

Ethnobotanical Study of Medicinal Plants in Hidabu Abote District, North Shewa Zone, Oromia Region, Ethiopia

Boja Tilinti , Yoseph Melka , Tesfaye Awas

Corresponding Author: Boja Tilinti, Forestry Department, Madda Walabu University

Abstract

The world population use medicinal plants for treating diseases in forms of drug developments also traditional medicinal specially developing countries. The aim of the study is to investigate medicinal plants and associated indigenous knowledge. Ethnobotanical data were obtained using semi-structured interviews and focus group discussion. Data were analyzed by descriptive statistics and Direct matrix ranking by SPSS version 20. Ethnomedicinal use of 136 medicinal plant species belonging to 117 genera and 63 families were identified and documented. Most of the medicinal plants harvested were herbs (37.50%), followed by trees (36.76%) and the least was lianas (0.74%). A Pearson correlation test indicated a positive significant difference between age of informants and number of medicinal plant species cited, and negative significant difference between level of education and number of medicinal plant species cited. *Cordia Africana* ranked first as a multipurpose medicinal plant. Agricultural expansion (41.96%) stood first as a factor threatening medicinal plants. To support local people effort on in-situ conservation and ex-situ conservation needed.

Results and Discussions

Medicinal Plants in Hidabu Abote district

A total of 136 medicinal plant species belonging to 117 genera and 63 families were identified in study the area. The number of medicinal plant species reported were higher than that of recorded to the Debre Libanos district by Getaneh and Girma (2014) where 83 medicinal plants were identified. This observation shows that the local peoples in Hidabu Abote district have relatively extensive knowledge of how to use plants as medicine against different diseases. Among the 136 medicinal plant species recorded from the study area the highest representation was for herbs, which accounts for 51 (37.50%) species, followed by trees 50 (36.76%) and the least was liana, which for 1(0.74%) species. This finding agrees with previous studies by Enyew et al. (2014); Kebede et al. (2016) who reported dominance of herbs for medicinal purpose.

Parts used, mode of preparation and routes of administration

Root parts of medicinal plants were the most frequently reported to be used in study area (25.74%), followed by leaves (24.26%), roots and leaves (9.56%) and seeds (8.82%) inline with other finding in Ethiopia (Lulekal et al., 2008; Limenih et al., 2015) and other countries (Okello et al., 2010). The major modes of preparation were crushing (17.65%), pounding (16.91%), powdering (13.97%), squeezing (5.88%), chewing (5.15%), pounding and powdering (4.41%). The major routes of administration used in the study area were oral only (30.88%), dermal only (14.71%), nasal and dermal (11.76%), nasal only (8.09%), dermal and oral (5.88%), dermal, nasal and oral (4.41%).

Conclusion

In Hidabu Abote district several plants are used for medicinal purposes. As compared to other studies much number of medicinal plants and associated indigenous knowledge were reported to be used in study area for human and livestock ailments. In the study area elders have better knowledge of medicinal plant than younger, while there was negative and significant difference between level of education and number of medicinal plant species cited. Also, there was also a significant difference was found between number of medicinal plants reported by key informants and household respondents. Agricultural expansion, firewood collection, construction, fencing, furniture, drought and charcoal were threatening medicinal plants in the study area. Local peoples were practicing ex-situ and in-situ conservation to decrease degradation of medicinal plants from the study area.

Introduction

Ethnobotany is a broad term referring to the study of the relationship between peoples, plants and the environment involving wide range of disciplines with particular emphasis on traditional cultures (Cotton, 1996). Indigenous knowledge of medicinal plants and their use by indigenous cultures are not only beneficial for conservation of cultural traditions and biodiversity, but also healthcare and drug development in the present and upcoming day (Tamiru et al., 2013). The world primary means of treating diseases and fighting infections has been based on the use of medicinal plant species. From ancient times, plants have been rich sources of effective and safe medicines (Russell et al., 2006). Globally, about 64% of the total world population is reliant on traditional medicine for their healthcare needs (Phondani et al., 2016). In Ethiopia, over 80% of the population was relies on traditional medicines (Tadesse et al., 2005; Bekele, 2007). The major reasons why medicinal plants are demanded in Ethiopia are due to culturally associated traditions, the trust of communities on medicinal values of traditional medicines and relatively low cost in using them (Bekele, 2007).

