Full Length Research Paper

Medicinal plants used in the treatment of livestock diseases in Berbere district of Bale zone, Oromia region, Ethiopia

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An ethnoveterinary study of medicinal plants used by local people of Berbere district was carried out from June 25 to September 5, 2015. The study was focused on utilization of medicinal plants to treat various livestock health problems by people of the study area. The data were gathered using semi-structured interview, participant observation and personal interviews. A total of 69 informants (55 male and 14 female) in the age between 30 and 89 years were purposively selected from eight kebeles. Twenty four medicinal plants, which are distributed in 18 genera and 17 families have been collected and identified. These medicinal plants were collected from natural habitat [23 (94.6%)], whereas 1 (5.6%) from home gardens. The most frequently harvested medicinal plants parts was shrub accounting for 11 species (45.8%) for livestock. Leaves [13 (52%)] were frequently used plant parts for preparation of livestock remedies. Agricultural expansion was the major threat to medicinal plants. Creating awareness of young generation on the usage of traditional medicine and conservation is recommended.

Key words: Medicinal plants, traditional utilization, Berbere district, South East Ethiopia.

INTRODUCTION

The importance of traditional medicine (TM) and its contribution to health care among humans worldwide cannot be under estimated. These medical systems are mainly dependent on various plant species and plant based products. Before the introduction of modern veterinary practice, traditional healers were usually the only people approached to attend to these livestock diseases. The various traditional practices included prevention of diseases, recognition of toxic plants, surgical intervention and crude vaccination methods. The current account of medicinal plants of Ethiopia, as documented for National Biodiversity Strategy and Action Plan by Tanto et al. (2002), shows that about 900 plant species were reported to be used in the traditional medicine.

Many researchers in Ethiopia have revealed the loss of valuable medical plants due to population pressure, agricultural expansion and deforestation (Abebe, 2001; Getachew and Shiferaw, 2002; Yirga, 2010). Moreover, documenting traditional medical knowledge is important to assist discovery of new sources of drugs (Hassan et al., 2014). This study, therefore, attempts to identify...
MATERIALS AND METHODS

Description of study area

Geographical location

Berbere district is situated between 06°33’ N and 06°75’N and 03°95’ E and 04°29’ E. It is located at about 526 km southeast of Addis Ababa, in Bale zone of Oromia Regional State. This district has 17 kebeles which are characterized by undulating highlands in the north and lowlands in the south (Figure 1).

Topography and climate

According to OIDA (2003), the area is characterized by flat lands and moderately steep rolling hills with valley bottoms. The altitude of the district ranges between 900 and 2100 m a.s.l. There are three agro-ecological zones represented in this district. The majority, 70% of the district is classified as lowland (Gammoojjii), with 25% midland (Badda- Daree) and only 5% is considered as highland (Badda). (BDARO, 2010).

Livestock

Livestock population in Berbere district is high because of large coverage size of pasture land of the district. According to the Berbere District Livestock Development Agency, the numbers of livestock in the district include: 1,320,500 cattle, 18,940 sheep, 5,645 camels, 131,000 goats, 13,654 poultry, 5,480 mules, 895 horses, and 11,850 donkeys. In the district, livestock make a substantial contribution to the rural economy. Most rural farming, transport and source of income are directly or indirectly linked with them. The contribution of their products like milk, meat and egg to the regional and national economy is very low mainly due to poor management, inadequate and low quality feed supply and the prevalence of various animals’ diseases.

There are three veterinary clinics in the district, located in Harawa, Chekata and Darasa kebeles. The number of cattle and clinics are not balanced. Therefore, there is no doubt that people of the district use ethnoveterinary medicine to treat various livestock ailments. The most important animal diseases in Berbere district include: trypanomiasis, lamp skin disease, bovine pasturalosis, gastro intestinal parasite, external parasite, black leg, blotting, phasolosis and African horse sickness (BDLDA, 2010).

Land use, soil and agriculture

A survey of the land in this district shows that 20.5% is arable (4.3% is under cultivation), 36.4% is pasture, 41.7% is forest or heavy vegetation cover, and the remaining 1.4% is considered swampy, degraded or otherwise unusable (BDARD, 2010a). The major crops include maize and teff, while sorghum and wheat are minor crops. The area has a high potential to produce cash crop like coffee and khat (BDARD, 2010b).

