

Prospects and Challenges of Medicinal Plants Conservation and Traditional Medicine in Tanzania

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Abstract

A qualitative study was carried to assess prospects and challenges of medicinal plants conservation and traditional medicine in Tanzania. The study shows that TRM and medicinal have great prospects in healthcare delivery worldwide. These prospects have more impact in developing countries where 70%-80% of population used TRM for Primary Healthcare (PHC). It is reported that 25% of prescribed drugs in conventional healthcare were derived from their ethnomedicinal use in TRM. Medicinal plants still provided hope for discovery of new drugs for the resistant diseases and those that were not treated by conventional prescribed drugs. Traditional medicine and medicinal plants were faced with challenges notably; threats due to increasing depletion of the natural resource as an impact of population increase, urbanization, modernization of agriculture and climatic change. There was erosion of indigenous medical knowledge as most of the traditional health practitioners were aging and dying, while the expected youths to inherit the practice shy away from practice. The youths in rural settings who were willing to practice some of them die because of AIDS. The other major challenges on traditional medicine and MPs were constraints and include lack of data on seriously threatened and endangered medicinal plant species. Others include inadequate and conflicting guidelines on management and utilization of natural resources, especially medicinal plants. Efforts for scaling up the practice of TRM and medicinal plant conservation have been suggested. These were creating awareness of the importance traditional medicine and medicinal plants in healthcare; training THPs on good practices for provision of healthcare; conserving medicinal plants through in-situ and ex-situ programs and sustainable harvesting of medicinal plants resources and training conventional health workers on the contribution of TRM and medicinal plants in PHC. Traditional health practitioners, TRM and medicinal plants should be essential components in PHC in order to meet the health millennium goals by 2025.

Keywords: Tanzania; Traditional Medicine; Medicinal Plants; Opportunities; Threats; Constraints

Introduction

Although modern medicine is well developed in most of the world, large sections of the population in developing countries especially in rural areas where more than 80% of the population live still rely on Traditional Medicine (TRM) for Primary Care (PHC) [1-5]. THPs include Traditional Healers (THs) and Traditional Birth Attendants (TBAs) [6]. Medicinal plants constitute 95% of the total components of TRM [6]. The major reasons for use of TRM and its practitioners for healthcare needs in these countries are inadequacy of health facilities, medical personnel, drugs and other medical supplies [7-10]. Most of the useful herbal plants are collected from the wild [4,5,11]. TRM and its practitioners are interwoven in the community's culture with its beliefs and taboo [3,12-14]. Importance of traditional medicine is also underscored by the African Union Head of State because conventional medicine and other medical supplies are increasingly expensive and most of these countries cannot afford to buy for meeting people's health need [15,16]. Legal framework should be developed to safeguard the practice of TRM and sustainable conservation of medicinal plants [15,16]. Promoting TRM in African countries and other developing countries in rural is the only possible surest means of bringing equal health to all at present. During the past decades, public interest in natural therapies has increased greatly in industrialized countries, with expanding use of herbal medicines [5,10]. One of the main reasons for increasing use of TRM in developed countries is the growing trend for patients to take a more proactive approach to their own health and seek out different forms of self-care for betterment of their health [5,10]. Medicinal plants are important for pharmacological research and drug development as starting materials for the synthesis of drugs or as models for pharmacologically active compounds [10]. Sustainable development of TRM in developing countries requires serious

investment on medicinal plants conservation and TRM for provision of better health care.

Current trend of population growth [17,18] has led to encroachment of forests including sacred forests that were cultural prohibited [12,13] and were areas where medicinal plants were found [12,19,20]. Sacred forests are also used for *matambiko* (traditional sacrifice) [12,13]. Not only that but also there are increasing number of companies in mining, road and railway construction, large or estate farming being introduced in many developing countries [19,20]. These human socio-economic activities have impact on medicinal plants, the main resource base of TRM [19,20]. Besides the above, it is being witnessed that in Africa, there is a high rate of deforestation and loss of biodiversity through bush fires, lumbering, bio prospectors on medicinal and aromatic plants [20-22,23]. For example, a recent study by FAO shows that from 1980 to 1990 the world's tropical forests were reduced by an average of 15.4 million hectares (8% annual rate of deforestation) [23]. In Africa the rate of deforestation exceeds the global annual rate of reforestation [22,23]. In Tanzania, depletion rate is estimated to be at 300,000 to 400,000 hectares per year [24-26]. Further, Tanzania holds a

