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Original Research

Ethno-veterinary Use of Medicinal Plants in the Selected Districts of Siltie Zone, Southern Ethiopia

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Abstract

Despite the wide use of traditional medicinal plants to treat animal and human ailments in Siltie Zone Ethiopia, the detailed ethno-veterinary knowledge was unexplored. To investigate the ethno-veterinary medicinal plants used in the selected districts of Siltie Zone, Southern Ethiopia. To identify and collect data related to medicinal plants and their traditional use, the pre-tested, semi-structured questionnaire-based survey was followed. The elderly willing farmers and experienced traditional healers were involved by using snowball sampling procedures from purposively selected study districts. Subsequently, the plant specimens were caught their leaves were collected, pressed and the identification of the plant was done within Werabe University in the Department of Biology. In the survey, 39 plant species and 35 genera from 26 families were identified and documented for treating 30 types of domestic animal diseases. The majority of plant species were grouped under the family Solanaceae (10.3%). The most frequently used plant part for remedy preparation was leaf 48 (58.3%), followed by root 16 (19.1%), seed 12 (14.3%) fruit 4 (4.7%), bark 2 (2.4%), and stem 1 (1.2%). It was found that most of the remedial preparation was delivered through the oral route (63.1%), followed by nasal (25%), topical (10.7%), and another route (1%). The highest fidelity (FL) value was recorded for Brassica carinata (A.) Br. (100%) and Schinus molle L. (100%), while the lowest was Phytolacca dodecandra L' Her (50%). The reproductive disease ailment category showed the highest (0.75) Informant Consensus Factor (ICF), while the ICF value of (0) was observed for external parasitic infestation and wound. In direct matrix ranking computed, Vernonia amygdalina Del. is the largest multipurpose use plant. Conclusion: The present study showed a rich knowledge of traditional medicinal plant use for animal disease treatment in the study districts and necessitated their conservation for future generations. The findings indicated a need for further investigation to determine the active medicinal agent, toxicity, and efficacy of medicinal plants that the traditional healers in the study districts used.

Keywords: Animal Disease, Medicinal Plants, Traditional Healers, Treatment, Siltie Zone, Ethiopia.

Introduction

Medicinal plants have long played important roles in the treatment of diseases all over the world. World Health Organization (WHO) has defined medicinal plants as plants that contain properties or compounds that can be used for therapeutic purposes or those that synthesize metabolites to produce valuable drugs (WHO, 2008). Ethiopia is known for its high sources of medicinal plant diversity due to its rugged topography and climatic diversity. Reports show that Ethiopian flora is estimated to consist of about 7,000 species (Girmay and Teshome, 2017). In the country, medicinal plants have played a significant role in treating health problems in both animal and human diseases (Feyissa *et al*., 2015).

Traditional medicine includes remedial practices that existed for long periods before the development of modern scientific medicine and are still in use today without much-documented evidence of adverse effects (Okigbo and Mmeka, 2006). The available literature shows more than 70% of human and 90% of livestock populations depend on traditional medicines derived from medicinal plants for their primary health care in Ethiopia (Bekele, 2007). Besides this, a greater concentration of medicinal plants is found in the southern and south-western parts of the country following the engagements of biological and cultural diversity (Edwards, 2001).

Due to the easy availability and low cost of ethno-veterinary medicinal plants, the livestock owners of remote areas use them as first aid for their animals (Jabbar *et al*., 2006). The proper documentation and understanding of farmers' knowledge, attitude, and practices about the occurrence, cause, prevention, and control of various animal ailments are essential in designing and implementing successful livestock production (Yineger *et al*., 2007). In the country, the ethno-veterinary system differs greatly among individuals, societies, and religions under rich agro-ecological and biodiversity settings (Yigezu *et al*., 2014; Feyissa *et al*., 2017). The inhabitants of Siltie Zone, located 172km southwest of Addis Ababa Ethiopia, have used traditional medicine to treat various ailments of animals. However, the detailed ethno-veterinary practice and knowledge in the community were unexplored. Therefore, this study aimed to investigate the ethno-veterinary use of the medicinal plant in the selected districts of Siltie Zone, Southern Ethiopia.

Materials and Method

Description of the Study Area

The study was conducted in the period between July 2021 to June 2022 in Siltie Zone, South Nation Nationalities, and Peoples of Ethiopia. The administrative center of Siltie Zone was Werabe. The area is located 172 km away from Addis Ababa (the Capital of Ethiopia) in the Southwest direction. The temperature in the area varies from 12-26C and the average annual rainfall ranges from 780-1818mm. About 95.5% of the population was engaged in agriculture. The reported livestock population of the Siltie Zone showed cattle of 1066,475 sheep, 749,864 goats, 436,453 poultry 1,739,178, and about 27,464 equine species (Unpublished data, SZFED, 2019). The geographical reference indicated that the area was located at 7°51'N latitude and 38°10'E longitude with an altitude ranging from 1500 to 3700masl (meter above sea level).