Vegetation

There are two types of vegetation in the area. One is deciduous bush land and thicket that forms ecotone between montane forest and deciduous forest. The second one is Acacia-Commiphora bush land. This type of vegetation is mainly characterized by Acacia species like Acania mellifera and Acacia senegal. The ecotone taxa include Euphorbia species and Carissa spinarum (OFEA, 2010).

Reconnaissance survey and selection of study sites

A reconnaissance survey of the study area was conducted from June 25 to July 5, 2015. The study sites were selected depending on recommendation from elder, local authorities and altitudinal range. Thus, the study was carried out in eight kebeles from two agro ecological zones. They are Burkitu, Chekata, Darasa, Gabe Keku, Gora Heddo, Haro Nannoo, Harawa and Sirima.

Sampling of informants

A total of 69 individuals (55 males and 14 females) in the ages of 30 and above were selected from eight kebeles purposively following Tongco (2007). Of the total informants, 30 key informants (25 males and 5 females) were systematically selected based on recommendation from elders and local authorities (Development Agents and Kebele Administration Leaders). The choice of informants was following the suggestion made by Martin (1995). Local healers were also considered as key informants since they are expected to have intensive knowledge of medicinal plants. The informants were selected from the local people of the study area to see the general knowledge of medicinal plants of the people depending on their willingness to participate.

Ethnobotanical data collection

Ethnobotanical data were collected from July 6, 2015 to September 4, 2015. The standard data collection methods like that of Martin (1995), Alexiades (1996), and Cotton (1996) have been followed to obtain indigenous knowledge of the local community on health, local classification of soil and plants, use, conservation and threats of medicinal plants. The techniques employed for data collection were group discussion, semi-structured interviews, guided field walks and observations with informants.

Market survey

Market survey was done on three markets in order to see medicinal plants in trade following Martin (1995). Three markets were encountered in the study area. One is found in Darasa in which the market day was held on Monday; Haro Dumal, in which the market day was on Thursday and Chekata in which the market day was on Wednesday.

Specimen collection and identification

At the end of each interview, sample specimens of the plants cited for their medicinal use were collected, numbered, pressed and dried for identification. The local names and growth habits of the medicinal plants were recorded for each plant species. Preliminary identification was done in the field. The voucher specimens which could not be identified in the field were taken to Jimma University herbarium and identified by using taxonomic keys, Flora of Ethiopia and Eritrea and the specimens that could not be identified using the taxonomic keys, Flora of Ethiopia and Eritrea were taken to the National Herbarium (ETH), Addis Ababa University and compared with already identified specimens. The specimens were deposited at Jimma University herbarium and the ETH.
RESULTS AND DISCUSSION

Medicinal plants used to treat livestock health problems

In comparison to human diseases, livestock diseases are treated with less number of plant species in the study area. A total of 14 livestock ailments were identified that are treated by traditional medicinal plants in the area. Medicinal plants collected and identified in the study area which are used for livestock health problems were 24 species. They were grouped into 18 genera and 17 families. Regarding the families of medicinal plants used in livestock health problem, family Fabaceae represented by three species (16.66%) and it was the leading family. Regarding the occurrence of the medicinal plants documented for treating livestock ailments, all were obtained from the wild and this shows that the attempt of local community is not promising for cultivating livestock remedies in home gardens. Various studies conducted in Ethiopia reported that the majority of medicinal plants were harvested from the wild, for instance the studies of Yineger et al. (2008).

Growth form and part used for livestock medicinal plants in the study area

Out of the 24 plant species used for treating livestock ailments in the area, 11 (45.8%) species were represented by shrubs. The growth forms indicate that shrubs constitute most of the medicinal plants used for treating livestock ailments in the study area. This result shows that people rely more on shrubs and herbs because they are relatively common in the area when compared to tree species. A study conducted by Teklehaymanot and Giday (2007) and Adefa and Abraha (2011) indicated that the shrubs are the major plants parts harvested followed by herbs (Tables 1 and 2).