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Received September 17, 2013; **Accepted** October 07, 2013; **Published** October 14, 2013

Citation: Kayombo EJ, Mahunnah RLA, Uiso FC (2013) Prospects and Challenges of Medicinal Plants Conservation and Traditional Medicine in Tanzania. *Anthropol* 1: 108. doi: [10.4172/2332-0915.1000108](https://doi.org/10.4172/2332-0915.1000108)

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unique position in the world as it is a home to a number of plants and animals some of them might have some medicinal value [27,28]. These natural resources and human practices are likely to lead to extinction of endangered plant/animal species and destruction of natural resources as a whole that are needed as raw materials for TRM practices [27,28]. The endemic plants in developing countries are highly targeted by gene hunters; and hence increasing threat and ultimate extinction of medicinal plants [29,30].

The transmission of indigenous knowledge on TRM has been mostly verbal and apprenticeship [31,32]. THPs who are reservoirs of indigenous knowledge and custodian of TRM and its practices are old and dying [31,33,34]. Studies reveal that most of the youths who are expected to inherit the practice of TRM are in schools and higher education institutions [35]. The movement of youths to urban or to schools is creating a problem of succession of the practice of TRM in developing countries. Further it is likely to weaken the medical knowledge of THPs as custodians of traditional medicine practices in the communities and emergence of charlatans and quacks in the practice. TRM practices is providing services in parallel with conventional medicine and alternative medicines like homeopath, oriental medicine, chiropractic and other conventional practice [36]. The introduction of these other complementary health practice is likely to have an impact on the growth of traditional medicine, because patients might be seeking these alternative medicine practitioners instead of TRM.

Development of traditional medicine needs funds for conservation of medicinal plants in the respective countries to identify endangered species. Many developing countries have donor depending budget [36,37] that might not allow the conservation of medicinal plants. Other possible huddles of growth of TRM are accessing the medicinal plants from the local reserved areas. An access to medicinal plants is also compounded by by-laws which are conflicting given the multiple uses as natural resources [24,25,37,38]. Some of these medicinal plants are used as timber products, building poles and utensils making; hence for conservation purposes, they are prohibited from harvesting for preparation of herbal remedies [24,25]. There is a need to evaluate the impact of these by laws on accessing medicinal plants for healthcare.

Hence there are opportunities and challenges in promotion of TRM and medicinal plants products in Tanzania and other developing countries. However currently there is no specific systematic study that has attempted to assess TRM resources in Tanzania and Africa south of the Sahara. Thus there is need to assess the natural and human resources needed in TRM in order to identify and document actual opportunities, threats, constraints and future prospects of the TRM and medicinal plants. The aim of this study was to assess status of TRM, medicinal plants and human resources in terms of opportunities, threats, constraints and future prospects in Tanzania guided by the following questions;

- i. What are the current opportunities of medicinal plants in African countries South of the Sahara?
- ii. What is the magnitude of threats and constraints of raw materials and human resources towards traditional medicine development?
- iii. What are the prospects of developing TRM in future taking into cognition of the level of modern technological development?

This paper answers the questions raised in the foregoing by employing some of the findings of the Network of Traditional Medicinal Plants and Traditional Medicine in East Africa study that

was carried in Tanzania Mainland in seven administrative regions [7]. The ultimate goal is to show the prospects and challenges of medicinal plants conservation and traditional medicine development in Tanzania.

Research Methodology

This study emanated from a wider study of the Network of Traditional Medicinal Plants and Traditional Medicine in East Africa, Tanzania chapter. This study was carried in seven administrative regions of Tanzania mainland (33% of total regions) namely Arusha, Coast, Dar-es-salaam, Iringa, Kilimanjaro, Morogoro and Tanga in the period 2004-2006, using qualitative approach. The study regions represent 42 districts and of these 14 districts were selected for this project representing 13% of the total districts in Tanzania. The total number of people living in selected regions was 14,173, 740 and of these 51% were women [18]. The main socio-economic activities in selected districts were peasant farming both food and cash crops; including livestock keeping especially in Arusha region. These regions and districts were purposively selected because of their accessibility to Dar-es-Salaam and considering time and framework of the project.