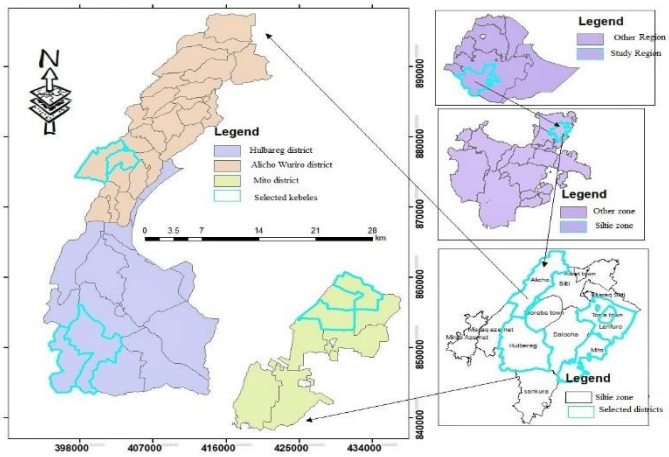

Fig. 1*: Study area map.*

Study Design, Selection of Participant and Plant Identification

To identify and collect data related to medicinal plants and their traditional use, the pre-tested, semi-structured questionnaire-based survey was followed. For this study, elderly willing farmers and experienced traditional healers in the area were selected by using snowball sampling procedures and through recommendations from animal health practitioners and community leaders in selected districts. A total of 84 respondents were interviewed in the three study districts, which were included based on their agro ecology. Additionally, the planned site visits of the area and group discussions took place during the study period. The interview activity was conducted in its integrality using open-ended and closed-ended questions prepared in the local language (Silt'e and Amharic) and translated into English. Before data collection, the informant's consent was obtained by explaining the topic of the study through a short group discussion with the healers to increase confidence in the provision of reliable information. Information regarding the local name of the plant, the kind of ailments treated, the type of animal treated, mode of preparation, parts used, conservation and cultivation, practice, route of administration, dosage, and plant habitat was recorded in pre-tested semi-structured questionnaires. Subsequently, the plant specimens were caught and their leaves were collected, pressed, and air-dried. Next, the identification of the plant was done at Werabe University in the Department of Biology with a botanical specialist. Furthermore, the flora of Eritrea and Ethiopia were followed to identify the collected plant specimen by using its taxonomic keys (Edwards *et al*., 1995, Edwards *et al*., 2000, Hedberg *et al*., 2006).

Data Analysis

The data from the semi-structured questionnaires and field visits were consolidated into Microsoft Excel (2013) and it was then exported into Statistical Package of Social Science (SPSS) version 21. The descriptive statistical method (percentage and frequency) was used for the data analysis. The information obtained from the informants was further calculated by Informants' Consensus Factor (ICF) using the formula ICF= Nur-Nt/(Nur-1), where Nur, denotes the number of use reports from informants for a specific plant use while Nt, denotes the number of species (taxa) that are used for that plant use category for all informants according to (Heinrich *et al*., 1998). The percentage of informants claiming the use of certain plant species for the same role for frequently reported ailments was calculated using the formula of Fidelity level (FL) = Ip/Iu×100, where Ip is the number of informants who independently indicated the use of a species for the same major ailment, and Iu is the total number of informants who mentioned the plant for any major ailment (Friedman *et al*., 1986). The direct matrix ranking method was also carried out for collected multipurpose plant specimens from each district based on their use categories to determine their relative importance to the local people to treat animal disease and the use values (5 = best, 4 = very good, 3 =good, 2 = less used, 1 =least used, and 0 =not used) was assigned (Martin, 1995).

Result

The socio-demographic characteristics of the informants showed that among the 84 respondents who were interviewed, the majority 72 (84.5 %) were male and 13 (15.5 %) were female. The majority of respondents fell within the age range of 32-45 years (Fig, 2). The education status of the respondents revealed that more than half 51 (60.7%) were illiterate. A small number of individuals (2 out of 84) completed their secondary school and the rest 31 (36.9%) were between 2nd to 5th grade of education. Most of the respondents 54 (64.5%) were farmers, while 10 (11.9%) were known traditional healers, and the rest 20 (23.8%) were involved with farming and healing activities in the target area.

In the present study, 39 plant species and 34 genera from 26 families have been identified and documented for their domestic animal disease treatment purposes (Fig, 3). The most significant number of plant species were under the family Solanaceae 4 (10.3%), followed by Euphorbiaceae 3 (7.7%), Brassicaceae 3 (7.7%), Rutaceae 3 (7.7%), Asteraceae 2 (5.1%), Boraginaceae 2 (5.1%), Alliaceae 2 (5.1%), Lamiaceae 2 (5.1%) and the remaining five families, each for one plant species were found.

The dominant plant growth forms were herbs 18 (46.2%) followed by trees 12 (30.8%), shrubs 7 (17.9%), and climbers 2 (5.1%) (Fig, 4). The most commonly used plant part for remedy preparation was leaf 48 (58.3%), followed by root 16 (19.1%), seed 12 (14.3%), fruit 4 (4.7%), bark 2 (2.4%) and stem 1 (1.2%). The study participants have reported various kinds of medicinal plants for the treatment of both animal and human ailments in the target area. These medicinal plants species included *Echinops kebericho* (Mesfin), *Capsicum frutescens* L.,

Capsicum annuum L., *Ensete ventricosum* (welw), *Zingiber officinale* Roscoe, *Eucalyptus globulus* Labill, *Brassica carinata* (A.) Br., *Linum usitatissimum* L., *Lepidium sativum* L and *Hordium vulgare* L., *Ocimum lamifolium* Hochst. ex Benth. and *Ruta chalepensis* L., *Phytolacca dodecandra* L'Her, *Olea europaea* L. subsp. *cuspidate* (Wall.ex G.don) and *Cynoglossum coeruleum* Hochst. ex A.DC. Majority of the respondents, 69 (82.1%) was not involved in medicinal plant conservation activities, while 15 (17.9%) grow various types of the medicinal plants around their home garden.