Ethiopia is a country with various types of climatic, topographic, soil features and agroecological zones (Institute of Biodiversity Conservation, 2005). This makes the country to have a rich and diverse fauna and flora. But little emphasis has been given to ethnobotanical studies over the earlier periods (Dawit, 2001), while there are some attempt in investigating medicinal plants and indigenous knowledge on sustainable use of plant resources. Awas (2007) noted that detailed information on medicinal plants of Ethiopia could only be acquired when studies are undertaken in several parts of the country where little or no botanical and ethnobotanical explorations have been conducted.

Results and Discussions

Distribution of knowledge of medicinal plants among local peoples

A Pearson correlation test indicated a positive and significant ($r = 0.409$, $p < 0.001$ and $\alpha = 0.05$) correlation between age group and the number of medicinal plant species reported by the household respondents in the study area. Similar finding were reported by (Zenebe et al., 2012; Kebede et al., 2016). A Pearson correlation test indicated a negative and significant ($r = -0.299$, $p < 0.001$ and $\alpha = 0.05$) correlation between a level of education and the number of species reported by the household respondents in the study area similar finding with (Zenebe et al., 2012; Kebede et al., 2016).. The average number of medicinal plants reported by males was 4.97 ± 3.38 whereas that of females was 2.90 ± 1.52 (mean \pm SD). There was significant difference between male and female in their knowledge of medicinal plants ($t = 2.767$ and $p < 0.009$). The average number of medicinal plants reported by key informants was 9.85 ± 3.18 , while that of household respondents was 4.60 ± 3.22 (mean \pm SD). There was significant difference between number of medicinal plants reported by key informants and household respondents ($t = 6.72$ and $p < 0.001$).

The results of the direct matrix ranking revealed that *Cordia africana* ranked first and hence it was the most preferred plant by local peoples for various uses and the most threatened species as the key informants reported, which was evidently shown by its scarce distribution in the area. This scarcity of *Cordia africana* was due to over harvesting for not only medicinal but also for other uses such as furniture and firewood mostly.

Threat and conservation of medicinal plants

Based on respondents perception agricultural expansion (41.96%) stands first to be a threatening factor of medicinal plants in the study area, followed by firewood collection (33.04%) and overgrazing (25.00%). Ex-situ conservation such as plantation of medicinal plants in homegarden and seed storage, and In-situ conservation such as limiting grazing by livestock's and pruning branches of species regenerate themselves by pruning (i.e. *Afrocarpus falcatus*) was practiced by local peoples.

Materials and methods

The study district's capital Ejere is 146 km away from Addis Ababa (HADANRO, 2016).

Before starting the actual field study, reconnaissance survey was conducted to obtain information about socio-economic characteristics of local people and indigenous agroclimatic classification of kebeles in the district. Based on the information obtained during reconnaissance survey, kebeles were stratified to three agroclimatic zones (highland, midland and lowland); three sample kebeles were purposively selected from three strata's depending on the proximity to forest and availability of traditional healers. Sample respondents were selected from each selected kebeles randomly after list of household was obtained from kebele administrative offices. 20 key informants were selected from traditional healers and knowledgeable informants by snowball method.

The sizes of household respondents sample were calculated by using the following formula (Espinosa et al., 2012). Accordingly, semi-structured interviewees, focus group discussions, and guided field walks with informants were employed.

Plant identification was performed at Herbarium of the Ethiopian Biodiversity Institute.

Descriptive statistics such as percentage and frequency were employed to summarize the data on medicinal plants use and associated indigenous knowledge.

Statistical Package for Social Science (SPSS) Version 20 was used to summarize Pearson correlation relationship and to compare mean t-test.

Direct matrix ranking was conducted in order to compare multipurpose medicinal plants commonly reported by informants following Cotton (1996).

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