The study population was THPs, in-charge of research institutions and some researchers in research institutions and NGOs involved in traditional medicine, and plants conservationists. Purposively sampling methods was used to select participants for in-depth interview. Only those who were well versed with knowledge on TRM; using medicinal plants, and willing to participate in this study were sampled for the in-depth interview. The aim of using purposeful sampling technique was to get as much information on availability and accessibility as a way to establish opportunities, threats and constraints of TRM and medicinal plants from knowledgeable participants.

Detailed structured open ended questionnaire was prepared tested, and used for collection of data from the selected population after being refined. THPs questionnaire focused on historical background of the practitioners, source of materials and their availability; distribution medicinal plants, threat, extinction or endangered, problems encountered when collecting medicinal plants, any methods used for conservation, and what they think would be the way forward for continual sustainable supply of the medicinal plants. For in-charge of research institutions, researchers and NGO the questionnaire focused on their experience in herbal remedies used by THPs in the health care system. Also to assess their availability and distribution, threats, endangered, extinctions, conservation measures and legal aspects governing collection of herbal remedies. The interviews were conducted by researchers themselves by face to face with sampled population in their respective homes or at research institutions.

The collected and transcribed data was qualitatively analyzed using sociological and anthropology methods by research team where codes were identified and opened as shown in Grounded Theory Procedures and Techniques [39,40]. In the process of analyzing the information, axial coding was used. Data were put according to the identified categories and subcategories; in this way making connection between the central idea of the research and categories and subcategories. The analyzed reports were re-screened several times for ensuring all important information of opportunities, threats, constraints of TRM and medicinal plants reported from in-depth interviews were included in the report. A document was developed and reviewed by a competent researcher on qualitative work. The relevant comments from an independent reviewer were cooperated in the results. The results including relevant comments from the independent reviewer

were summarised and is presented below.

Results

Socio-demographic characteristics of the participants

A total of 72 participants of whom 7 were researchers from research institutes in universities, government officials and NGOs involved in traditional medicine and plants conservation participated in the in-depth interviews. The rest were THPs that included Traditional Healers (THs) and Traditional Birth Attendants (TBAs). About 20% of the participants were females. The age of the participants ranged between 35-60 years old.

Opportunities of traditional medicine and medicinal plants

The analysis of the findings from researchers and THPs showed that traditional medicine and its practitioners play an important role in healthcare; and had great opportunities at present and in future. The importance of TRM and its practitioners was more felt in rural areas where health facilities, medical personnel, drugs and other medical supplies were inadequate. It is in these areas in the country where most of the people live. As narrated by one of the researchers in the interview:

“In Tanzania especially in rural areas where the majority of the community live, people rely heavily on medicinal plants and THPs because they are relatively accessible, inexpensive and locally available when compared to conventional medicine. There is a shortage of medical doctors and other experts, thus making it necessary for most of rural communities to rely exclusively on THPs and medicinal plants for meeting healthcare needs”.

During the interview it was learnt that TRM was giving relieve to patients who were suffering from stomach ulcers, diabetes, HIV/AIDS, infants health problems with undefined ill health conditions in rural areas. Researchers also argued that emerging and re-emerging diseases which had no cure in the conventional medicine had led to increasing use of TRM. Traditional medicine and medicinal plants were promising areas for search of new drugs for resistant diseases encountered in conventional medicine as well as for diseases that have no cure.

Further, the analysis showed that some of the medicinal plants were species like *Zingibar officinalis*, *Allium sativum*; and some were food items such as *Tamarandus indica*, *Adansonia digitata*, *Moringa oleifera*, *Hibiscus subdarifa*. One researcher argued that some of the used medicinal plants were more preventive in nature as well as food supplements e. g. *Psidium guajava*, *Citrus sinensis*, *Cymbogon citrates*. All these medicinal plants were being used for a wide range of maladies both in rural and urban areas in Tanzania. The importance of medicinal plants was cemented by another researcher who argued that there were useful herbal preparations from medicinal plants for malaria, asthma, stomach ulcers, skin conditions, and fungal infection. That researcher further emphasised plants have great potential active ingredients; and some of these plants include aloe species, *Acacia* species, *Eurporbia hirta*, *Psidium guajava*, *Ocimum* species, *Mangifera indica*, *Tamarandus indica*, *Moringa oleifera*, *Hibiscus sabdarifa* and *Citrus lemon*. The findings showed many THPs have a lot of untapped Indigenous Medical Knowledge (IMK) and techniques that were useful on healthcare and other socio economic aspects. The observed IMK and techniques could be harnessed for betterment of the populace on health care and other utilities like defence, animal husbandry and decision making.