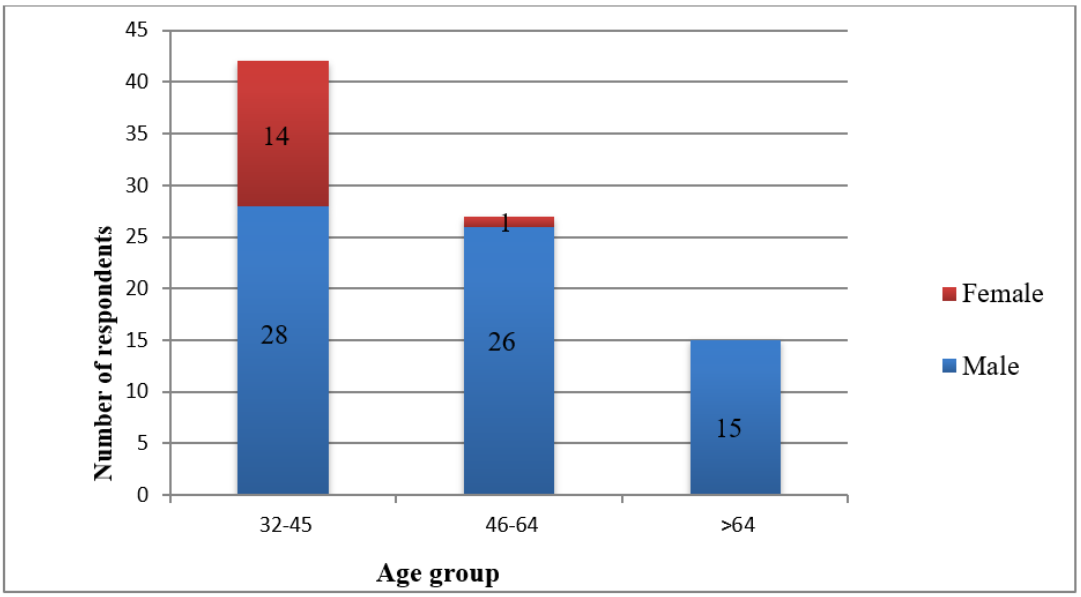

Fig. 2: Number of respondents by age group and gender in three districts of Siltie Zone, Ethiopia

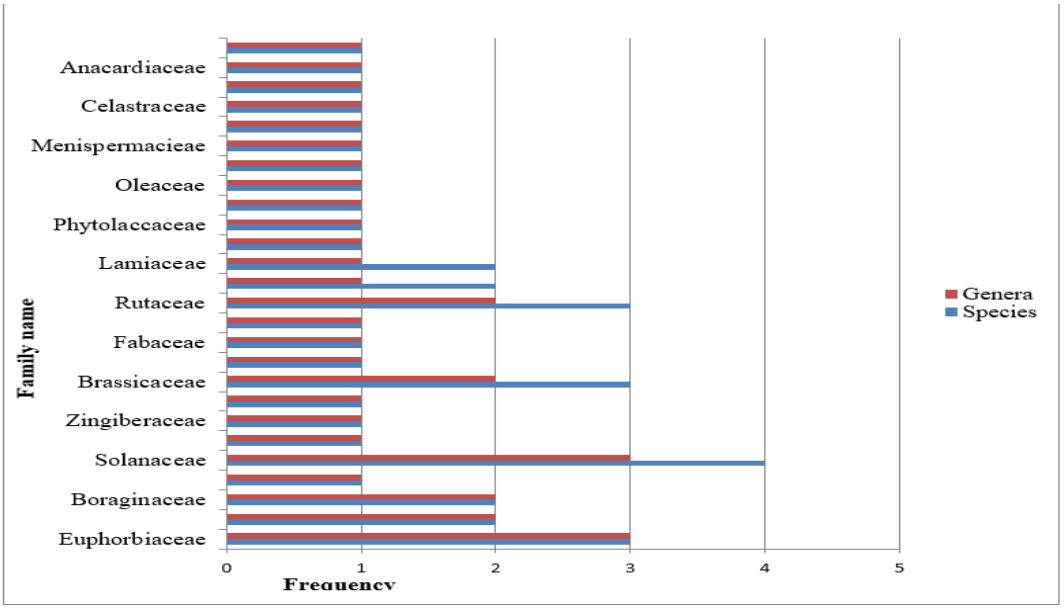

Fig. 3: Family wise distribution of medicinal plants for animal disease treatment at three districts of Siltie Zone, Ethiopia

The majority of the medicinal plants were used fresh (72.6%), followed by dried (4.8%), and the rest were used in the mixed form (22.6%). In our investigation, it was found that most of the remedial preparation was delivered orally (63.1%) followed by nasally (25%), topically (10.7%), and another route (1%) (Fig, 4) to treat 30 different types of livestock diseases (Table, 2). In this study, it was also found that the remedy was used as a single species (35.7%) or in combination (64.3%) through a different method of preparation to treat the various livestock diseases. Furthermore, the frequently used medicinal plants as singly or in combination were summarized in Table 1.