Regarding the plant parts documented for preparing various medicines to livestock ailments, leaves accounted for the highest represented by 13 species.
Table 1. List of livestock disease in the study area.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Local name</th>
<th>Medical name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nyaaqarsa</td>
<td>Trypanomiasis</td>
</tr>
<tr>
<td>2</td>
<td>Jogii</td>
<td>Froze Blotting</td>
</tr>
<tr>
<td>3</td>
<td>Darabaa</td>
<td>Black leg</td>
</tr>
<tr>
<td>4</td>
<td>Furtu</td>
<td>Mastitis</td>
</tr>
<tr>
<td>5</td>
<td>Jigoo</td>
<td>Oedema</td>
</tr>
<tr>
<td>6</td>
<td>Goflaa</td>
<td>African horse sickness</td>
</tr>
<tr>
<td>7</td>
<td>Kilisi</td>
<td>***</td>
</tr>
<tr>
<td>8</td>
<td>Burka</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Slimi</td>
<td>Ticks</td>
</tr>
<tr>
<td>10</td>
<td>Raammoos gara</td>
<td>Intestinal parasite</td>
</tr>
<tr>
<td>11</td>
<td>Madaa afaani</td>
<td>Mouth sore</td>
</tr>
<tr>
<td>12</td>
<td>Budaa</td>
<td>Evil eye</td>
</tr>
<tr>
<td>13</td>
<td>Madaa</td>
<td>Wound</td>
</tr>
<tr>
<td>14</td>
<td>Nyaakarsa lafee</td>
<td>Bone TB</td>
</tr>
</tbody>
</table>

Table 2. Habit of medicinal plants used to treat livestock disease.

<table>
<thead>
<tr>
<th>Habit of the species</th>
<th>No. of the species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climber</td>
<td>5</td>
<td>20.8</td>
</tr>
<tr>
<td>Epiphyte</td>
<td>3</td>
<td>12.5</td>
</tr>
<tr>
<td>Herb</td>
<td>3</td>
<td>12.5</td>
</tr>
<tr>
<td>Shrub</td>
<td>11</td>
<td>45.8</td>
</tr>
<tr>
<td>Tree</td>
<td>2</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Various techniques such as crushing, pounding, powdering, boiling and crushing and pounding. Majority of the method contributed by crushing which accounted for 15 medicines (60%) followed by pounding which accounted for 5 medicines (20%). The findings of Hunde et al. (2006) revealed that crushing (17%) is the leading remedy preparation in Boosat sub-district, Central Eastern Ethiopia (Figure 3).

The routes of application like oral, ocular, anal, nasal and dermal have been documented in association with various livestock ailments. The common adopted route of application was oral which accounted for a total of 13 (52%) preparations followed by 11 (44%) preparation through dermal routes and similar studies revealed that oral routes of administration was more prominent (Yineger et al., 2008).

Knowledge on medicinal plants

Ethnomedicinal knowledge is concentrated in the elderly and relative members of the community and is difficult to transfer from the elders to the young generation. The majority of the respondents (79%) preferred to transfer their indigenous knowledge to their family verbally and...
he remaining informants (21%) by showing the medicinal plant in the field and through demonstration including remedy preparation methods. The indigenous knowledge transfer is poor which may cause erosion of the practice and knowledge. The study revealed that, medicinal plant knowledge and transfer of knowledge to the young generation is affected by modernization due to having access to modern education and health services. This might be related to the diminishing of interest of the young generation on indigenous knowledge. The same idea was generated by Yineger and Yewhalaw (2007) based on a study from Sekoru district, Jimma zone, Southwestern Ethiopia.

**Ranking of medicinal plants**

In the study area, a number of medicinal plants were found to be multipurpose species being utilized for a variety of uses. Direct matrix ranking showed that, of the
total medicinal plants, *Premna schimperi* Engl is the most multipurpose use medicinal plant followed by *A. mellifera* (Vahl) Benth.

**Threat and conservation of medicinal plants of the study area**

**Threats**

Medicinal plants are at increasing risk from destruction of their habitats (agricultural expansion, fire, construction, overgrazing, and urbanization) and over harvesting of known medicinal species (Cunningham, 1992). According to Roberson (2008), about 15,000 medicinal plant species may be threatened with extinction world widely due to habitat loss and over harvesting and it is estimated that the earth is losing one potential major drug every two-year. In the study area, the people also rely on medicinal plants for various purposes such as charcoal, medicine, firewood, construction and food. The major threat to medicinal plants in the study area was agricultural expansion which accounted for 55%, charcoal production (15%) and fire wood accounted for 18%. The result of Giday et al. (2003) indicated that intense deforestation became the major threat to medicinal plants in Zay people. Also Yineger and Yewhalaw (2007) reported that deforestation (40%) and agricultural expansion (12.5%) were the most threat to medicinal plants of Sekoru district of Jimma zone. Findings of Lulekal et al. (2008) reported deforestation (90%) as the principal threat to medicinal plants in Mana Angetu district, Southeastern Ethiopia.