Besides the foregoing, opportunities of TRM were revealed on the legal framework aspects. Traditional health practitioners who participated in this study were aware that TRM was now recognized by the government of Tanzania. The government has established policy guidelines on the practice of Traditional and Alternative Medicine through the Act 2002. These entire instruments provide conducive institutional framework for development of TRM in the country. Researchers further indicated that there had been behavioral change for some THPs on better practice of TRM after the training that included THPs. Also researchers reported that there was an increasing use of remedies derived from medicinal plants world-wide. Moreover there were initiative in conducting research to develop drug products and income generating activities through trade in medicinal plants.

Threats of medicinal plants and traditional medicine

Despite the opportunities shown above there were challenges for the future development of TRM in Tanzania. The interviews have shown that there were threats of TRM and medicinal plants. Majority of plants and animals used locally in TRM and those exported were collected from the wild. There was an increasing demand of herbal medicine world-wide; and this has led to indiscriminate harvesting from spontaneous flora including in sacred forests in Tanzania where *matambiko* (sacrifice for thanks giving, repentance or request to the ancestors) were held. The increasing demand on medicinal plants was due to high cost in conventional medicine which has been ever increasing to users in developing countries and often inaccessible. Many plant species had become extinct and some were being endangered. Respondents gave specific cases of plants that were being threatened or being endangered. e.g. *Kizulu* (*Osyris lanceolata*) in the Pare land, Kilimanjaro region, *Kigelia africana* and *Steganotaenia araliacea*. It was reported there was introduction of exotic plant species in many parts of the country threatening indigenous plants growing in the same area. Two plant species *Azadirachta indica* and *Eucalyptus ssp.* were mentioned as exotic plants that had negative effect on development of indigenous plant species. Little effort was made in planting indigenous useful medicinal plants in home garden and farms

Another threat mentioned in interviews mainly by researchers was climatic changes that include global warming which has an effect on the distribution of medicinal plants. The changes have contributed to loss of genetic resources in areas where they were used to be found. However respondents did not give a specific example of such medicinal plants and where in Tanzania were affected with climatic change. Moreover, from researchers it was learnt that there was lack of awareness, informal knowledge sharing system and inheritance of the practice due to secrecy. Also it was reported that there were absence of inventory of useful plants and specific policy to regulate access and harvesting of medicinal from the wild.

The analysis has shown there were an increasing number of charlatans and quacks on the practice of TRM. These charlatans and quacks focused on difficult disease and conditions like HIV/AIDS, cancers, asthma and diabetes. Some of these charlatans and quacks had come with formulations claimed to treat a multiple of diseases with a single concoction but at a high price. “Ngetwa” and “ngoka” were mentioned as some of the formulations claimed to treat a wide range of diseases. These charlatans and quacks advertised in mass media the remedies used to treat problematic health conditions like AIDS, cancer, pressure, stomach ulcers and diabetes. These malpractices have stigmatized the credibility of honest practitioners of TRM in Tanzania.

The researchers indicated that currently there was increasing

practitioners of alternative medicines in Tanzania such as Chinese Traditional Medicine, Homeopath and Radionic medicine. The alternative medicines and modern medicine were increasing competition to TRM. This challenge has led to influx of unfair competition and hence impoverishing indigenous THPs. In addition, researchers have revealed that there were multinational gene hunters involved in traditional medicine research and bio prospecting. These gene hunters would lead to unfair competition on issues of formal collaboration. They link directly with THPs, instead of mandated linking through Tanzania research institutions. This problem needs to be addressed through collaborative agreements.

The findings also showed that the issue of transmission of indigenous medical knowledge and practice of TRM was in danger. Some of the potential youths to practice TRM were moving to urban centers, boarding schools, higher learning institutions and some of these youths were not interested in the practice of TRM. Others who were expected potential THPs were dying of AIDS and others were already sick. One of THPs remarked during the in-depth interview:

“With this modernization through education some of the potential youths for inheriting the ‘mkoba wa dawa’ (bag of medicine) were not willing. Traditional medicine is going to die. Learning to practice TRM takes longer time and concentration on both on the practice and looking for herbal remedies”.