Table 1: Medicinal Plants used

S.No	Vernacular name (Siltie)	Scientific name	Family	Habit	Collection code (CC)
1	Messena	*Croton macrostachyus* Dell.	Euphorbiaceae	Tree	CC-18
2	Kulkwal	*Euphorbia candelabrum* Kotschy.	Euphorbiaceae	Tree	CC-30
3	Kobo	*Ricinus communis* L.	Euphorbiaceae	Shrub	CC-19
4	Heba	*Vernonia amygdalina* Del.	Asteraceae	Tree/shrub	CC-16
5	Koboricho	*Echinops kebericho* (mesfin)	Asteraceae	Herb	CC-77
6	Wadesha	*Cordia africana* Lam.	Boraginaceae	Tree	C-8
7	Atamako	*Cynoglossum coeruleum* Hochst. ex A.DC.	Boraginaceae	Herb	CC-5
8	Oda	*Ficus vasta* Forssk	Moraceae	Tree	CC-55
9	Tumbako	*Nicotiana tabacum* L.	Solanaceae	Herb	CC-7
10	Afrinja	*Capsicum annuum* L.	Solanaceae	Herb	CC-69
11	Mitimito	*Capsicum frutescens* L.	Solanaceae	Herb	CC-79
12	Gizawa	*Withania somnifera* (L) Dunal	Solanaceae	Shrub	CC-22
13	Busha Weyese	*Ensete ventricosum* (welw) Cheesman	Musaceae	Tree	CC-41
14	Janjabelo	*Zingiber officinale* Roscoe	Zingiberaceae	Herb	CC-11
15	Gumara	*Eucalyptus globulus* Labill.	Myrtaceae	Tree	CC-57
16	Dankale/Wonge	*Brassica carinata* (A.) Br.	Brassicaceae	Herb	CC-78
17	Sinafiche	*Brassica nigra* (L.) koch	Brassicaceae	Herb	CC-40
18	Shunf	*Lepidium sativum* L.	Brassicaceae	Herb	CC-76
19	Telb	*Linum usitatissimum* L.	Linaceae	Herb	CC-59
20	Seena	*Calpurnia aurea* (Ait) Benth.	Fabaceae	Shrub	CC-23
21	Ikili	*Hordium vulgare* L.	Poaceae	Herb	CC-51
22	Lome	*Citrus aurantiifolia* (Christm.)	Rutaceae	Tree	CC-3
23	Charot	*Ruta chalepensis* L.	Rutaceae	Herb	CC-83
24	Komtate	*Citrus aurantium* L.	Rutaceae	Tree	CC-61
25	Tumma	*Allium sativum* L.	Alliaceae	Herb	CC-29
26	Shunkurta	*Allium cepa* L.	Alliaceae	Herb	CC-63
27	Damakese	*Ocimum lamifolium* Hochst. ex Benth.	Lamiaceae	Shrub	CC-50
28	Beker	*Ocimum basilicum* L.	Lamiaceae	Herb	CC-81
29	Askamo	*Olinia rochetiana A. Juss*	Oliniaceae	Shrub/tree	C-48
30	Hunduda	*Phytolacca dodecandra* L'Her.	Phytolaccaceae	Herb	CC-72
31	Dabkola	*Cucurbita pepo* L.	Cucurbitaceae	Climber	CC-64
32	Woger	*Olea europaea* L. subsp. *cuspidate* (Wall.ex G.don)	Oleaceae	Tree	CC-24
33	Anamuro	*Capparis tomentosa* Lam.	Capparidaceae	Shrub	CC-66
34	Makaras/tray	*Stephania abyssinica* (Dillon &A. rich) Walp	Menispermacieae	Climber	CC-60
35	Qawa	*Coffee Arabica* L.	Rubiaceae	Shrub	CC-28
36	Chat	*Catha edulis* (Vahl.)	Celastraceae	Tree	CC-27
37	Worab karshe	*Aloe vera* (L.)	Aloeaceae	Herb	CC-39
38	Yelib fanfa	*Achyranthes aspera* L.	Amaranthaceae	Herb	CC-48
39	Trumantry	*Schinus molle* L.	Anacardiaceae	Tree	CC-14

