

Transference of Ethnobotanical Knowledge and Threat & Conservation Status of Medicinal Plants in Ethiopia: Anthropological and Ethnobotanical Perspectives

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Submission: 📅 August 19, 2017; **Published:** 📅 October 10, 2017

Abstract

In Ethiopia, the use of traditional medicine for primary health care is becoming accepted and popular. However, it is under great risks when looked from the point of losing the knowledge transfer and the degradation of the vital medicinal plants. Thus, this review was initiated to briefly look into how is the very common way of transferring indigenous knowledge and to look at the threats & conservation effort of medicinal plants in the country. The review indicates that indigenous knowledge of medicinal plants is transferred from a practitioner father to elder son as he is getting older. However, if there is no elder son it would be passed over to any one among the family who is supposed to be loyal to keep the knowledge secret; but if the practitioner does not have families, the knowledge passes to any one among his relatives who is believed to keep the knowledge secret. This review also showed that the main reasons for the degradation of medicinal plants in Ethiopia are environmental degradation, agricultural expansion, deforestation, over harvesting of species and invasive alien species. It is also indicated that Ethiopia is practicing both in-situ and ex-situ conservation. The Ethiopian traditional medicine association should work to fill the gap between how the herbalist can transfer their knowledge even to the wider researcher without compromising the rule to Convention on Biological Diversity (CBD). Participatory medicinal plant conservation shall be the best approach to follow in the country as a better conservation strategy. To access the conservation effort, the Ethiopian Biodiversity Institute (EBI) has to expand cold room gene banks and field gene banks in different provinces of the country.

Keywords: Ethiopia; Ethnobotanical knowledge; Ex-Situ conservation; Gene bank; Threats of medicinal plants

Introduction

Utilization of traditional medicinal plants in various areas of the world is very evident. It has been said that majority of the developing country is relied on traditional medicinal plants (TMPs) for the primary healthcare. This is not only because of poverty, shortage of allopathic doctors, and less access of hospitals but also due to the fact that it is more culturally accepted and does not produce complications for harming the physiology and anatomy of a patient as modern medicine may does [1,2]. While showing how far these TMs goes in line with our physiological needs, Hippocrates who mainly remembered as a father of medicine said that herbal remedies contain synergistic and/ or side effects neutralizing combinations [3].

Apart from the very reliance of developing countries on traditional medicines (TMs), and medicinal plants (MPs) the modern worlds are also showing great interests in using them for their healthcare. For example, India, Korea, Japan, China,

and Malaysia are frequently cited countries in using traditional medicine. WHO [1] in its report noted that in Australia, Europe and North America, "complementary and alternative medicine" (CAM) is increasingly used in parallel to allopathic (orthodox) medicine, particularly for treating and managing chronic disease. The same report showed that 31% of the population in Belgium, 49% of the population in France and 70% of the population in Canada uses CAM at least once.

Report of the United Nations Conference on Trade and Development (UNCTAD) revealed that in United states of America (USA) medicinal plants have been used as one alternative therapies and its application increased from 34% in 1990 to 42% in 1997 [4]. In Latin America 71% of the population in Chile and 40% of population in Columbia have been reported to use TMs [5]. In many Asian countries TMs are widely used even though western medicines are often readily available [6,7].

Not only the indigenous people but also allopathic doctors are well aware of the use of TMs. For example, 40% of all general allopathic practitioners of United Kingdom (UK) offer some form of TM referral. In Germany 80% of the physicians prescribe herbals [3]. In Japan about 70-85% of physicians prescribe herbal medicine to their patients [5,8].

The acceptability and use of TMPs in developed countries also revealed in terms of the high demand for the marketability of MPs for their therapeutic values. Many developed countries like USA, Canada are involving in the exporting and/or importing TMPs. A report from WHO [1980] estimated the annual revenue generated from international trade of medicinal plants to have reached up to 500 million USD. Having understood the importance of traditional medicines some other developed countries like Australia, China, Mexico, Thailand, among many others, have started integrating TM/ CAM within their health care policies and programs [9].

As elsewhere in other continents, Africans have been supposed to use TMs to safe guard against disease since time immemorial [10,11]. The report from world health organization (WHO) revealed that about 80% of the population in Africa primarily relies on traditional medicinal plants [1]. As a matter of testimonial there has been found documentary evidences like that of medicinal plants of East Africa [12], Medicinal plants of North Africa [13]. Ayensu [13] have documented medicinal plants of West Africa. Hutching & Terblanche [14] also emphasized the use of herbal remedies for the physical and physiological health care in South Africa.