Above all, it was learnt that there was the depletion of traditional beliefs and taboos that were coined in the practices of TRM. This included ways of collecting herbal plants like when and how to collect and which part of the herbal plant was most effective; how to store the remedy and remain potent for long time; and many others would go away with what was called modernization mainly through education and technological development.

Constraints in developments of traditional medicine

The study also wanted to establish if there were constraints on development of TRM practices with regard to recourse availability. The in-depth interviews showed many constraints on development of TRM and medicinal plants. The major ones were; first, even though THPs were recognized by the Traditional and Alternative Medicine Act 2002, attitude of some doctors and researchers towards TRM and its practitioners as relate to partnership, treatment and care was negative. This created a gap for effective collaboration of the two healthcare systems in the country. Further, despite the big role played by TBAs in child delivery in rural areas where health facilities were limited, TBAs were still considered to be major cause of maternal and infant mortality since they were ignorant on managing maternal health problems. As shown by District Medical Officer in one district of the study areas:

“TBAs kill our wives. I shall allow you to interview THPs but not TBAs because they are killing our wives”.

When asked, how many mothers were killed by TBAs, and why many women go to TBAs for assistance of child delivery. He said,

“We have not carried a research to establish how many but they are killing our wives. The reasons why many pregnant women ask assistance at child delivery from TBAs are the abusive language used by nurses to pregnant women and claiming our services as poor”.

Further traditional medicine had no scientific evidence to offer for general public health care when compared to conventional medicine. Indigenous medical knowledge and technology, like when and how to collect herbal plants, mode of preparation, storage facilities and mode

of treatment of illnesses emphasized in TRM was being associated with the practice of witchcraft. This has led clients of THPs to go for services at odd hours for fear of being seen by other people since it was associated with witchcraft.

Second, despite the unchallenged position of TRM in ensuring healthcare coverage to majority of people, the study showed that little has been done to ensure that TRM was mainstreamed into the formal health care system. In Tanzania, THPs and users of TRM were glad to have policy guidelines and Act of Traditional and alternative health practice Act 2002. The study has shown that THPs have limited knowledge on precaution when preparing administering herbal formulations, including the right dosage per age, and weight and also the contra indication to different categories of clients. Third, it was revealed there were problem of accessing herbal materials from government reserved forests; they had either to have a dialogue with the security officers of the forest or went at odd hours when they could not be seen by security officers. Furthermore, lack of transparency from researchers on herbal remedies collected for scientific investigation was mentioned by THPs and demanded feedback information to healers of whom researchers collected from on medicinal plants.

In addition, the findings have shown there were some constraints regarding funding and laws governing medicinal plants. There were limited funds for conservation, mapping medicinal and aromatic plants. The mapping study would show status of harvested plants and those that were being overexploited or threatened or endangered. As emphasized by one of the respondent

“There are no official reports but anecdotal that shows there are certain endangered/rare or extinct medicinal plants”.

In addition, the study revealed that utilization and access of medicinal plants involved several players that viewed bio-recourses very differently depending on the multiple uses of plants such as timber, firewood, poles and as sources of herbal remedies. There was no single or specific policy and law governing the conservation and management of medicinal plants where THPs got guidance. Management of medicinal plants was covered by policies and laws under various sectors of ministries like Ministry of Natural Resources and Tourism (forest products) and the Ministry of Health and Social Welfare (medicinal plants). Again, there were by-laws from the village governments for conservation of biodiversity. Since there were no legal frameworks specifically on medicinal plants, there were problem to implement the directives from higher authorities regarding medicinal plants by either the THPs or local traditional leaders because they were mixed up.

The analysis has shown there were no centralized guidelines for the access to the bio-resources at the community level particularly to external harvesters including bio-prospectors. Sometimes access permits were issued by high authorities that were unaware or disregard communities' priorities and needs. This gave hard time to local government leaders at village level in conserving the reserved forests. Further, it was learnt there were inadequate human and financial resources for training and induction seminars on traditional and Alternative Medicine Act 2002 and upgrading the practice. Such Training and induction seminars would empower THPs to offer good services to the people. It was found out a lot of research has already been done but results were scattered and not easy to package for immediate access and use. There was a need to have a central pool of research documents for retrieval purposes.