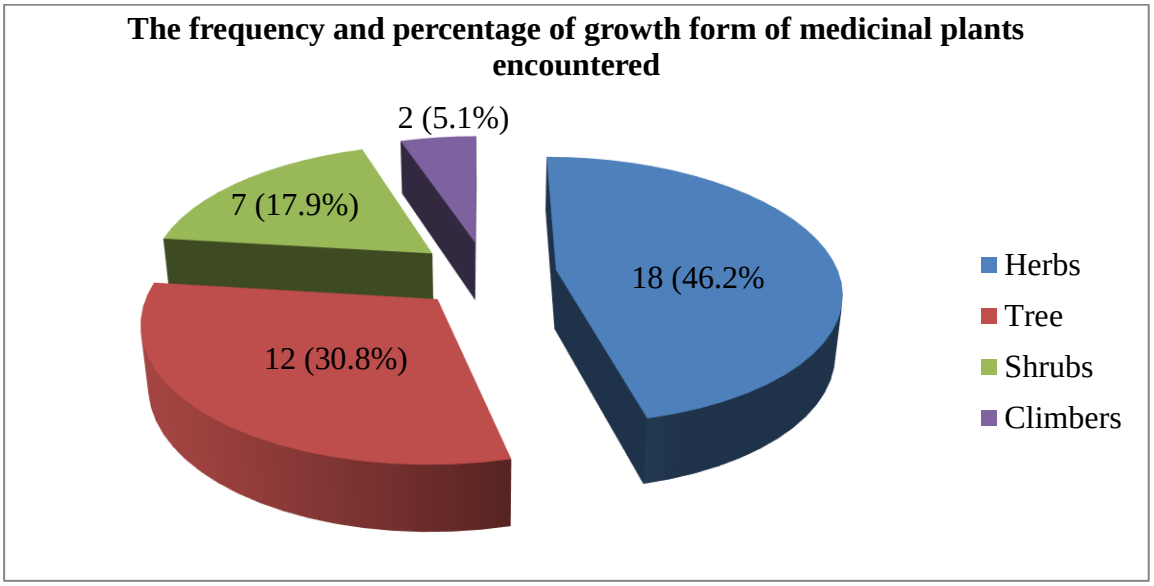

Fig. 4: The growth forms of medicinal plants identified in the study area

The dominant methods of remedial preparations documented in this survey were grinding (57.1%), chopping (15.5%), squeezing (8.3%), fumigation (7.1%), chewing (1.2%), and other methods (10.7%) (Fig, 5).

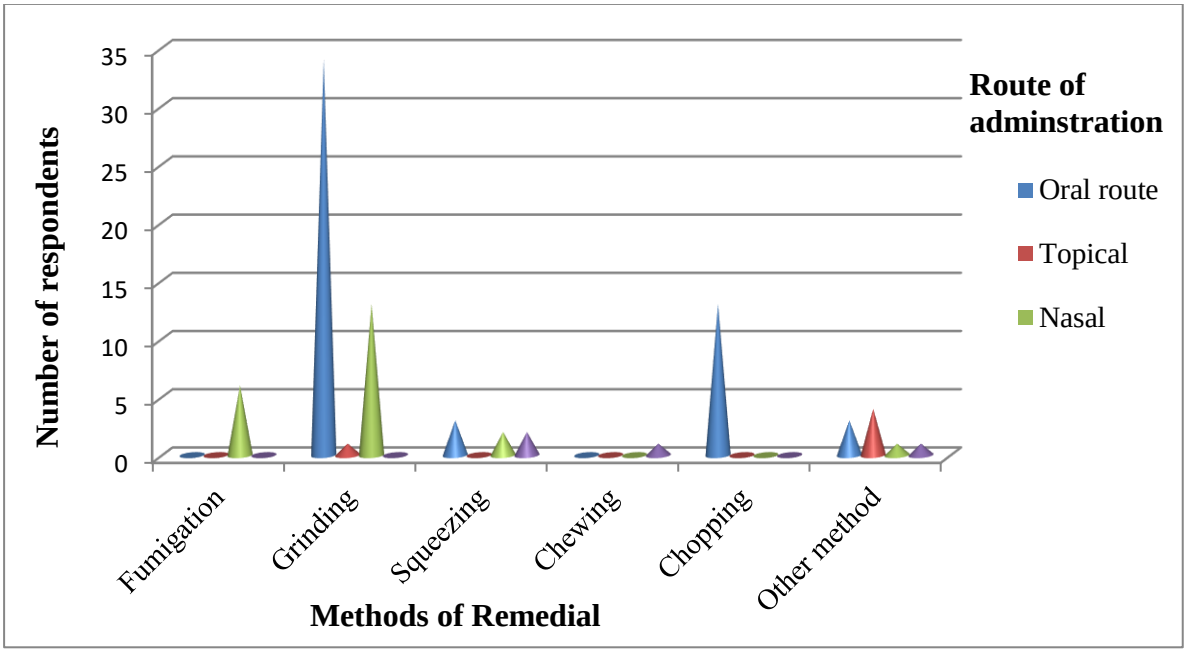

Fig. 5: Methods of remedial preparation and the routes of administration used to treat the livestock disease in three districts of Siltie Zone, Ethiopia.

The various categories of animal diseases have been treated using different medicinal plant preparations in the study area. The most commonly treated animal disease recorded in the districts was gastrointestinal disorder (34.5%), followed by Respiratory Disease Complex (RDC) (17.9%), infectious disease (13.1%), other disease conditions (such as the evil eye) (10.7%), Reproductive Tract Disorder (RTD) (6%), external parasitic infestation (6%), metabolic diseases (9.5%) and wound (2.4%).

