



Ethnobotanical study of medicinal plants used by indigenous people in and around Dirre Sheikh Hussein heritage site of South-eastern Ethiopia



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ABSTRACT

Ethnopharmacological relevance: The uses of medicinal plants have a long history and become important sources of the health cares in Ethiopia. These medicinal plants and their associated indigenous knowledge are being seriously depleted due to rapid change in environment and socioeconomic conditions of the country. However, as to the knowledge of the present researchers, limited studies have been done to identify these medicinal plants and to preserve the communities' indigenous knowledge on these plants.

The aim of the study: This study aimed at assessing and documenting traditional medicinal plant species, mode of preparation and delivery, and parts used in and around Dirre Sheikh Hussein heritage site of South-eastern Ethiopia. The study was also meant to explore related indigenous knowledge of the communities on the utilization of medicinal plants.

Material and methods: The data were collected using household survey, in-depth interviews of key informants, focus group discussion and field observation. The number of informants involved in the survey was 194 (one hundred ninety-four).

Results: A total of 87 medicinal plants belonging to 77 genera and 51 families were identified. These medicinal plants were comprised of shrubs (33%), trees (31%), herbs (29%) and climbers (7%). Of the total number of medicinal plants found out in the study, 43 were used to treat human diseases, 8 were used to cure animal diseases and 36 were used to treat both human and live stock ailments. Of the identified plant species, about 83% species were proved that they are commonly known and used elsewhere whereas, the uses of remainder ones are limited to the study area. Most of the medicinal plants (60%) were sourced from the forest and the rest were found from both the forest garden. The study also revealed that leaves were the most frequently mentioned (36%) plant part used in preparing remedies. Crushing (20%) and oral route of administration (59%) were commonly mentioned mode of preparation and administration, respectively. The study also indicated that peoples' perception and cultural beliefs had significant influence on their preference of source of health care, whereas religion was found to have no association with the health seeking behavior.

Conclusions: This study revealed that varieties of plant species are playing important role for treating different human and livestock diseases in the study area, and traditional healers have accumulated wealth indigenous knowledge on usage of plant medicine inherited through generation. Besides, the therapeutic use of the documented plants will provide basic data for further research that focus on pharmacological studies and the conservation of the most important medicinal plants.

1. Introduction

The use of medicinal plants had been practiced since the ancient time and become an important source of the health care in Ethiopia (Giday and Teklehaymanot, 2013). Out of 6500–7000 species of higher plants reported in flora the country, about 800 species of plants are being used in the traditional health care system to treat nearly 300

physical and mental disorders (Teklehaymanot, 2009). About, 80% of Ethiopian population relies on traditional medicine to treat different types of human illness (Bekele, 2007). Besides, more than 90% of livestock health in the country depends on traditional medicine, and over 95% of the traditional remedy preparations are a plant origin (Tantot et al., 2003). The reasons for using traditional medicines include: the cultural acceptability of healers, presence of local pharmacopeias,

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relatively low cost of traditional medicine (Hunde et al., 2011), and lack of adequate healthcare services in the country (Bekele, 2007). For instance, in 2000 alone, 9.45% of all deliveries in Ethiopia were attended by trained attendants and health workers. The rest were attended by traditional birth attendants (Lambert, 2006). A study of pharmaceutical drug use also showed that 35% of the Ethiopian population did not obtain prescribed drugs due to lack of money (Hanbin and Gao, 2003). Like many other Ethiopian, people around Dirre Sheikh Hussein heritage site are affected by waterborne diseases such as typhus, typhoid, amoebae, giardia and even bilharziasis; however, it has recently been noticed a less acute prevalence of those diseases. Moreover, 36 Peasant associations in the study area are actually suffering from high malaria prevalence because of higher levels of illiteracy and poverty (Piguet, 2003). These rural people rely almost exclusively on traditional medicine for their primary health care. The dependence on traditional medicine is high due to lack of modern healthy services. Although the communities have known and used a lot of medicinal plants, no one has documented their knowledge for future uses. Many medicinal plants and associated indigenous knowledge are being seriously depleted due to agricultural expansion, deforestation, fuel wood harvesting, overgrazing and urbanization (Khan et al., 2012; Mesfin et al., 2013). On the top of this, most of the indigenous knowledge which are still available among traditional healers, is either be lost or passed to next generation only by the word of mouth. Besides, lack of adequate documentation on knowledge of ethnomedicinal plants is among often cited problems in the study region (Birhanu et al., 2015). Hence, valuable indigenous knowledge associated with medicinal plants need to be properly documented (Awat et al., 2012). The present study was conducted, firstly, to identify plant species used as remedy for human and livestock diseases, secondly, to determine plant part(s) used, mode of preparation and routes of administration, and thirdly, to determine the influence of perception, culture and religious belief on preferred source of healthcare in and around Dirre Sheikh Hussein heritage site of South Eastern Ethiopia.