Way forward for development of traditional medicine

The study wanted to know views from the respondents towards future development of TRM and medicinal plants conservation in Tanzania. The findings showed that use of TRM is culturally acceptable and would continue to be used in future because of limited resource for conventional health practices including funds to buy modern drugs and other medical supplies. Regarding the way forward the findings revealed that there should be a deliberate effort to promote the community and local government on TRM participation through sensitization and advocacy. These should focus on the importance of TRM on healthcare; especially in rural areas where conventional health facilities were limited or absent. Second, there was a need to initiate a training course to conventional health practitioners on TRM and medicinal plants so that they know what their counterpart in provision of health care were doing. Also to learn what was best in management of human health problems, and what aspects should start the collaboration as an initial stage. Third, encourage the practitioners of TRM and other interested in medicinal plants conservation to introduce medicinal plants farms or botanical gardens as ex situ conservation. Further develop programs with THPS to establish possible strategies for in situ conservations. Fourth, sensitize community on replacement of trees through planting and establishment of by-laws to protect plants of medicinal value. Fifth, the government should support research on TRM and production of drugs/remedies from MPs especially for diseases that had no cure. The THPs wanted genuine collaboration based on trust, respect, and transparency with researchers and conventional health practitioners. Genuine collaboration would lead to disclosure the secrets of the practice of THPs. Traditional medicine and its practices should not be associated with witchcraft. Finally, the THPs wanted training on elementary knowledge of human body, hygiene, processing of herbal remedies, and storage, establishment of dosage and better ways of record keeping.

Discussion

The collected data have been analyzed and presented. The study shows that medicinal plants and TRM have great prospects in healthcare in Tanzania especially in rural areas where health facilities, medical personnel, drugs and other medical supplies are inadequate. Similar findings in Tanzania have been reported by Mahunnah et al [30], Kitula [41] and Mahongee et al. [42]. Inadequate health facilities, drugs and other medical supplies have been also underscored by the Ministry of Health [37,43]. The prospects of TRM have also been reported in many African countries [13,16,32,33,44,45] as well as other developing countries [2,5,6,46,47]. Utilization of TRM is also noted in countries where conventional medicine is predominant in national health care system [2,10,38,48,49]. The reasons for increasing use of TRM in developed countries is that traditional medicine and medicinal plants are believed to have fewer side effects and comprehensive in health care [45-47] when compared to conventional medicine [46-49]. People are tired of using synthesized conventional drugs and would like to have an alternative cure of their health problems [47-50]. Besides the use of TRM for health care, also the findings has revealed that medicinal plants are potential sources for development of new drugs for diseases that have shown resistance to conventional drugs and chronic diseases like cancer, diabetic and nervous disorders [10,30,38,51]. As reported by Zollman and Vickers [52] placlitaxel drug for cancer is derived from barks of yew tree. Magnolia herbal tree is believed to help to fight cancer, dementia and heart disease [52]. Currently it is being estimated about 25% of modern medicine are descended from plants first used traditionally and then converted to conventional medicine [10,38].

The importance of TRM has been further underscored by WHO [53], Wang [47] and Kunwar et al [54]. Potential herbal plants for drug discovery are likely to be found in Tanzania, one the world of hotspots of plants and animals [24,25]. However, the problem on use of TRM is safety; efficacy and dosage are some of the major concerns that need to be worked out for safe use to human being [6,10,30].

The study has shown TRM is recognized by the Tanzanian government and has established policy guidelines and Traditional and Alternative Medicine Act 2002 with its regulations. Implementers of the Act 2002 with its regulations in Tanzania is the Ministry of Health and Social Welfare through health workers at village to national level, medical schools and health practitioners, planners and political leaders [55,56]. Tanzanian's recognition of TRM is supported by international organization such as WHO, OAU/AU and NEPAD by arguing developing countries to promote TRM and develop policy and legal framework for practicing TRM [6,10,15,16,57]. The establishment of policy on traditional and alternative medicine, and legal framework in various developing countries are legalizing the practice of TRM in these countries [10,57]. It appears there is a political will of legalizing the practice of TRM in developing countries [6,11,15,16,43,58]. But implementation of TRM Act 2002 and its regulations is still a problem in Tanzania, because most of policy implementers are converts of conventional medicine practitioners [43,56]. Some of conventional medicine practitioners are shying away from traditional health practitioners and TRM itself [7,33,59]. Conventional health practitioners associate TRM practitioners with superstition; and hence ignoring the important role played by these practitioners [3]. Interestingly some of these conventional health practitioners who are shying away from THPs had likely used TRM when young and were attended by TBAs at delivery because there were no conventional health facilities. It was expected these conventional health practitioners would be proactive to search from THPs medical knowledge on healthcare and improve their level of practice because they are their counterpart in provision of healthcare in developing countries.