Similar study by Yineger et al. (2008) from Southwestern Ethiopia and Yirga (2010) from Alamata, Southern Tigray showed that deforestation is the major threat to medicinal plants. This indicates that special focus should be given for conservation of these plants since they are being widely exploited for purposes other than their medicinal value. Availability of medicinal plants has been affected by a dramatic decrease in the area of native vegetation due to agricultural expansion, deforestation, fire, overgrazing and charcoal and firewood (Cunningham, 1996; Giday et al., 2003).

**Conservation of medicinal plants in the study area**

The influences of human on the natural habitat of medicinal plants are the problems for the conservation of medicinal plants and associated knowledge. Even though there are many problems plus high population growth and thus there are over exploitation of medicinal plants for different purposes and for daily activities, the significant numbers of the local people of the area knew the importance of conserving the plants in both *ex-situ* and *in-situ* conservation methods. The effort to conserve medicinal plants in the district was observed to be very poor. Some informants have started to conserve medicinal plants by cultivating at home gardens, though the effort was minimal. About 5.5%, of the medicinal plants collected were reported as found cultivated at home gardens. The result of Lulekal et al. (2008) indicated that only 5.7% of medicinal plants were cultivated in home garden showing minimal effort of medicinal plant conservation in Mena Angetu district.

Yinegeret et al. (2008) suggested that natural resources could be utilized best in sustainable way if management practices are complete. In fact, such valuable activities require appropriate action and changes by the full range of societies and stakeholders involved in the conservation, production and management as well as use of medicinal plants. Since an action on conservation and sustainable use of medicinal plants need involvement of various sectors and greater public support, it needs a continuous task of creating public awareness (Schippmann et al., 2002).

**Conclusions**

A study on medicinal plant utilization in area revealed that the communities commonly use medicinal plants for maintaining their livestock healthcare and they have rich traditional knowledge on use, preparation and application of local plants to cure various ailments animals. The study has resulted in 24 medicinal plants species which include 23 angiosperms and one gymnosperm spread in 18 genera and 17 families. The families of medicinal plants Asteraceae represented the largest number of medicinal plants. Out of the 24 medicinal plants, 23 species occur in wild and one is found in home gardens and cultivated lands.

Shrubs found the dominant growth form of medicinal plants used for preparation of livestock traditional remedies followed by herbs and trees. Leaves were the most used plant parts for the preparation of livestock remedies. Traditional medicine preparation mostly involves a single plant and the method of preparation was mainly crushing followed by pounding; the mode of administration was mainly internal in which oral administration is the common route.

Depletion of indigenous knowledge among the people of the district was serious because of disinterest of young generation to gain the knowledge, oral based knowledge transfer, unavailability of the species and influence of modern education. The main threat for medicinal plants in the area arises from agricultural expansion, firewood, charcoal production and construction. In addition, the multipurpose use of some of the medicinal plants led to overexploitation followed by the depletion of the natural population became a highly threatening factor for the medicinal plants in the study area. Threat exerted on medicinal plants was high due to the utilization of root.
Even though there was no conservation measure taken in the area, the people of the district had started conservation either in their original place or in home gardens.

**RECOMMENDATIONS**

Based on the results of the study, the following recommendations are forwarded:

1. Special consideration and all possible endeavors must be made to use the traditional medicinal plants in the study area.
2. The indigenous knowledge and skill of preparing traditional medicine of indigenous people must be encouraged and protected. This could be the way through which such people could exercise their knowledge boldly.
3. Identifying effective medicinal plants and promoting their production and cultivation. This is a task to be accomplished through genuine collaboration between local administrators and local people.
4. Encouraging people to grow medicinal plants in the home gardens, mixing with crops in farmlands, as live fences and on degraded land.
5. The uses of medicinal plants for the treatment of different ailments indeed need to be confirmed through scientific investigations to identify those that may provide alternatives for modern drugs.

**CONFLICT OF INTERESTS**

The author has not declared any conflict of interests.

**ACKNOWLEDGEMENTS**

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