Of the domestic animals treated, the highest number was cattle 80.9% followed by shoat 7.2%, poultry 6%, and canines 3.6%, and equine 2.4%. None of the respondents mentioned the medicinal plant's adverse effects in the study area. Only a few respondents 9 (10.7%), reported the use of stored medicinal plants for ethno-veterinary practice, while the majority 75 (89.3%), collect plant material from wild habitats for treatment against animal ailments. Moreover, the survey showed that a significant number of respondents has been used water 46 (54.8%) as

an ingredient for remedy preparation, followed by milk 2 (2.4%), butter 4 (4.8%), whey 2 (2.4%), nothing 19 (22.6%) and other (such as salt and honey) 11 (13.1%). A large proportion of respondents indicated that knowledge about the use of traditional herbal medicine was obtained from their parents 63 (73.8%), followed by close relatives 21 (25%) and neighbors 1 (1.2%).

The highest fidelity (FL) value was recorded for *Brassica carinata* (A.) Br. (100%) and *Schinus molle* L. (100%) followed by *Croton macrostachyus* Dell. (85%) for treatment the gastrointestinal disease. Similarly, *Cynoglossum coeruleum* Hochst. ex A.DC (80) and *Nicotiana tabacum* L. (75) showed relatively high FL against infectious and respiratory disease complexes of domestic animals, respectively (Table, 2).

Table 2: The fidelity level (FL %) of the top seven (7) medicinal plants recorded for their highest frequency of citation against major animal disease categories in three districts of Siltie Zone, Ethiopia.

No	Scientific name	Family	Disease treated	*Ip*	*Iu*	FL (%)
1	*Croton macrostachyus* Dell.	Euphorbiaceae	Gastrointestinal disorder	6	7	85
2	*Vernonia amygdalina* Del.	Asteraceae	Metabolic disease	4	6	66.6
3	*Nicotiana tabacum* L.	Solanaceae	Respiratory disease complex	6	8	75
4	*Brassica carinata* (A.) Br.	Brassicaceae	Gastrointestinal disorder	5	5	100
5	*Phytolacca dodecandra* L'Her.	Phytolaccaceae	Reproductive tract disease	3	6	50
6	*Cynoglossum coeruleum* Hochst. ex A.DC.	Boraginaceae	Infectious disease	4	5	80
7	*Schinus molle* L.	Anacardiaceae	Gastrointestinal disorder	4	4	100

Ip is the number of informants who independently indicated the use of a species for the same major ailment (single use of the plant mentioned); Iu is the total number of informants who mentioned the plant for any significant ailment (total use of the plant mentioned).

The ailment category that has the highest (0.75) ICF was a reproductive disease, followed by gastrointestinal disorder (0.50), metabolic disease (0.33), and infectious disease (0.30). In contrast, the ICF values of (0) were observed for the ailment categories of external parasitic infestation and wound (Table 3). Zero ICF values indicate no homogeneity among the informants reported for the medicinal plants that have been used for each of the above ailment categories (Caunca and Balinado, 2021).

Table 3: Informants consensus factor (ICF) on major livestock disease category in the three districts of Siltie Zone, Ethiopia.

No	Ailment category	Total number of taxa (species) (Nt)	Total number of use reports (Nur)	ICF
1	Gastrointestinal disorder	15	29	0.50
2	Respiratory disease complex	13	15	0.14
3	Infectious disease	8	11	0.30
4	Reproductive tract disease	2	5	0.75
5	Wound	2	2	0
6	Metabolic disease	6	8	0.33
7	Parasitic infestation (external)	5	5	0
8	Other disease conditions	8	9	0.12

In direct matrix ranking computed, of the total medicinal plant's *Vernonia amygdalina* Del. is the largest multipurpose use plant followed by *Brassica carinata* (A.) Br. and *Croton macrostachyus* Dell (Table 4). The above-mentioned medicinal plants have been most preferably used for medicine, fence, fuel, food, and other uses by the local community.

Table 4: Direct matrix ranking of five multipurpose veterinary medicinal plants used in the three districts of Siltie Zone, Ethiopia.

Scientific name	Informants (1-5)	Multipurpose use categories and values (0-5)					Total	Rank
		Medicine	Fence	Fuel	Food	Other		
Vernonia amygdalina Del.	1	5	4	4	0	0	48	1st
	2	3	4	2	0	0		
	3	4	3	5	0	0		
	4	3	1	5	0	0		
	5	5	0	0	0	0		
Phytolacca dodecandra L'Her.	1	3	4	1	0	0	28	5th
	2	4	0	0	0	0		
	3	3	4	0	0	0		
	4	3	0	0	0	3		
	5	2	0	0	0	1		
Ensete ventricosum (welw) Cheesman	1	4	0	0	4	4	43	4th
	2	3	0	0	3	3		
	3	4	0	0	2	1		
	4	4	0	0	4	2		
	5	3	0	0	1	1		
Brassica carinata (A.) Br.	1	4	0	0	4	0	47	2nd
	2	4	0	0	4	0		
	3	4	0	0	3	0		
	4	4	0	0	4	4		
	5	4	0	0	4	4		
Croton macrostachyus Dell.	1	4	1	3	0	0	46	3rd
	2	4	0	4	0	0		
	3	0	4	4	0	0		
	4	4	4	4	0	0		
	5	3	3	4	0	0		