Besides the above, the findings have shown that funds for research and development of TRM are limited when compared to conventional medicine [30,39]. Most research institutions on TRM rely on donor money whose projects are donor driven [30,39]. Most of these researches are fulfilling the interest of the donor and not priority of nation like conserving and mapping medicinal plants in a given country or searching for rare and endangered species [30,39]. The need of the research funds from the national governments is crucial now in order to come up with drugs for chronic diseases like HIV/AIDS, cancer, diabetes and new drugs for resistant diseases. Further, there is a need of drugs for priority diseases affecting many people like malaria and infants diseases/illnesses. Governments have to acknowledge the call of African Union: 2nd Ordinary Session of the Conference of African Ministers of Health (camh2), held Gaborone in Botswana, 10-14 October of promoting traditional medicine [16]. Conventional drugs are increasingly expensive every day and most developing countries cannot afford [18].

Even though TRM and medicinal plants have great opportunities; the present study has shown to be facing challenges as objects and their practitioners. The major challenges shown in this study are threats of depletion of medicinal plants as an impact of population increase, bush fires and over exploitation of some species. Depletion of medicinal plants in Tanzania has been reported by other studies by pointing finger to road and railway construction, mining urbanization, over exploitation by bio piracy, bio prospecting, bush fires and climatic

change [30,39]. For instance, in Tanzania “kizulu” (sandalwood or *Osyris lanceolata*) in the Upare lands is almost extinguished [30]. A branch of CHAWATIATA which is a Traditional Health Practitioners Association in Tanzania, in Arusha reported “*Mvule*” (*Milicia Excelsa*) is heavily harvested in Arusha and Mtwara regions [30,39]. These threats have also been reported by other studies in Africa as a whole [20,22,60,61] and worldwide [62,63]. The problem, however, is the yard stick to establish the impact of climate change, bio piracy, bio prospecting and their effect on medicinal plants as major problems to attract attention of key stakeholders. This requires systematic study that will take all key parameters to establish each and its magnitude to effect the availability and accessibility of herbal plants. There are efforts to control the threats shown in this study are being made by THPs through conserving natural resources both in-situ and ex situ by establishing gardens and farms at small scale; similarly by the government through Ministry of Natural Resources and Tourism and village governments [24,25,30]. This strategy is underscored by OAU/AU summit that declared a decade (2001-2010) [58,64] for African Traditional Medicine. The summit called upon African governments to acknowledge and build upon the traditional medical knowledge and plant based resource in order to make the goal of health for all easier to achieve by mobilizing and using these resources more effectively [58]. Also, the New Partnership for Africa’s Development (NEPAD) [64] calls for encouraging cooperation between medical doctors and THPs and ensuring indigenous knowledge in Africa is protected through appropriate means.

Furthermore, another challenge is the constraint on to control and conserves natural resources. There is lack of data on resources that show the magnitude of medicinal plants which are seriously threatened or facing extinction. Similar findings in Tanzania were reported in the National Stakeholder’s Workshop for the Network on Medicinal Plants and Traditional Medicine, Eastern Africa [39], National Stakeholder’s Workshop on Traditional Medicine and Medicinal Plants [65] and Kayombo [12]. The problem of threats or extinction of medicinal plants might be there as reported, but needs to be established scientifically with figures. This problem might be existing in other developing countries as well because there are little isolated cases of information that show some plants are threatened or facing extinction on literature reviewed but not systematically documented [61-63]. Lack of funds for scaling up research on natural resources as cited in this study are a loud cry to other developing countries [12,39,65]. To improve healthcare in rural areas, funding for assessing the natural resources for healthcare is necessary for conserving both in-situ and ex situ on potential medicinal plants. This could go along with mobilization with THPs and other stakeholders interested on medicinal plants to have gardens and medicinal plant farms.