WHO [1] reported the degree of some specific African countries towards the use of TMs; and accordingly 70% of the Benin people use TMs. Similarly 70% of Rwandans, 60% of Tanzanians, 60% of Uganda peoples are relied on TMs. The same organization in 2003 reported the use of TMs in treating and/or proactive prevention for some chronic disease. For example in Ghana, Mali, Nigeria and Zambia, the first line treatment for 60% of children with malaria is the use of herbal medicine, and in South Africa, 70% of people living with HIV/AIDS use traditional medicine [15].

Ethiopia is a land of mosaic topographies which is responsible to have diverse *Floras* and *Faunas* [16]. It is also a land of multiple ethnic groups, and a land of Lucy (first known primitive human species; and scientifically known as *Australopithecus Afarensis*), Selam (Lucy's baby, world's oldest child belonging to the species *Australopithecus Afarensis*) and Ardi (*Ardipithecus Ramidus* which is another fossil that gave evolutionary proof for human origin and believed to have lived even before Lucy did on this world) [17]. These archeological findings signifies the country as the cradle of humanity; and hence it is not that much astonishing to have deep rooted indigenous cultures in Ethiopia. These traditional practices associated with plant base health care systems are in use since time immemorial [18] and is supposed to be the only system available for health care before the introduction of allopathic medicine to get cured from disease arising from worms, fungi, virus and protozoa [19]. According to this scholar 80% of the populations in Ethiopia use TMPs as the primarily health care system. As

closer to this agreement WHO [1] reported that the number of Ethiopian populations using TMPs reached about 90% exceeding other African countries like Benin (70%), Rwanda (70%), Tanzania (60%), Uganda (60%). This shows that using traditional medicine in Ethiopia for primary health care are becoming accepted and popular. In spite of the fact that TMP is a backbone of our medication system, it is under great risks from the point of losing the knowledge transfer about these traditions and the degradation of these vital medicinal plants. Thus, this review is initiated to briefly look into how is the very common way of transferring indigenous knowledge and to look at the threats & conservation effort of medicinal plants in the country.

Methods

This review work was conducted by consulting relevant related literatures on transference of indigenous ethnobotanical knowledge and issues related to opportunities and challenges of ethnobotanical floras. Observation of Herbarium medicinal specimen, interview and personal communications with academicians and researchers on the area has also been undertaken.

Significance of the Review

This review paper is summarizing information on the transference and maintenance of ethnobotanical knowledge in Ethiopia where there is the imminent risk of loss of numerous floristic materials susceptible to ethnomedicinal use. This review is supposed to be used by academicians and researchers to imply a great advance in knowledge of both sociologist and ethnobotanist.

Discussion on the Outcome of the Review

Most often priorities in transferring indigenous ethnobotanical knowledge in Ethiopia: anthropological perspectives

Because Indigenous Knowledge (IK) is highly diverse and is with dynamic nature, it may not possible to develop a single and exclusive definition of the term. However, most scholars and organizations agreed that it is the knowledge, innovations, and practices which are an integral part of the culture, history and identity of a particular indigenous people and local communities around the world [19-25]. IK is broad term. For example, religion and spirituality for indigenous peoples are parts of IK [26,27]. It is not even confined to aborigines alone; all communities have developed their own body of knowledge over generations [28,29].

Indigenous knowledge associated with medicinal plants has been part of the people's culture in Africa Sofowora [10]; and in Ethiopia more than 80% of the people are dependent on plants for their healthcare service [16]. In this country such healthcare system is often unwritten and handed down orally from generations to generations. The knowledge about the plant use and the method of preparation are often kept secret [30].

Most often the practitioner father, as he is getting older, gives priority to his elder son in passing over his IKs [31]. However, if there is no elder son it would be passed over to any one among the family who is supposed to be loyal to keep the knowledge

secret; but if the practitioner does not have families, the knowledge passes to any one among his relatives who is believed to keep the knowledge secret [32].

Threats and conservation of medicinal plants in Ethiopia: ethnobotanical perspectives

Threat to medicinal plants in Ethiopia: In spite of the fact that TMPs and its associated IK have tremendous role in having medicinal value, food value, economic value, conservation value, etc. they are now under great threats mainly due to anthropogenic factors [33-35]. Those and many others studies also reported that most of the medicinal plants are from wild and only some others grow near home [36]. This tells us that the loss of forests directly links with the loss of MPs; but obviously forests are getting lost in Ethiopia. It has been said that about 16% of the country in 1954 was covered by forest which has gone down alarmingly to 4% in 1979, and at present only less than 3% is supposed to be covered by forest [37]. More over Desta [38] claimed that the current rate of deforestation is about 150,000 to 200,000 hectares per year which is supposed to eliminate the remaining natural forests with in a period of thirty years.