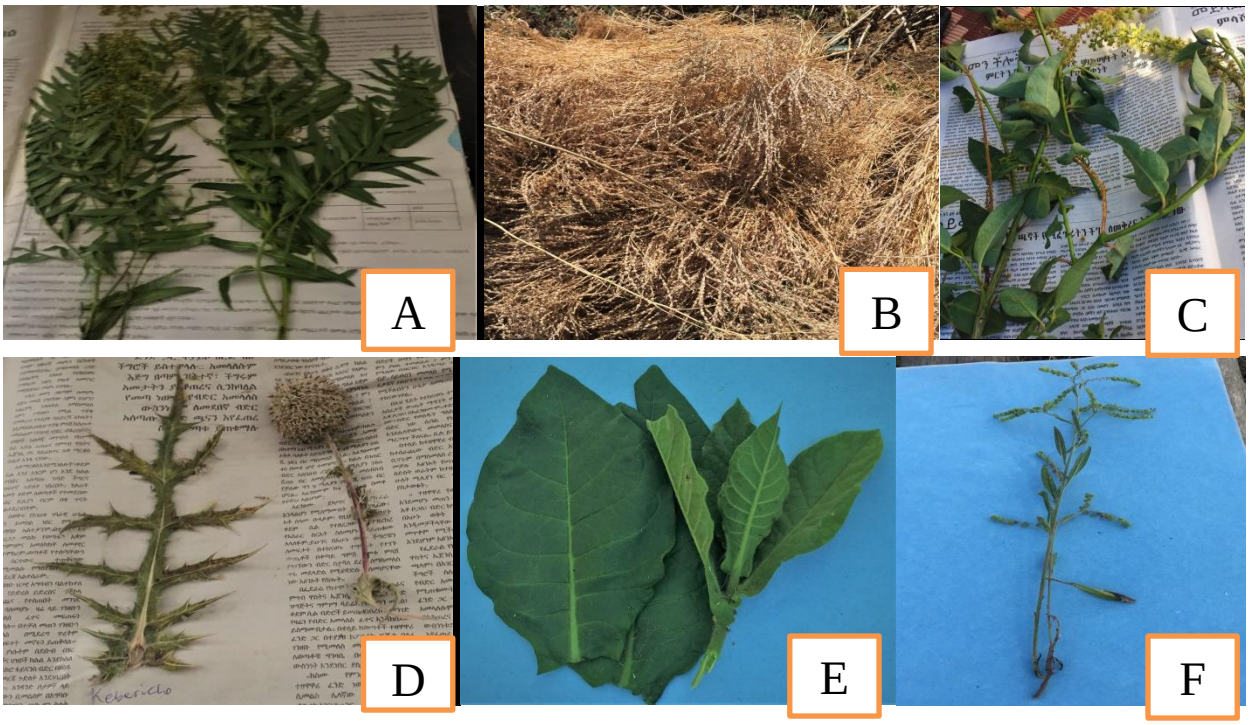

Fig. 6: Some of the veterinary medicinal plant specimen collected from the study district: Schinus molle L. (A), Lepidium sativum L. (B), Phytolacca dodecandra L'Her. (C), Echinops kebericho (mesfin) (D), Nicotiana tabacum L. (E) and Cynoglossum coeruleum Hochst.. ex A.DC. (F).

Discussion

The summary table above shows that the use of medicinal plants for animal diseases forms an important part of three districts of the Siltie Zone, Southern Ethiopia (Table 1). Most informants, 72 (84.5 %), were men, and 13 (15.5 %) were women (Figure 2). The reason for the large gender difference results in traditional knowledge of medicinal plants might be attributed to the local tradition restricting those practices to males rather than females, as reported by several scholars across the country (Belayneh *et al*., 2012; Yigezu *et al*., 2014; Teklehaymanot, 2009). The educational status of the respondents showed that the majority 51 (60.7%), was illiterate. This suggests that most of the knowledge about medicinal plants is concentrated in illiterates than in those with modern training. Of the total 39 plant species that have been identified and documented for their ethno-veterinary purposes, the majority of plant species were grouped under the family Solanaceae (10.3%), followed by Euphorbiaceae (7.7%), Brassicaceae (7.7%) and Rutaceae (7.7%). Our finding was in agreement with the report of Tadesse *et al*., 2014 in East Wollega Ethiopia, that Solanaceae and Euphorbiaceae are the medicinal plant families with the largest proportions in their study. Our observation was in contrast to the report by Yigezu *et al*., 2014; who found Asteraceae as the dominant family followed by Curcubitaceae and Solanaceae. The difference in plant families indicates their particular distribution in their respective environments (Ameya *et al*., 2016).

The dominant medicinal plant growth form reported by traditional healers in the current study was herbs, followed by trees. A similar study from Wolaita, Ethiopia (Bassa, 2017), Bahir Dar district Ethiopia (Tadesse *et al*., 2018), Himalaya Pakistan (Rafique Khan *et al*., 2021), and Limpopo South Africa (Mahwasane *et al*., 2013) recorded herbs as the leading growth form of medicinal plants. Different from our results various researchers from other geographical regions of Ethiopia reported that shrubs as the dominant plant growth form of medicinal plant (Belayneh *et al*., 2012; Lulekal *et al*., 2014; Tuasha *et al*., 2018). The widespread use of herbs for medicinal purposes might be due to their predominant occurrence and ease of collection. Moreover, the higher frequency of citation, 71.4% for the use of cultivated veterinary medicinal plants recorded in our findings may indicate that there might be more herbs grown than trees in the study area.