As reported from literature review, conflicting regulations and guidelines about utilization of the natural resources has featured in this study. The problem arises because mandate on natural resources are found in different sectoral Ministries in Tanzania that have different views on uses of medicinal plants. Thus there is no wonder to find that THPs are denied to enter in the reserved areas as reported in this study. The present findings are underscored by other studies in Tanzania [12,30,39,65] and other developing countries [66]. All these pose challenges for medicinal plants which is the main resources base of TRM [30,64,65]; and need to be tackled for sustainable development of medicinal plants and TRM both for domestic and economic growth as argued by AU [66].

Another concern shown in this study is the secrecy of THPs on

medical knowledge of TRM. This has been a loud cry from many researchers and medical doctors [30,43,64]. It has to be noted that in Africa TRM medical knowledge is not a property of the individual [31,66]. It is the ancestors, family/community property [31,66]. Traditional health practitioners are only the custodians and median of TRM guided with socio-cultural beliefs and taboos of the community [31,34,66]. It is also to be seen as a way of protecting the indigenous medical knowledge for the community not to be abused by an intruder [31,33,66]. To tackle some of the constraints of TRM and medicinal plants effective control of bio-resources at the community level, bio-prospectors should involve local people /village environmental committee and forest experts in the area where bio-prospectors need to operate by taking into account beliefs and taboos traditionally used to conserve TRM and medicinal plants [12,33,66]. In addition, all key players should be coordinated and have a common plan for conserving natural resources and ironing out differences from different sectors involved in plants conservation. This could be achieved by regular meetings all key players of environmental conservation. Mutual trust, transparency and respect, among other things, should be adhered by all parties.

Potential measures for scaling up protection and conserving of the medicinal plants and TRM in this study has been suggested. These strategies might come with sustainable development of TRM and medicinal plants that can lead to development of drugs and discovery of new drugs for resistant and chronic diseases. Literature reviewed has shown some countries worldwide which are already involved in trade of herbal pharmaceutical products like India, Korea, and China [39,56,57]. Tanzania is one of the importers of herbal drugs and plant derived pharmaceuticals from India and Korea [46,58]. But, these drugs could as well be produced in Tanzania and immensely boost local economies by limiting importation and creating exports for pharmaceuticals companies [30]. There is already an indication of high demand of extracts of some plants which grow in Tanzania, like *Prunus africana*, *Moringa oleifera* and *Withania somnifera* [30,39]. Apart from International markets, these extracts may be sold and used locally [30,39]. The major challenge is willingness and dedication of scaling up of conserving natural resources from policy implementers and involving participation of all community key stakeholders. This calls for a well coordinated programme. Each stakeholder should see conservation of the natural resources as must and a responsibility for betterment of the present and future population. In the conflicting laws and regulations in government sectors, the authorities concerned should sit down, go through the regulations and iron out differences. There is also a need to put efforts to all key stakeholders together to promote the conservation and sustainable, safe and effective use of medicinal plants and herbal products as well as integration of TRM in public health care services. Developing countries have begun to realize that their current health system are dependent upon technologies and imported medicine that end up being expensive and whose supply is erratic [8,9,11,56]. Such efforts will be of interest to developing countries especially south of the Sahara, and should address the respective national poverty reduction strategies and development visions.

Conclusion

Even though traditional medicine and medicinal plants are still having great prospects in the present competitive healthcare system, the identified challenges like threats, constraints in this study and those reviewed should be addressed in order to ensure their sustainable development especially in developing countries. The latter cannot run away from the THPs and TRM including medicinal plants. As shown

in the findings and reviewed literature, currently there are inadequate human resource in the health sector in Tanzania and other developing countries; including limited health facilities and medical supplies for healthcare of the people. There is political will of scaling up TRM and conservation of medicinal plants but lack support from policy makers and enforceable legal framework. It is being argued that effort is needed to make the policy makers and implementers to see TRM and medicinal plants in the lens of PHC for better health and wellbeing of the people in the world in order to meet the health millennium goals by 2025.

Acknowledgement

We are grateful to IDRC for funding the study under the Network on Traditional Medicine and Medicinal Plants in Eastern Africa. Director of Institute of Traditional Medicine, the research team and the Network partners are thanked for their support. Special thanks are extended to District Medical Officers and managers of health centers interviewed in this study for their cooperation.

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Citation: Kayombo EJ, Mahunnah RLA, Uiso FC (2013) Prospects and Challenges of Medicinal Plants Conservation and Traditional Medicine in Tanzania. *Anthropol* 1: 108. doi: [10.4172/2332-0915.1000108](https://doi.org/10.4172/2332-0915.1000108)

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