2. Materials and methods

2.1. Description of the study area

The study was conducted from November 01 to February 30, 2016 in and around Dirre Sheikh Hussein heritage site, Bale Zone, South Eastern Ethiopia. Dirre Sheikh Hussein is a religious, cultural and historical center which has great significance to millions of the followers of the Islam Religion throughout Northeast Africa. The sanctuary of Sheikh Hussein contains different components that include mosques, shrines, stone-walled fences, tombs, water ponds, festive and ceremonial yards natural forests/landscapes and a historically associated human settlements. It is located 620 km far away from the Capital city Addis Ababa, Ethiopia. The study site is geographically situated between 7°15'–7°51' N and 40°19'–40°52' E (Fig. 1). The elevation gradients constituting from, lowland (1200–1500 m a.s.l) to highland (2301–2660 m a.s.l). The mean monthly temperature is estimated to 22 °C (ranging from 17 °C to 27 °C), and mean total annual rainfall is 900 mm (ranging 600–1200 mm). Based on Central Statistical Authority (2007), the population of the study district is amounted to 110,286, and is predominantly occupied by the Oromo people who speak Afan Oromo language. The dominant vegetation types in the area are trees, shrub and herbaceous species. The dominant tree species include *Cordia africana* Lam., *Acacia abyssinica* Hochst., *Croton macrostachyus* Del., *Eucalyptus camaldulensis* Dehnh., *Juniperus procera* Hochst ex Endl. and *Ficus* species. The shrub layer includes *Olea europaea* L. subsp., *Carissa spinarum* L., *Calpurnia aurea* (Ait.) Benth. *Vernonia* spp. The livelihood of the local people in the study site depends on mixed farming but pastoralism predominates over crop production. In addition, bee keeping and collection of wood and non-wood products (e.g., wild edible and medicinal plants, incense, gum and etc.) are practiced.

2.2. Sample size and sampling techniques

The required sample size was obtained using Njoroge et al. (2010), formula as shown below.

$$S = \chi^2 NP(1 - P) \div d^2(N - 1) + \chi^2 P(1 - P).$$

Where; S = required sample size, χ^2 = table value of chi-square for 1 degree of freedom at the desired confidence level (3.841), P = the population proportion (assumed to be population using and practicing medicinal plant (80%) in Ethiopia (Bekele, 2007), N = population size (2417) and d = margin of error (6%).

The use of medicinal plant is not regulated and the number of community that goes to the healer has not been recorded in Ethiopia. But, there is a high expectation of enormous indigenous knowledge on the use of medicinal plant species in Ethiopia due to the existence of diverse languages, cultures, beliefs and significant geographical diversity which suited the availability of different habitat for medicinal plant. However, sample size was calculated using the proportion of the population using medicinal plants. The required sample size became 160 households. By adding a non-response rate of 5%, the minimum sample size became 168. But, we sampled a total of 194 households (including 20 key informants) to ensure the representativeness of the sample. For this study, four kebeles were purposively selected based on their proximity to Dire Sheikh Hussein heritage site, the availability of medicinal plants and traditional healers, religious and cultural intactness. Accordingly, Kejewa, Dire Sheikh Hussein, Ourgessa and Kura wada kebeles were selected from the area. Kebele is the lowest administrative unit within the district in Ethiopia. Twenty key informants (five for each kebele) including specialized herbalists, knowledgeable elders, religious leaders and development agent were selected through snowball sampling methods (Stepp, 2005). In this method, five (5) individuals were purposively asked to give the name of 5 KIs in each sample kebele, and then the most frequently appeared 5 KIs were taken for further discussion. A total of 174 households were randomly selected from the list of households in the study area. This made 194 sample households, constituting 125 males and 69 females.

2.3. Ethnobotanical data collection

Household survey was undertaken with randomly selected households on medicinal plants and parts used, mode of preparation and administration, condition of uses, habitats of medicinal plant and influence of perception, culture and religious believe on preferred source of healthcare. Key informants interview was carried out to pre-test the relevance of questionnaires that were employed for household survey. Besides, four focus group discussions each of which consists of 10 members of traditional healers, religious leaders and knowledgeable elders were carried out. For these joint discussions, questionnaires that were employed for household survey were brought to make triangulation and validation of the information given by respondents. This method assumed that there exist variation in opinion, experiences and knowledge among informants. Floristic voucher specimens were collected with the help of traditional healers, knowledgeable elders and development agent. The collected specimen were properly identified by comparing with already identified specimens in Herbarium of Ethiopian Biodiversity Institute using taxonomic literatures such as Edwards et al. (1995, 1997, 2000); Hedberg and Edwards (1989, 1995) and Hedberg et al. (2003, 2004, 2006).

2.4. Data analysis

The ethnobotanical data were analyzed using Microsoft Office Excel spreadsheet (2010) and SPSS version 20 software. A descriptive statistics was employed to analyze and summarize the data on reported medicinal plants, parts used, mode of preparation and administration. Data on the influence of perception, culture and spiritual beliefs on

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