Among all the informants interviewed, only 10.7% used the stored medicinal plants for animal disease treatment. This indicates that the preservation of medicinal plants was not practiced on a large scale in the community and could lead to the extinction of valuable medicinal plants in the future. The use of leaves as the dominant plant part for the treatment and grinding as the significant method of remedy preparation in this survey was consistent with a study conducted in the East Wolega zone of Western Ethiopia, by (Tadesse *et al*., 2014). Several reports have shown that leaves have contributed most to ethno-veterinary medicine preparation (Teklehaymanot, 2009; Shilema *et al*., 2013; Yigezu *et al*., 2014; Tuasha *et al*., 2018). The good reason for the widespread reporting of leaves for traditional medicinal treatments of animal disease is attributed to the presence of pharmacologically useful phyto-constituents in the leaf that may be responsible for the remedy of various animal ailments (Marjorie, 1999). It was found that most of the remedial preparation was delivered orally (63.1%) followed by nasally (25%). The highest proportion of oral route administration of medicinal plants in our finding might be due to the most (34.5%) gastrointestinal-related disorder treatments and the informants' belief that the oral route was safer and easier than the other routes.

The highest fidelity (FL) value was recorded for *Brassica carinata* (A.) Br. (100%) and *Schinus molle* L. (100%), followed by *Croton macrostachyus* Dell. (85%) for the treatment of gastrointestinal disorders suggests those plants were frequently administered for the same major ailments (Ugulu, 2012). The reproductive disease ailment category has the highest (0.75) ICF, while the ICF value of (0) was observed for external parasitic infestation and wound. The highest ICF elucidated the more significant number of homogeneities among the informants for the particular plant species and its uses in the local community. In direct matrix ranking computed, *Vernonia amygdalina* Del. is the largest multipurpose use plant of the total medicinal plants. Reports showed that medicinal plants with the highest multipurpose use might be more threatened than those with less multipurpose value (Alemneh, 2021).

The present study showed the *Croton macrostachyus* Dell. and *Vernonia amygdalina* Del. has been used against a various domestic animal ailment in three districts of Siltie Zone. For example, the former medicinal plant species were documented for the remedy against ringworm (to the cattle), foreign body (to the cattle), bloating, and constipation (to the cattle). However, the latter was predominantly reported for treatment against Lumpy Skin Disease (LSD) (to the cattle) and inappetence (to all domestic animals). The findings on the use of *Croton macrostachyus* Dell. for ringworm to cattle was consistent with the study by (Lulekal *et al*., 2014). However, the same survey reported *Vernonia amygdalina* Del. for treatment against retained placenta. Overall, the similarities

and differences in the uses of the above-mentioned plants may be due to the rich ethnic knowledge diversities toward the medicinal plants and variations in the medicinal plant distribution (Rafique Khan *et al*., 2021).

The application of remedies varied between the type of the disease and the sites of the animal body affected. For example, the leaves of *Catha edulis* (Vahl.) which was crushed and mixed with water, and the filtrate was applied orally and nasally for the treatment against leech infestation. While the jelly extract of the *Aloe vera* (L.) locally "Worab Kershe" is rubbed over the wound surface of the ox. The new finding encountered in the present survey was the medicinal use of *Schinus molle* L. locally "Trumantry" which was widely used against the bloating in all domestic animals and *Cynoglossum coeruleum* Hochst. ex A.DC. locally "Atamako" that was used against circling disease in sheep and body condition loss in children. The extensive spectrum use of *Stephania abyssinica* (Dillon & A. rich) Walp, locally "Makaras" was also the new report for its use against blackleg, anthrax, and mastitis in cattle. In general, the veterinary uses of the aforementioned medicinal plants justify the greater importance of these plant species for local communities and necessitates their conservation in the study districts.

Conclusion and Recommendation

Medicinal plants have been an integral part of the study districts for the treatment of domestic animal diseases. This survey identified and documented 39 species of medicinal plants used to treat 30 different domestic animal diseases and the associated indigenous knowledge in the study community. Herbs were the leading growth form of medicinal plant in the study districts. The dominant remedial preparation method involved grinding and mixing the paste with water. The majority of the curative application was given through the oral route followed by nasal and topical application. Of the animal ailment category, the most frequently treated disease in the area was gastrointestinal disorder. The study has shown the highest number of respondents collect fresh plant material from wild habitats for the treatment of animal ailments. Based on the above conclusion, conservation measures should be applied for those valuable medicinal plants in the study area for future generations and experimental investigations should be conducted to isolate biologically active anti-illness agents.

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Declarations

This study was approved by the Ethical and Research Review Board of Werabe University, and a formal letter of contact was made with the selected zonal and district governmental bodies. Before the data collection, the informant's consent was achieved by explaining the study's objective through brief group discussions with the healers.

Contribution by Authors

Equal contribution. All authors declared that 'written informed' consent was obtained from the approved parties for the publication of this article and accompanying images.

Conflict of Interests

There is no conflict of interest.

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