Linn. f.) Sond. | Cucurbitaceae | *Haregresa* (Am) | CI    | Leaf/root | Bathe in the infusion of leaf and root for 7 days                                      | Topical | [53]       |
| 70     | *Zingiber officinale* Roscoe  | Zingiberaceae   | *Injihdiloae* (Ko) | H     | Rhizome | Rhizomes are chewed and the exudates are swallowed                                     | Oral | [36]       |

Habits—Cl: climber; H: herb; S: shrub; Su: succulent; T: tree; Language—Af: Afar; Am: Amharic; Gu: Gumuz; Ha: Hadiyigna; Ko: Koorete; Or: Oromiffa; Sd: Sidamigna; Sh: Shinasha; Tg: Tigrigna; *Endemic.
aphrodisiac effect. That is, 50% ethanolic extract of *Syzygium aromaticum* L., (oral; 100, 250, and 500 mg/kg to rats) improved libido and erection, intromission frequency, mounting behavior, and mating performance [79, 80]. Hexane extract of the flower bud of *Syzygium aromaticum* (L.) Merr. & Perry. (clove) (oral; 15 mg/kg to mice) raised delta (5) 3-beta and 17-beta-hydroxysteroid dehydrogenase (Δ5, 3 β-HSD, and 17 β-HSD) and serum levels of testosterone [81]. Aqueous extract of *Zingiber officinale* (oral; 600 mg/kg to male *Wistar* rats) was tested for its possible androgenic activity and increased testis relative weight, serum testosterone, testicular cholesterol, and epididymal α-glucosidase activity [82]. Aqueous, chloroform, and alcohol extracts of *Gloriosa superba* at the dose of 500 mg/kg body weight showed an aphrodisiac effect with an increase in sexual and orientation behavior. Its aphrodisiac effect could be due to the presence of steroids, saponins, and alkaloids [83]. Hence, these studies support the acclaimed use of these plant species as a treatment for sexual dysfunction in Ethiopia.

These days, in Ethiopia, the continuation of traditional plant remedies is highly threatened due to deforestation, overgrazing, environmental degradation, agricultural expansion, and the rise of the population [15]. This, in turn, jeopardizes the extinction of essential medicinal plants which may have stored indispensable compounds that are responsible for addressing the existing global health issues. Therefore, early detection of the pharmacological activities of the reported species against ED is strongly recommended.

### 4.4. Growth Forms of the Medicinal Plants

The growth forms of the reported species were herb (37%), shrub (34%), tree (22%), climber (4%), and succulent (3%) (Figure 4). This study is consistent with studies conducted by Worku [12] and Yirgu et al. [18] who reported that herbs were the most dominant plant growth forms as well as used as remedies in the Ethiopian traditional medicine. The highest use of herbaceous plants as compared to other growth forms could be due to their accessibility, the higher possibility of obtaining pharmacologically active compounds, and the sociocultural beliefs and practices of the healers in treating the ailment [84].

### 4.5. Plant Parts Used

The most common plant part used was root (41 species), followed by leaves (7 species), fruit (3 species), and bark (3 species) (Figure 5). Similarly, in another study, it was reported that the root was the predominant plant part used for the management of ED [85]. The people of South Africa, Limpopo province, also use roots as the most preferred medicinal plant part [19]. In contrast to this study, the people of Western Uganda use leaves as the commonest plant part for ED [86]. Irrespective of the dominancy, however, confirming the pharmacological activity of the claimed plant part is necessary, because most plant parts reside several bioactive principles.

### 4.6. Mode of Administration

The most common route of administration of the medicinal plants was oral (86%), followed by topical (10%), oral/topical (3%), and nasal (1%) (Figure 6). In agreement with this study, Semenya and Potgieter [19] mentioned the oral route as the dominant route for ED. The commonly reported cosolvents were “tella” (local drink)” (8 species), butter, honey (5 species), and coffee (4 species).
5. Conclusion

The present review compiles and documents for the first time seventy (70) medicinal plant species used for the management of ED in Ethiopia. Fabaceae was the dominant plant family used for the management of ED in Ethiopia. *Asparagus africanus* was the most repeatedly cited plant species against ED. Plant species like *Syzygium aromaticum* L., *Zingiber officinale* Roscoe, and *Gloriosa superba* L. are traditionally claimed in Ethiopia; they scientifically displayed significant aphrodisiac effect. This suggests the reported plant species could be a source of a new class of drugs against ED. Thus, the current findings may serve as references for the selection of plants for further pharmacological, toxicological, and phytochemical investigations in developing new plant-based drugs used for the treatment of ED.

### Abbreviations

ED: Erectile dysfunction  
PDE5-Is: Phosphodiesterase type 5 inhibitors

### Data Availability

The datasets used to support the findings of this study are available from the corresponding author upon request.

### Conflicts of Interest

All authors declared that they have no conflict of interest.

### Authors’ Contributions

DA designed and developed the first drafted manuscript. THK and TYA screened genuinely, if there are any missed relevant articles. DZW, DMD, and GGT reviewed and edited the whole manuscript. Finally, all authors reviewed and approved the manuscript.

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