A study conducted by Ensermu Kelbessa and his colleagues nearly two decades ago found out four important reasons for the degradation of medicinal plants and associated IK. These include environmental degradation, agricultural expansion, deforestation and over harvesting of species. In line with this a study conducted by Zemedu [39] & Edwards [40] also showed similar threatening factors exposing medicinal plants under a problem of sustainability and continuity. In addition to those findings recent studies by the International Livestock Research Institute (ILRI) and International Union for Conservation of Nature (IUCN) reported that invasive alien species are currently known treat to MPs in Ethiopia [41,42]. Very recent studies also indicated that some medicinal plants are under threat due to increased use pressure coupled with unsuitable harvesting that frequently targets roots and barks (Figure 1) for remedy preparations.



Figure 1: Examples of bad harvesting system, A-debarking *Prunus africana* & B and C- uprooting of *Asparagus africana* for local remedial preparation in Ada'a District, Ethiopia.

The endangered threat status of *Prunus africana* throughout Ethiopia might have resulted from such practices. *Taverniera abyssinica* (commonly known as 'Dingetegna' in Amharic, the national language of Ethiopia) is also another important medicinal species in the country reported for treating stomach ache, headache and fever. The root part of this shrub is the most wanted and hunted

part for herbal preparation; and consequently uprooting is killing this medicinal species making it one of the critically endangered species of the country [43]. Currently *Taverniera abyssinica* only found as a remnant of isolated and scattered populations in Shewa, Tigray and Welo regions of Ethiopia (Figure 2) [32,44].



Figure 2: *Taverniera Abyssinica*, a well-known medicinal plants in Ethiopia and currently at risk due to over utilization of the root system for traditional remedy preparation (Photo taken with permission from Herbarium of Haramaya University, Ethiopia).

Those and other perilous events are exacerbating challenging pressure on medicinal plants of Ethiopia. Because of this degrading ongoing process, Tesfaye [45] seemingly scared and suggested that with the present ecological and socio-economical changes, the medicinal plants together with an ethnobotanical knowledge may be vanished from humanity forever, and this is a great disaster. That is why fully conscious ethnobotanists compare the death of an experienced herbalist to the loss of a whole library [9].

Conservation efforts of medicinal plants in Ethiopia: Efforts have been done for conservation of MPs in Ethiopia even though it is not yet enough when compared with the speed and frequency of taxa being lost. Both in-situ and ex-situ conservation approaches are being practicing by Ethiopian Biodiversity Institute (EBI).

The two forms of ex-situ conservation practicing by EBI are seed storage in Cold Room Gene Bank and Field Gene Bank; and accordingly around 31 MP species were conserved in the cold room gene bank and around 300 samples of MPs were conserved in Wendo Genet Medicinal Field Gene Bank [45]. This scholar also gave notice about Community based in-situ conservation of MPs which are taking place in Kefa, Bale, Tigray, North Shewa, South Welo, and Eastern Shewa provinces of Ethiopia.

Ethiopia also signed the Convention on Biological Diversity (CBD) which contain article 8j to guaranty indigenous people to maintain and conserve their IK associated with medicinal plants [46]. About 1000 different medicinal plants have been conserved as a voucher specimen in the national herbarium of Ethiopia and data base has also been established for them [32]. Endeshaw [47] studied the ways to propagate some traditionally useful medicinal plants which is one important step for the conservation of medicinal



plants by propagating in or near home gardens. Zemedede Asfaw [24] also noted the contributions of Home gardens for the conservations of MPs. Whether aiming for conservation purpose or not Ethiopia, unlike many other countries both from Africa and Europe, do not have a legal trading of medicinal plants which by itself contribute to the conservation of MPs.

Conclusion

This review indicates that the knowledge about the plant use and the method of preparation in Ethiopia are often kept secret. In most cases the practitioner father, as he approaches to die, give priority to the elder son in passing over his IKs. However, if there is no elder son it would be passed over to any one among the family who is supposed to be loyal to keep the knowledge secret; but if the practitioner does not have families, the transference will be given to any one among his relatives who is believed to keep the knowledge secret. The main reasons for the degradation of medicinal plants and associated IK in Ethiopia are environmental degradation, agricultural expansion, deforestation, over harvesting of species and invasive alien species. The two forms of ex-situ conservation practicing by EBI are seed storage in Cold Room Gene Bank and Field Gene Bank; and accordingly around 31 MP species were conserved in the cold room gene bank and around 300 samples of MPs were conserved in Wendo Genet Medicinal Field Gene Bank.

Recommendation

The Ethiopia traditional medicine association should work strongly to convince the herbalists on how to transfer their knowledge even to the wider researcher without compromising the rule of CBD. Participatory medicinal plant conservation shall be the best approach to follow in the country as a better conservation strategy. To access the conservation effort, Ethiopian Biodiversity Institute (EBI) has to expand cold room gene banks and field gene banks in different provinces of the country.

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